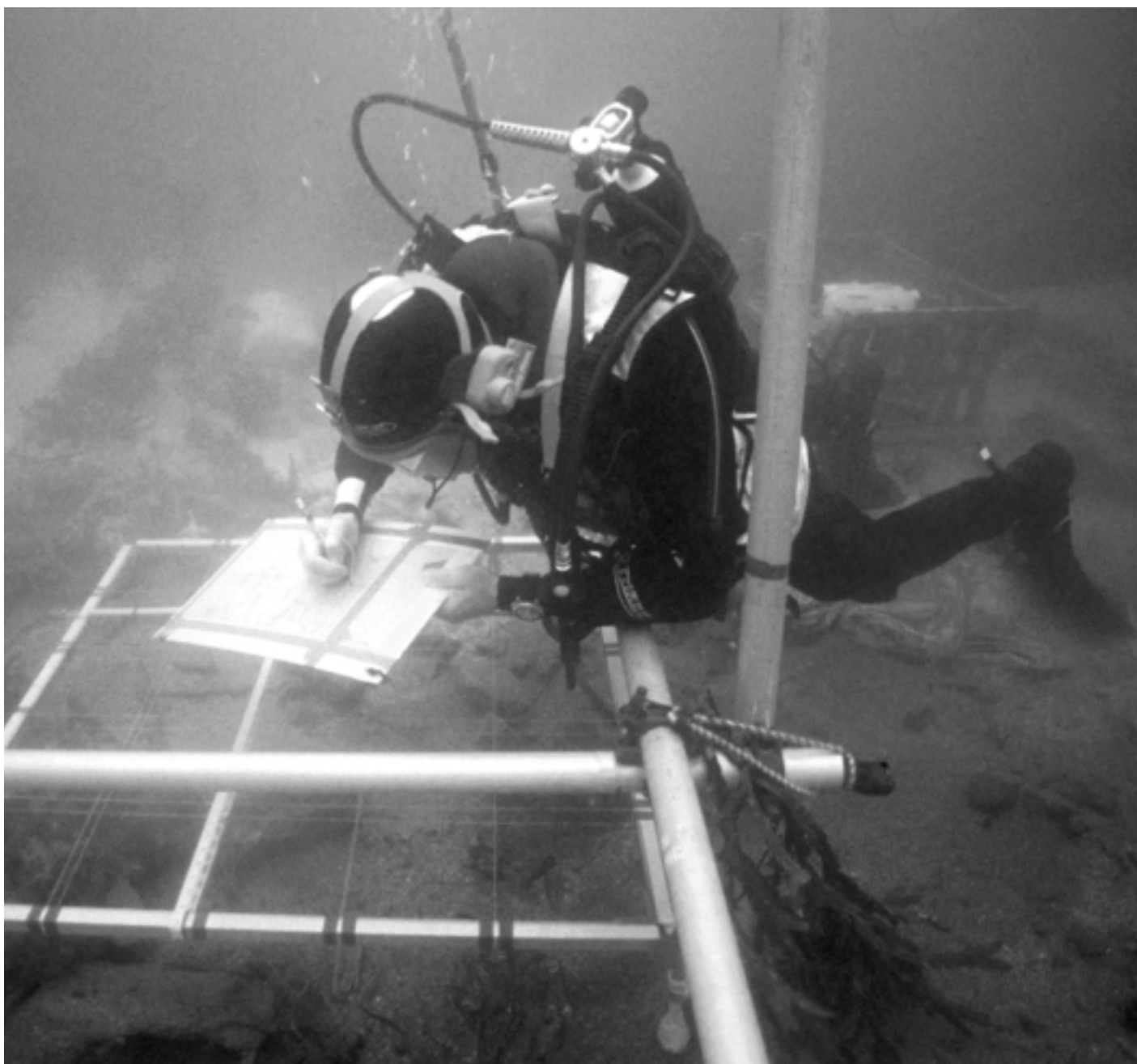


# The marine archaeological resource

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IFA Paper No. 4



Ian Oxley and David O'Regan

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# The marine archaeological resource

## INSTITUTE OF FIELD ARCHAEOLOGISTS PAPER NO. 4

by Ian Oxley and David O'Regan

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## Introduction

Increasing attention is being paid to the archaeological heritage on and beneath the seabed. The aim of this paper is to help familiarise archaeologists with the nature of this resource together with its management, protection and investigation.

Guidance is offered here in order that those archaeologists more conversant with the situation on land can be made aware of the possible methods for approaching and investigating marine sites. It is hoped that other individuals and organisations whose activities and responsibilities relate to and affect the marine archaeological resource will also benefit where appropriate.

The marine zone of the UK can comprise inshore waters, the inter-tidal zone, river estuaries, and a stretch of coastal land influenced by the ocean, which contains an abundant but fragile archaeological resource reflecting the past use of coastal land and sea. Often these historic landscapes can extend seamlessly from land, through the inter-tidal zone and into sub-tidal areas. Thus maritime archaeological resources exist in two different environments; on dry land and underwater. Underwater, maritime or marine archaeology has a broad meaning, often shifting and inter-locking within a specific watery environment and includes a range of sites from shipwrecks and harbours to submerged prehistoric landscapes. Satisfactory and widely accepted definitions of 'marine', 'maritime' and 'underwater' do not exist and often the word 'maritime' is used to provide the broadest coverage and inter-relation with traditional, terrestrial archaeology.

It is essential to consider the 'interconnectedness' of evidence in a holistic way across all the environments. Boundaries or distinctions, such as inland, coastal, foreshore, inter-tidal, and marine, are artificial devices that do not necessarily have any relevance to the present extent of the marine archaeological heritage. In addition, the current limits to the responsibilities of local government (often the mean low water mark) are of historic origin and have little to do with actual limits of the archaeological resource. The diversity and interrelation of archaeological evidence must be recognised as existing as a whole, and any strategy of approach applied to the landscape (and former landscape or 'seabed-scape') must be considered holistically. For example, anchorages and frequently travelled sea lanes can provide a valuable insight into the development of sea traffic and trade over time and may be marked simply by a spread of widely dispersed debris. All aspects of the archaeological environment (prehistoric and historic) must be viewed in an integrated way before they are considered as independent components.

While the practice of underwater or marine archaeology

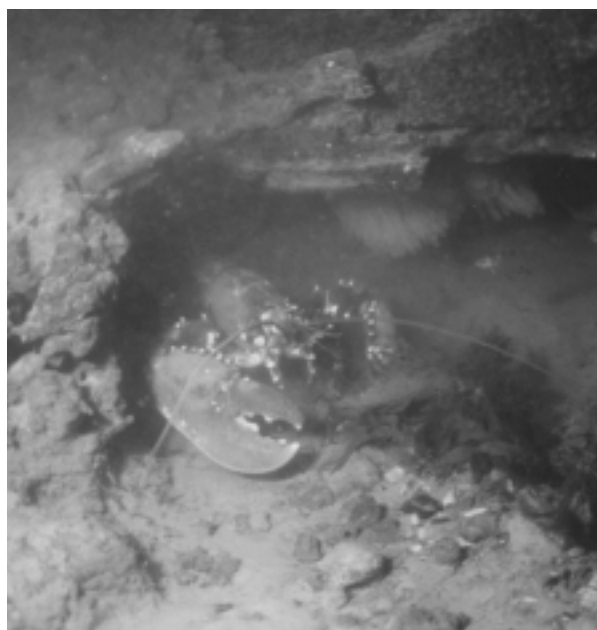
employs similar procedures and approaches as on land, its management differs substantially. Presently no integrated statutory or development controls exist that are sympathetic to the marine archaeological heritage in its entirety.

It must be stressed that although there are clearly differences between the nature of the archaeological resource on land and that under the sea there should be no differences in the approach to the investigation, protection and management of what are essentially parts of the same resource. The current variations in treatment and management result from the separate development of different sectors of the disciplines of archaeology and heritage management. Hopefully, in the near future the management of the marine resource will be fully integrated into archaeological management and practice as a whole.

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## Background

Marine archaeological environments are especially vulnerable to impacts as their preservation is dependent upon poorly understood (compared to terrestrial environments) biological, physical and chemical processes (see Fig 1). Further information can be found in Ferrari and Adams (1990), Oxley (1992) and Gregory (1996) and see also Fulford *et al* (1997).



*Figure 1 The effects of burrowing fauna on the submerged marine archaeological resource: a lobster adjacent to prehistoric timber and worked flints (Momber 2000) (Gary Momber, Hampshire and Wight Trust for Maritime Archaeology).*

Although there are many potentially destructive forces, complementary interests can aid in the protection and enhancement of the marine archaeological heritage. There is a growing number of coast edge and inter-tidal archaeological initiatives that recognise the importance of submerged remains. These concerns (and those of wildlife and nature conservation, recreation and tourism, industry, commerce) will all benefit from increased co-operation at as early a stage as possible. Moreover, it is important to accept the legitimate and necessary uses of the sea and the impossibility of completely eliminating the impacts.

## Development of maritime archaeology in the UK

Maritime archaeology is a relatively new discipline and its general history can be found in texts such as Dean *et al* (1995), Green (1990), Babits and Van Tilburg (1998) and the *International Journal of Nautical Archaeology*. The uncontrolled digging on wreck sites in the late 1960s and early 1970s prompted the enactment of the Protection of Wrecks Act 1973 and marked the beginnings of modern maritime archaeology in the UK (Baldwin 1994). In the 1970s licensed excavations took place on designated historic wreck sites to varying standards ranging from large, organised projects culminating in the raising of the remains of the *Mary Rose*, to small, long-running, amateur excavations. Most of the latter sites remain essentially unpublished. Furthermore, it is arguable that the former large projects are probably unrepeatable due to the changed economic situation. The approach in the mid to late 1980s involved less intrusive investigations on a much smaller scale, with no intention to recover hull structures or large numbers of artefacts with their attendant conservation implications (Watson and Gale 1990).

In the 1990s a different philosophy has emerged. Rather than excavation being the principal activity with the public forming the main audience, now the conservation ethic is established with much more pre-disturbance or non-intrusive survey work taking place. At the same time there is greater involvement by marine archaeologists in the development of the discipline and a steady integration of maritime archaeology into field archaeology as a whole (Oxley 1996, Firth 1997).

An important lobby group, the Joint Nautical Archaeology Policy Committee has published *Heritage at sea* (JNAPC 1989) and *Still at sea* (JNAPC 1993). Both documents identified key areas for improvement, such as the extension of the areas of responsibility of English Heritage and all the Royal Commissions to include territorial waters, as well as stressing the need for better information to be available on the nature and extent of marine archaeological heritage to inform planning decisions. An additional important initiative has been

the production of a *Code of Practice for Seabed Developers* (JNAPC 1995), sponsored by substantial industrial concerns, which promotes early contact between the archaeological community and developers.

Despite these advances it has proved remarkably difficult to break down commonly held misconceptions such as

- ‘fortunes’ can be made by exploiting ‘treasure’ ships under the sea – a mistake which can be soundly refuted (Von der Porten 1994)
- the (erroneous) belief that ‘finders-keepers’ applies underwater (see below ‘**Historic** wreck’)
- that it is somehow brave and courageous to go diving and that anyone who does so deserves to profit from what they find

On the positive side we have seen examples of a steady ‘creeping down the foreshore into the sea’ of terrestrial archaeologists. Useful examples of this growing integration include the Langstone Harbour Project which advocates a ‘seamless’ approach to survey on land, in the inter-tidal zone and underwater (Allen *et al* 1993, Allen and Gardiner 2000), the recovery of the medieval Magor Pill boat (Nayling 1998), and the archaeological audit of the Fal Estuary (Ratcliffe, 1997).

However, amongst the public as a whole, and to a certain extent within the archaeological community, there remains widespread ignorance of, and misconceptions about, archaeology underwater. It is not unusual to confront the view that archaeology cannot be effectively carried out underwater. In a sense there still remains a time-lag in this country (in contrast to many parts of the world) in the integration of submerged archaeology into field archaeology in general. For example, in parts of mainland Europe an increasing number of examples of the routine application of scientific archaeological techniques to material derived from marine or nautical archaeological projects can be found (Robinson and Aaby 1994). Such projects are not regarded as exotic or fundamentally different from land archaeology in any way.

Another contentious area is the steadily opening up of previously inaccessible areas of the seabed to those with the technology and funds to reach them. These deep-sea environments, normally in international waters, are largely unregulated (see **International initiatives** below) and many issues of ownership, appropriate behaviour and environmental responsibility arise (Goodheart 1999). However, important archaeological research is also being carried out in such challenging environments (Ballard *et al* 2000).

Other current trends include a steady growth in development-led maritime and coastal archaeology which, as well as hopefully coping with the increasing exploitation

of inter-tidal and marine zones, is also contributing to our overall understanding of the archaeological potential of such areas (Firth 2000).

## Character of the marine archaeological resource

The relative levels of land and sea have not been static in the past, and they are changing even today. During the Ice Ages, the sea level was lowered by as much as 140m, as thousands of millions of litres of water became locked up as ice. As a result many new lands were opened up that do not exist today. Once the sea levels rose again, evidence of human activity was submerged and preserved under the advancing waters (Coles 2000). Sites, which are now in inter-tidal areas or underwater, may once have been many miles from the sea. In the past people lived in valleys which have now become estuaries and on hills which now form shallow areas of seabed. Evidence of former human activity can be direct, in the form of artefacts or structures, or indirect as information recovered from palaeo-environmental deposits (Fulford *et al* 1997).

The character of the marine resource includes single artefacts, inundated earthworks and midden sites, as well as shipwrecks, ancient harbours and submerged villages, with an age range stretching from prehistoric hunter-gatherer sites, to historic towns of the sixteenth and seventeenth century, through to modern times. Archaeological evidence also includes palaeoenvironments (submerged landscapes and/or sedimentary contexts containing environmental evidence) to a coastal zone affected by harbour, waterfront and coastal engineering works (Tomalin 1998, Momber 2000). Other remains include jetties, slipways, breakwaters, and evidence of maintained channels. Information can also be found of activities, which straddled the shoreline such as fish traps, weirs and saltworks. Most importantly, underwater sites have implications beyond the water environment into social, technological and environmental factors both on land and at sea (Heritage Coast Forum 1993). Continuing sea level changes, land subsidence, erosion and human error claim more areas of former human occupation and activity every year. An example of the dynamic nature of the marine environment and the potential for major impacts is the wrecking of the tanker *Braer* in Shetland waters in 1993.

In common with terrestrial environments there will be very few areas of the seabed or coastal zone that have not been affected by human activities. Coastlines, river courses and harbour works are direct signs of modification, whereas particular coastal habitats and sedimentation patterns also result from present-day and earlier human alteration of the environment. As such there will be numerous ways in which evidence of the past can be gained from

study of marine and underwater environments not least because preservation of archaeological materials in these environments is generally better than on most terrestrial sites (Coles 1987).

### Background to the marine archaeological resource: summary

- **Level of awareness** – Widespread ignorance of the range, extent, vulnerability, significance and potential of the marine archaeological resource.
- **Character** – Single, isolated finds to structures ranging from jetties to harbours; shipwrecks, palaeo-environmental deposits.
- **Visibility** – Essentially hidden to the majority of the population because it is submerged.
- **Threats** – A wide range of impacts (of both natural and human origin) threaten the existence and integrity of the marine archaeological resource.

## Visibility of archaeological material underwater

As on land the visibility of archaeological material on the seabed varies from immediately recognisable structures to imperceptible 'humps and bumps', possibly of archaeological interest, to invisible remains buried deep beneath the seabed. A significant factor which is less frequently encountered on land is the mobile nature of the sedimentary materials (sands, silts and muds) which cover much of the seabed. Currents, waves and tides alter the structure of the seabed, moving sediment from one position to another. Often such movement may be cyclical with significant amounts of material being moved, perhaps during a storm, then replaced through natural sedimentation during later calmer periods.

Such seabed movement may simply bury and expose archaeological materials making them visible during one time of year and invisible at another. In contrast, in many areas of the marine environment, particularly estuaries, archaeological remains permanently lie deeply buried and are not obvious from the surface of the sea or the seabed.

## Effect of human activities disturbing marine archaeological environments

The marine environment is comprised of seawater and sediment moved by waves, currents and tides. The combination of seawater and sediment provides excellent burial environments for the preservation of archaeological material. These marine environments exist because of the interaction of many factors. Archaeological material

Table 1 Range of development activities in relation to the process and zone (Firth 1993)

	INLAND	COASTAL	MARINE
<b>Extraction</b>	Alterations to water courses	Maintenance dredging	Aggregate extraction
<b>Construction</b>	Bridges	Marinas, fish farms, port facilities	Offshore installations
<b>Linear developments</b>	Cable-laying	Outfalls	Pipelines, trenching
<b>Shoreline</b>	Embankments	Coastal defences	
<b>Diffuse activities</b>	Boat wash	Anchoring, recreational diving	Trawling, dumping, commercial salvage

remains are preserved because of the fragile balance of a complex variety of chemical, physical and biological processes which combine to produce specific environmental characteristics in particular areas. Continued preservation of archaeological remains depends on the environment staying in relative equilibrium. Upsetting the balance, including the simple exposure of previously buried archaeological remains, can have a catastrophic effect (Martin 1995).

There are few spheres of human activity which do not, even indirectly, change or impact the natural environment. Human activities at the coast and on the seabed may interrupt currents and tidal systems and their accompanying natural sediment regimes, resulting in significant alteration to marine environments. Table 1 illustrates the range of activities in relation to the development process (extraction etc) and zone (inland, coastal, marine).

In general, coast defence structures reduce coastal erosion through the construction of walls and other fabrications, or promote accretion of sediments on the coast by 'trap' mechanisms. Such devices reduce sediment load within the water column and so areas down-current may suffer increased erosion. Offshore areas may also be deprived of sediments essential for the maintenance of marine environments, eg sandbars. Piers, wharves and breakwaters may have a similar effect.

Marine aggregate dredging involves the removal of large amounts of sand and gravel from offshore areas, often involving millions of tons annually. Such processes inevitably alter marine environments with an, as yet, unquantified effect on archaeological material. Impacts (that can also occur at significant distances from the original development) may be:

- physical, causing the exposure of artefacts and structures,

- chemical, due to changes in the nature of the environment,
- biological, altering the balance of fouling organisms which colonise upstanding features on the seabed.

Such phenomena may also occur at significant distances from the original development.

Trawling, which involves dragging large, heavy gear over the seabed, often results in the penetration of the seabed surface and will consequently damage archaeological material located on or near the sediment surface. It is fairly common for archaeological material to be found in trawl nets (Tomalin 1998).



## Management

The current planning and management framework of the coastal and marine zones is characterised by the number of organisations with powers or responsibilities (NCEAG 1993).

### Organisations involved in the management of the maritime zone: summary

- landowners
- port and harbour authorities
- Crown Estate Commissioners
- regional water companies
- Environment Agency
- over twenty government departments and agencies
- county, district and metropolitan local authorities

The complexities of the management of coastal and offshore areas are such that it would be impossible to present a full picture within the confines of this paper. A review of coastal management and the division of powers and responsibilities among the many bodies is given in *Coastal Planning and Management: a Review* (Department of the Environment 1993); Firth (1993). Fulford *et al* (1997) describe submerged archaeological remains and their place in the management of the coast and offshore areas. Presented below is a brief introduction to some of the responsibilities of a number of authorities at the coast.

The Department for Culture, Media and Sport (DCMS) takes responsibility for maritime archaeology in England but limits its involvement to hosting the management of the Protection of Wrecks Act, 1973 (see below). In Scotland and Wales the respective heritage organisations, Historic

Scotland and Cadw, take responsibility for all submerged remains. Likewise the Environment and Heritage Service, an executive agency within the Department of Environment (NI), undertakes responsibility for submerged archaeology in Northern Ireland waters.

Therefore, an anomalous situation remains in English waters where no organisation has primary responsibility for archaeology below the mean low water mark. This unfortunate accident of history, which has its origins in the original restricted remit of English Heritage, is being addressed (English Heritage 1999) and primary legislation is currently (2001) going through Parliament to give English Heritage front-line responsibility for the management of marine archaeology in England's waters.

### Government departments responsible for near and offshore areas

The Department of the Environment, Transport and the Regions (DETR) has responsibility for designating Marine Nature Reserves and Special Protection Areas (for bird habitat preservation). It also co-ordinates the Government view procedure that are used to determine whether marine aggregate exploitation can take place below the mean low water mark (see below, **Government View**) and oil and gas extraction. The DETR administers the provisions of the Merchant Shipping Act 1894 which applies to ownership, salvage and the reporting of material removed from the seabed in UK territorial waters (see 'Ownership of Wreck' below). The Department of Trade and Industry has responsibility for the licensing of oil and gas exploration, appraisal and development. Such licensing includes requirements for Environmental Assessments and relates to the archaeological resources.

The jurisdiction of local planning authorities usually ends at the mean low-water mark. However, local authorities do have control over inland waters and some areas below the low-water mark (eg estuaries and enclosed bodies of water such as harbours) as if they were land under the planning system (see Firth 1993).

The Crown Estates Commissioners (CEC) are responsible for not only maintaining but also enhancing the value of the Crown Estate, which includes the seabed out to the 12 nautical mile territorial limit, having regard to requirements of good management. The CEC's role in the maritime aggregate industry is restricted to issuing licences to operators, following a favourable Government view. In addition, along with the DoE, it is responsible for determining the need for Environmental Assessments in advance of development proposals.

Local authorities or private companies may control the harbour authorities. Their powers may extend below the

low-water mark and include many by-laws to control movement of vessels, fishing and navigation within harbour waters. In executing their responsibilities harbour authorities must take into consideration the maintenance of the natural and built environment which may include archaeological material.

The Environment Agency, a non-departmental public body sponsored by the DETR, has a wide range of responsibilities in the coastal zone of England and Wales including supervision of all matters relating to flood defence. The Agency actively considers archaeological implications in the carrying out of its duties and is responsible for conserving archaeological features and buildings of historic interest on land that it owns. The Scottish Environment Protection Agency is responsible for the protection of the environment in Scotland.

### Boundaries

Legal jurisdiction overlaps in the inter-tidal area as mean low water is often used to define the seaward extent of land, and high water can mark the landward extent of the sea. Problems of jurisdiction may arise in areas such as poorly surveyed shelving beaches or large tidal ranges because boundaries are based on average, rather than extreme tides (Firth 1993). Boundaries are often designated in terms of changes in environment such as wet or dry, depth, extent of climatic influence. The 'coastal' zone has been defined as the area from high water to a point inland where there is no longer a direct relationship with the sea (be it marine activity or threat of erosion); 'inter-tidal' is the area between high-water and low-water marks and 'sub-tidal' means the area from low water to the boundary of territorial waters (12 nautical miles).

### Traditional rights

There are strong traditional rights covering many uses of the sea such as fishing, navigation, bait-digging, cockling and freedom of access. Unless these rights have been removed by legislation, they can only be regulated through by-laws confirmed by the appropriate Secretary of State. Consequently the existence of traditional rights is an important consideration in achieving conservation objectives in the coastal zone.

### Ownership

Ownership of material lost at sea rests with the original owners unless it can be shown that it has been abandoned (see below **Merchant Shipping Act 1995**). In terms of ownership of the seabed about half of the UK foreshore and almost the entire seabed out to the UK territorial



limit is managed by the Crown and rights to the mineral resources are administered by the Crown Estates. Numerous wrecks still have current owners. Either ownership resides in the Crown, as in ships that were in government service prior to their loss or rights have been acquired by successive institutions (eg insurance companies) or individuals. The State maintains rights of ownership over some historic wrecks through the MoD but the State does not assume ownership of archaeological remains underwater. The discovery of a wreck, or any other archaeological material, does not have to be reported by law unless it is raised from the seabed and brought ashore, when the Merchant Shipping Act of 1995 would apply.

### International initiatives

A draft *Convention on the Protection of the Underwater Cultural Heritage* is currently under development through UNESCO (Srong 1999). The aim is to clarify and address inconsistencies in the treatment of the cultural heritage in the various marine zones ie internal waters, territorial seas, Exclusive Economic Zones, continental shelf, and the seabed beneath the high seas. Contentious issues include the rights and responsibilities of coastal states, the laws of salvage and the rights of ownership, and the management of the cultural heritage in deep, international waters.

Another important initiative (which is included in the draft UN *Convention* as an annex) is the *Charter on the Protection and Management of Underwater Cultural Heritage* developed by the International Council for Monuments and Sites (ICOMOS 1998). The *Charter* covers matters such as archaeological research design, funding, the scientific objectives, methodology and techniques of investigation, qualifications of the researchers, collaboration, safety, reporting and deposition of archives.

#### Management of the marine archaeological resource: summary

- A large number of organisations are involved in the planning and management framework of marine archaeology
- Many Government Departments have responsibilities in marine areas and activities
- Many interests and activities have different administrative boundaries such as the low water mark or 12 nautical miles from shore
- Numerous traditional rights exist such as freedom of navigation or access
- Ownership of objects found in the sea rests with the original owners unless it has been abandoned
- Initiatives are increasingly required to be integrated on a European or International basis.

Other developments in the international context include recommendations for the acquisition policy for the International Congress of Maritime Museums to limit the market and trade in objects recovered in an unacceptable manner and suggestions for underwater sites (including shipwrecks) which may be eligible for World Heritage Listing (Henderson 1994).

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## Inventories of maritime sites

A number of counties and regions in the UK (and other planning authorities that operate on a regional basis, National Parks) maintain up-to-date Maritime Sites and Monuments Records (MSMRs) often as a part of the established Sites and Monuments Records (SMR). By having as complete a record as possible of such sites it is possible to make informed archaeological management decisions when reviewing development proposals.

### National inventories

English Heritage (EH) and revised Royal Warrants of the Royal Commission on the Ancient and Historical Monuments in Scotland (RCAHMS), and Royal Commission on the Ancient and Historical Monuments in Wales (RCAHMW), confirm the extension of their responsibilities to include ancient and historical monuments and constructions in, on or under the seabed within the UK territorial sea adjacent to England, Wales and Scotland. The Environment and Heritage Service (EHS) has taken on equivalent responsibilities for Northern Ireland

English Heritage, RCAHMS and RCAHMW have each established a Maritime Record, which forms part of the National Monuments Record (NMR), providing an inventory of maritime sites including shipwrecks and areas of archaeological importance within a coastal limit of twelve nautical miles and with a cut-off date of 1945. Northern Ireland has a well-established SMR for recording sites on land but before 1993 had no equivalent record for maritime sites. To provide a record of maritime site the EHS set up the Maritime Archaeology Project (MAP) in October of 1993 that aims to create a database of all underwater archaeological sites in Northern Ireland's coastal waters (Breen 1996).

### Local inventories

Maritime SMRs have been established in some English counties and at least two Scottish regions (Fife and

Highland). These records aim to complement the land records and provide a more complete inventory of the archaeological resources of the area concerned. However, local SMRs should not be considered a complete record of submerged sites at this time.

Other individual projects have enhanced the records for specific areas. Cleveland County Council, North Yorkshire County Council, and North York Moors National Park recently completed a study, funded by the RCHME (now EH), of a section of coast stretching from Seaham (County Durham) to Whitby (North Yorkshire). The objectives of the project were to:

- identify and access sources of data at a local level
- enhance data in the SMRs and EH's Maritime Record
- contribute towards the development of compilation and enhancement methodologies of inventories in the marine zone
- raise the awareness of marine archaeology in the northeast

The project identified 2243 potential archaeological sites and contacted 194 individuals and organisations. It also significantly increased public awareness of the local submerged archaeological resource (Buglass 1994).

The Maritime Fife project (funded by Fife Council, Historic Scotland and RCAHMS) has significantly enhanced the Fife SMR and Scotland's NMRS. This has been achieved by carrying out archaeological audits of the coast edge and inter-tidal zones, and compiling records of shipwrecks situated in Fife's coastal waters (Oxley 2001).

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## Legislation

### Scheduling or protection of sites

Archaeological sites of any type underwater in the UK are *not* protected unless there has been a specific legal order of protection. Although there are relatively few pieces of legislation with direct relevance to archaeology underwater, their interrelationships are often complex, misunderstood and subject to variations in interpretation. Separate legislation is currently applied to shipwreck sites thought to be of significance and there is no provision for the comprehensive portable antiquities legislation that has equal application regardless of the environment in which the find was made.

Recognising the inconsistencies in the current situation the Joint Nautical Archaeology Policy Committee has published a set of proposals for legislative change aimed at securing the protection of the underwater cultural heritage (JNAPC 2000a). A summary of the application and implications of various pieces of legislation applied to the submerged cultural resource follows.

### Merchant Shipping Act 1995

'Wreck' recovered from the sea and other tidal waters (including material of archaeological and historic value) is subject to the provisions of the Merchant Shipping Act 1995 (Receiver of Wreck 1994). 'Wreck' includes a ship, aircraft, or hovercraft, parts of these, their cargo and equipment. The Receiver of Wreck, located within the Maritime and Coastguard Agency, is responsible for the administration of the Act on the behalf of the Department of Transport, Environment and the Regions. All recovered material must be reported to the Receiver who will then determine if it can be considered as wreck or not. This requirement includes material recovered from sites designated under the Protection of Wreck Act 1973 (see below). The Receiver will investigate ownership of wreck items and the owner has one year to come forward and prove title to the property. During this statutory period the finder may be allowed to hold the material on behalf of the Receiver. The Receiver must be satisfied that the finder has sufficient expertise and resources to provide adequate conservation treatment to ensure that the material does not deteriorate.

### 'Historic' wreck

Parts of the Merchant Shipping Act were designed specifically to control problems relating to the salvage of commercial material and to protect the rights of owners whose property was lost at sea or wrecked on the coast of the UK.

The system still requires that items be raised from the seabed. In the past this has served to encourage uncontrolled disturbance of burial environments of sites. The obligation to report to the Receiver comes as a requirement of salvage, as all objects recovered from the sea had an owner when they were lost. If nothing is recovered there is no requirement to report the location of the wreck. Thus the Act does not provide for the reporting of archaeological remains *per se*, nor for their preservation *in situ*, and it does not cover inland waters.

Wreck recovered from within UK waters which remains unclaimed at the end of the one-year statutory period, becomes the property of the Crown and the Receiver of Wreck is required to dispose of it. This may be through

sale or auction, although in many instances the finder will be allowed to keep items of unclaimed wreck in place of a salvage award. The latter is normally the market value of the object. The Receiver of Wreck is committed to try, wherever practical, to offer items of historic wreck to institutions where they will remain accessible to the public (eg registered museums).

New reporting systems for marine finds developed on a local or regional basis should include notifying the Receiver of finds so that all legal requirements are complied with. This should also help to engender good communication links between the Receiver and the local archaeological expertise (Allen 1995).

#### Reporting of maritime finds: summary

- inform Receiver of Wreck
- notify National Monuments Record
- notify local Sites and Monuments Record
- notify local archaeologist

### Protection of Wrecks Act 1973

The Protection of Wrecks Act 1973 is administered by the Secretary of State for Department for Culture, Media and Sport (DCMS), but advice is supplied by the Home Country heritage bodies on designations in those countries.

Under this Act wreck sites of archaeological, historical or artistic interest are designated and a restricted area around the wreck established where activities such as diving, excavation, deposition of materials, and salvage are prohibited, except where a licence is issued (with appropriate restrictions) by the DCMS, Historic Scotland or Cadw. Advice on designation is provided by the Advisory Committee on Historic Wreck Sites (ACHWS), a non-governmental body composed of individuals with interests and expertise in the marine zone. DCMS provides secretarial support to the ACHWS, who only advise on application presented to them and therefore sites which merit protection may not necessarily come to the attention of the Committee.

Technical support for the implementation of the Act is currently provided under contract to the DCMS by the Archaeological Diving Unit (ADU) based in the University of St Andrews (see below **Appendix 1**). The functions of the ADU include:

- The investigation and assessment of new sites proposed for designation under the Act
- The monitoring of survey and excavation work

- carried out under license on existing designated sites
- Advising existing licensees and advising archaeologists
- The assessment of threats (human and natural) to existing designated sites

Once designated an entry is published in *Notices to Mariners* (marine advice notes produced regularly by the Hydrographic Office) and the designated area is marked on Admiralty charts (subject to periodic revision). Some sites, situated close to shore, have notices warning of the restricted area placed nearby. Offshore sites may be marked with an historic wreck buoy.

There is no specific age limit for designating a wreck nor any reference in the Act to 'national' importance but the sites must be located within the 12 mile territorial limit and in tidal waters. Currently most of the designated wrecks are post-medieval with the majority located in the south and southwest of England. There are at present 49 designated historic wreck sites (see Fig 2 and Table 2), six in Scotland, five in Wales, 37 in England and one in Northern Ireland. This distribution reflects historically favoured areas for sport diving rather more than maritime activity in the past.

The discovery of any new wreck sites should always be reported to the DCMS, Historic Scotland, Cadw or the Environment and Heritage Service depending upon its location or to the ADU, so that appropriate action can be taken to assess whether the site is of archaeological, historic or artistic significance. The information should also be sent to the relevant local SMR *and* national monuments inventory.

Further information about the location of designated historic wreck sites and the forms required for applications to survey, excavate or designate new sites under the Act can be obtained from the organisations listed above (see below **Appendix 1**). A guide to the designated historic wreck sites is published by the ADU on the World Wide Web URL <http://www.st-and.ac.uk/institutes/sims/Adu/deswreck.html> (Archaeological Diving Unit 1998). Advice for prospective licensees and archaeological advisors (Dean *et al* 2000) can also be downloaded from <http://www.adu.org.uk>.

### The Historic Monuments and Archaeological Objects (NI) Order 1995

This order extends legal protection to archaeological sites and objects below the high-water mark and on the seabed. Under this legislation, sites can be scheduled on land and the seabed to 12 nautical miles offshore. A number of sites in the inter-tidal zone in Strangford Lough have recently been scheduled under this order.

## Ancient Monuments and Archaeological Areas Act 1979

The Ancient Monuments and Archaeological Areas Act 1979 can be applied within UK territorial waters as it contains a general provision for the scheduling of monuments in the territorial sea and it also refers specifically to vessels. The only wholly submerged sites to have been scheduled in the UK (protected as recently as May 2001) are the seven remaining warships from the German High Seas Fleet scuttled in Scapa Flow after WWI. As part of their published policy to treat submerged remains in the same way as terrestrial archaeology (Historic Scotland 1999), Historic Scotland have chosen to use the 1979 Act in this case because of the need to maintain and encourage a high level of appropriate access to the sites by the recreational diving community.

## Protection of Military Remains Act 1986

The Protection of Military Remains Act 1986 provides for the protection of the remains of military aircraft and vessels that have crashed, sunk or been stranded and this includes any associated human remains. Wreckage of ships have to be designated as a 'protected place' or as a 'controlled site' by the Secretary of State for Defence. Once designated it is an offence to tamper with, damage, move, remove, unearth or enter such remains. Divers are allowed to visit such sites provided that no damage results. However there are many problems with the 1986 Act and its relation to archaeological and historical remains (Dromgoole 1996). In any event no sites have been designated and there has been recent widespread expression of concern about the behaviour of some recreational divers on some military wreck sites, particularly those which involved the loss of life, the so-called 'war graves'. In response to questions raised in the House of Lords in November 2000, the Parliamentary Under-Secretary for State, MoD, responded by noting the concerns, stating that the MoD is to undertake a review of its policy on military sites.

### Inventories and legislation: summary

- Increasingly national and local SMRs are including records of maritime and marine archaeological sites
- Underwater sites are not automatically protected
- There are many inconsistencies between the relevant Acts of Parliament relating to the submerged heritage
- All recoveries of objects from the sea must be reported to the Receiver of Wreck
- The Protection of Wrecks Act, 1973, is used to control activities in areas of seabed containing wrecks of historic, artistic or archaeological interest

Table 2 List illustrating the type of site designated under the Protection of Wrecks Act 1973. The site numbers refer to the locations shown on Figure 2 (Archaeological Diving Unit, University of St Andrews)

Site No	Name	Date (AD except where shown)	Description	Location
1	Cattewater	1500–1550	armed merchantman	Plymouth
2	Mary Rose	1545	warship	Portsmouth
3	Grace Dieu	1439	warship	Hamble River
4	Amsterdam	1739	Dutch East Indiaman	Hastings
5	Mary	1675	Royal yacht	Anglesey
6	Assurance/Pomone	1738	warships	Isle of Wight
7	Anne	1690	warship	Rye Bay
8	Tearing Ledge	1707	warship	Isles of Scilly
9	Rill Cove	1616?	armed merchantman?	Lizard, Cornwall
10	South Edinburgh Channel	late c 1700s	merchantman	Thames Estuary
11	Church Rocks	c 1500s?	warship?	Teignmouth
12	Pwll Fanog	Late Med.	slate carrier	Menai Strait
13	Moor Sand	c 1000 BC	artefact scatter	Prawle Point
14	Coronation (Offshore)	1690	warship	Rame Head
15	Kennemerland	1664	Dutch East Indiaman	Shetland
16	Langdon Bay	c 1100 BC	artefact scatter	Dover
17	Tal-y-bont	1600–1650?	armed merchantman?	Barmouth
18	Stirling Castle	1703	warship	Goodwin Sands
19	Invincible	1758	warship	Solent
20	Bartholomew Ledges	c 1500s	armed merchantman	Isles of Scilly
21	Northumberland	1703	warship	Goodwin Sands
22	Restoration	1703	warship	Goodwin Sands
23	St Anthony	1527	merchantman	Lizard
24	Schiedam	1684	merchantman	Lizard
25	Brighton Marina	c 1600s	warship?	Brighton
26	Yarmouth Roads	c 1600	armed merchantman?	Isle of Wight
27	Studland Bay	c 1500	armed merchantman?	Poole
28	Admiral Gardner	1809	English East Indiaman	Goodwin Sands
29	Hazardous	1706	warship	W. Sussex
30	Coronation (Inshore)	1690	warship	Rame Head
31	Iona II	1864	paddle steamer	Isle of Lundy
32	Gull Rock	c 1400/1500s	artefact scatter	Isle of Lundy
33	Wrangels Palais	1687	Danish warship	Shetland
34	Erme Estuary	c 1500/1700s?	artefact scatter	S. Devon
35	The Smalls	c 1100	isolated findspot	W. Wales
36	Duart Point	1653	warship	Sound of Mull
37	Dartmouth	1690	warship	Sound of Mull
38	Girona	1588	warship	N. Ireland
39	Royal Anne	1721	warship	Lizard, Cornwall
40	Erme Ingot site	multi-period?	artefact scatter	S. Devon
41	Dunwich Bank	c 1600s	warship	Suffolk
42	Resurgam	1880	submarine	N. Wales
43	Hanover	1763	PO packet	Cornwall
44	Seaton Carew	c 1800s	collier brig	Teesside
45	Cannon site	c 1600s	artefact scatter	Devon
46	A1	c 1900s	submarine	Solent
47	Burntisland	c 1600s	ferry	Firth of Forth
48	Loe Bar	c 1600s	English East Indiaman	Lizard
49	Mingary	c 17th	warship	Ardnamurchan
50	Kinlochbervie	c. 16th	merchantman/warship	Kinlochbervie

Figure 2 The location of the 49 current historic wreck sites in United Kingdom waters designated under the Protection of Wrecks Act 1973.

The shaded area indicates the extent of the 12 nautical mile territorial limit (Archaeological Diving Unit, University of St Andrews)



## Coastal planning and management

Development control and development plans are widely used to protect specific sites and larger areas but they are mainly aimed at terrestrial archaeological resources. However, in recent years a number of initiatives, often co-ordinated by local authorities and partly sponsored by national heritage organisations, have focused on discrete areas of the coast such as the Fal Estuary (Ratcliffe 1997), Plymouth (Firth *et al* 1997) and Flamborough Head (FHSMAP 1998).

### Planning decisions

In England, government policy on archaeology and development on land is set out in *Planning Policy Guidance Note 16 (PPG 16): Archaeology and Planning* (Department of the Environment 1990). In Scotland, *National Planning Policy Guideline (NPPG 5): Archaeology and Planning* (Scottish Office Environment Department 1994) provides guidance on archaeology. In Wales the equivalent is provided by Welsh Office circular 60/96. Similar guidance is being considered for Northern Ireland. Archaeological sites are viewed as being a finite resource that must not be needlessly destroyed and where threatened by development a presumption in favour of their physical preservation should be made. These principles can be applied equally in marine environments but this is not specified in the planning guidance.

Additional guidance notes have implications for submerged archaeological material. In England, *Planning Policy Guidance Note 15 (PPG 15): Planning and the Historic Environment*, provides guidance on the protection of the historic landscape and deals briefly with the question of sustainability (Department of the Environment 1994). *Planning Policy Guidance Note 20 (PPG 20): Coastal Planning* is concerned with planning at the coast and makes specific reference to the historic landscapes associated with the coast, noting that the coastal zone has a rich cultural heritage both above and below the low-water mark (Department of the Environment 1992). Although the jurisdiction of planning authorities extends only to the mean low water mark, it is recognised that onshore developments may have impacts beyond that limit and that these should be taken into account.

Similarly, additional guidance notes have implications for submerged archaeological material in Scotland. *NPPG 13: Coastal Planning*, (as with PPG 20), is concerned with

planning at the coast and sustainable development. It identifies cultural heritage as a resource to be considered in planning and includes '...scheduled monuments and other archaeological sites and landscapes, listed buildings, conservation areas and historic gardens and designed landscapes, as well as surviving archaeological remains both on land and below low water mark' (Scottish Office Development Department 1997). It emphasises that planning authorities should recognise the interrelationship of land and sea and between onshore and offshore activities.

## Coastal Zone Management

Coastal Zone Management (CZM) achieved national attention with the publication in March 1992 of the House of Commons Environment Committee's report on *Coastal Zone Protection and Planning*. The committee reached some fifty conclusions and made recommendations including the creation of a National Coastal Zone Unit, the formation of regional CZM groups, the development of a hierarchy of CZM Plans from national to local levels and the harmonisation of land and seaward planning controls to the 12-mile limit of territorial waters. However, the subordinate position of archaeology in CZM is apparent. Of the eighty plus submissions to the committee, none of them were principally concerned with archaeology (Firth 1995).

In the *Coastal Zone Protection and Planning* (Department of the Environment 1992) report the government stated it was not persuaded that extension of local planning controls seaward was necessarily the best approach, nor did it accept the suggestions for a National Coastal Zone Units, regional groups or a hierarchy of CZM plans. Instead, the government proposed that local authorities take the lead in preparing management plans and liaison with local bodies. Further, the government identified the damage to archaeological interests in the coastal zone as an important theme for management plans. The government also accepted the need for a consistent approach to the application of consent procedures to marine industries and improved application of Environmental Assessment procedures in coastal areas, raising the possibility of archaeological assessments in advance of marine developments.

Despite these sentiments it is clear that a strategic vision for the future coast is lacking and the UK government and the devolved administrations are under pressure to put forward new proposals. The European Commission has recently published guidance on Integrated Coastal Zone Management (ICZM) (Commission of the European Communities 2000). Member States need to develop national strategies to implement the following principles of ICZM:

- A broad 'holistic' perspective (thematic and geographic).
- A long term perspective.
- Adaptive management during a gradual (planning and management) process.
- Reflect local specificity.
- Work with natural processes.
- Participatory planning.
- Support and involvement of all relevant administrative bodies.
- Use of a combination of instruments.

The national strategy should:

- Define the relative roles of the different administrative actors ensuring both adequate local control, and also sufficient regional vision and consistency.
- Develop the means of bridging the land-sea interface in terms of national legislation, policies and programmes.
- Identify measures to promote bottom-up initiatives.
- Identify sources of long-term financing of ICZM initiatives.
- Establish adequate, continuous systems for monitoring and diffusing information in appropriate and compatible forms.

In another attack on the government's position of favouring a voluntary, local approach the Local Government Association (LGA) has published a Coastal Strategy targeting the situation in England (LGA 2000). The archaeological heritage is stated to be at risk both from development through disturbance or removal of archaeological remains and also the direct and indirect effects of natural processes. The LGA recognise the weakness of the voluntary approach, pointing to the complexity of relevant legislation, a national policy vacuum, a democratic deficit in coastal decision-making, an information gap and a lack of funding to deliver the goods at local level. Making over sixty recommendations to local, regional and national authorities, the LGA calls for a new 'Coastal Commission' or multi-agency forum, under ministerial direction, to deliver co-ordinated national policy.

## Government View (GV)

Government View is the procedure used by government to determine whether marine sand and gravel extraction can take place below the mean low-water mark (DTLR 1998). It is an extended consultative process administered by the Department of Transport, Local Government and the Regions (DTLR)/Welsh Office (WO). In reaching its decision DTLR/WO will consider all the information submitted with the application, including reports on the environmental impact of the proposed dredging, all

comments received in response to consultation with interested parties and following advertisement of the application.

Further information can be obtained from the DTLR/WO (see below **Appendix 1**).

## Environmental Assessment

In recent years, there have been assessments in advance of developments, such as sewage outfalls and mineral extraction applications, which have included consideration of the maritime archaeological resource and this trend is expected to continue. The government, moreover, has recognised that the application of Environmental Assessments could be stricter and it is expected that more attention will be paid to the inter-tidal and inshore waters in future projects.

In the management of Environmental Assessments it is important that all areas of potential impact should be assessed by appropriate techniques. It is unacceptable to restrict assessment to known sites in areas where no systematic prospection has previously been conducted. All known sites (ie those featuring on inventories), and apparently blank areas between them, should be assessed and it is important to consult with other conservation and protection organisations eg Heritage Coasts (see below) in the assessment process. Environmental consultants are encouraged to develop their contacts with competent marine archaeological agencies and incorporate them in consultation rounds for all stages of development projects.

## Management plans and conservation policies

Management plans and conservation policies provide an important opportunity to include land and submerged archaeological sites in the management of the coastal zone. They are non-statutory documents but have support in statutory structure and local plans. These management plans, for conservation purposes, are being developed for coastal areas, and fragile estuarine environments, all of which have competing commercial, industrial, nature and historical interests. The development of effective management plans demands a co-operative effort to include concerns of many groups with an interest in the coastal zone. For an example of an integrated approach to coastal management see Gilman *et al* (1995)

## Coastal management plans

In Scotland *NPPG 13 Coastal Planning* (Scottish Office Development Department 1997) and in England and Wales, *PPG 20: Coastal Planning* (DoE and Welsh Office

1992), set out guidelines for including the coastal zone within development plans (structure and local plans) and for the consideration of historical and archaeological material. It also states that proper management plans need to be based on a range of information from physical processes, development impact and trends, and environmental quality, including archaeological information. Each county must define the coastal zone for its own purposes and may include areas affected by offshore and nearshore processes, areas of potential flooding and erosion, enclosed tidal waters, and areas directly visible from the coast.

Although coastal management plans are linked to statutory plans the link is not binding, which is both a strength and a weakness. Management plans are not limited to the planning process and as such are free to state policy that falls outside development control such as guidelines on conservation of underwater historic remains. On the negative side, implementation of non-development policies lacks statutory support.

## Estuary and firth management plans

Estuaries are important and threatened areas that often combine sensitive wildlife areas with busy commercial ports. Estuary management plans provide a framework for the future, in which activities can take place without damaging the natural, cultural and economic resource. To aid in the development of such plans, English Nature began its Estuaries initiative in 1992 and its recommendations recognise submerged archaeological sites as well as land archaeology, including them as a resource to be considered in the formulation of management plans.

In a similar way Scottish Natural Heritage has initiated Focus on Firths, a Scotland-wide initiative to provide integrated management of the natural resources of selected firths (eg the Moray, Clyde, Solway and Forth). The initiative will review and analyse various aspects of each firth's environment, its uses and activities, identify issues and create objectives for its future management (see Forth Estuary Forum 1998).

## Shoreline Management Plans

Shoreline Management Plans (SMPs) are non-statutory documents setting out sustainable coastal defence policies for defined sections of coast. The entire coastline of England and Wales has been subject to SMPs but there has only been one in Scotland (Fife). They take account of natural coastal processes, human and other environmental influences, and are subject to extensive consultation. The SMP provides detailed information about coastal processes and how they affect the shoreline that may inform other management plans, providing useful

information for integrated coastal zone management of a particular stretch of coast. Statutory documents, such as structure plans and local plans, must consider the suggestions and strategies of the non-statutory SMP.

SMPs can provide information for archaeologists about coastal processes and the effect of human activities on those processes for defined stretches of coast. This information may be used to assess future impacts or environmental change on submerged archaeological deposits. Conversely, the level of input of archaeologists into the drafting and consultation processes in the development of SMPs has usually been very low, and many other problems in relation to the historic environment have been noted (Wessex Archaeology 1999). However, one example of a different approach is the concentration on focal studies of coastal archaeological sites in Fife commissioned by Historic Scotland as part of the Fife Shoreline Management Plan (Oxley 1998b).

### Heritage Coasts

Heritage Coast initiatives are non-statutory designations which aim to focus attention on the management needs of stretches of undeveloped coast, where the relationships between landscape and nature conservation, sport, recreation, tourism, pollution and water quality issues are interlocking and distinctive (Countryside Commission 1991). The Heritage Coast definition now includes within its boundaries one mile of inshore waters and thus protects submerged archaeological sites in that zone. The objective of Heritage Coast policy is to protect the natural beauty (including marine flora and fauna), and their heritage features (including archaeology), enhance public enjoyment, maintain and improve the environmental health of inshore waters, and take account of economic needs such as agriculture and fishing. Heritage Coast management plans, produced by local authorities, are to encompass the objectives of Heritage Coasts including effective controls by appropriate authorities of the intertidal and inshore waters (Countryside Commission 1991).

### Integrated marine conservation initiatives

In the UK important advances have been made in developing a management plan for the Marine Nature Reserve situated around the island of Lundy in the Bristol Channel. The plan was produced by English Nature in co-operation with the Landmark Trust (which manages the island and the marine reserve) and the Devon Sea Fisheries Committee (which regulates fisheries in the surrounding waters). Two sites designated under the Protection of Wrecks Act 1973 lie within the Marine Nature Reserve boundaries and English Nature acknowledges the importance of integrating the man-

agement of the archaeological heritage with that of other heritage interests. Within the Lundy Marine Nature Reserve a zoning scheme has been adopted to show people where they can undertake activities with minimal impact on the wildlife or conflict with other users of the reserve (English Nature 1993). The brochure detailing the scheme includes the restrictions for the two designated sites required under the Act. An assessment of the archaeological resource within the reserve has been carried out which highlights the benefits to be gained by including the culture heritage in the future management of the reserve. This is achieved under headings which include resource protection issues (controlling access), resource management (managing archaeological remains *in situ*, encouraging reporting of finds) and interpretation (interpretative display boards) (Robertson 1995).

**Coastal management and development control: summary**

- the marine archaeological resource generally receives little consideration within coastal and marine management initiatives
- it is only recently that coastal and marine planning mechanisms have taken account of submerged archaeology
- increasingly environmental impact regulations demand that attention is paid to threats to the marine archaeological resource



## Marine archaeological assessments

### Appraisal

In any archaeological assessment exercise there will be a requirement for seeking expert advice and opinion. When it comes to physically evaluating sites then an experienced archaeologist with a specialism in the relevant subject area or environment should be involved (IFA *Code of Conduct, 1997, Code Of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology 1998, Standards and Guidance, 1999*).

### Sources of archaeological expertise

There are a large number of organisations with an interest in the archaeological resource of the marine zone. They



range from university departments with teaching and contract interests, to organisations operating as charitable trusts, and others as small, informal networks of individuals. The first source for expertise should be the IFA's *Yearbook and Directory of Members*. There is a steady increase in the number of archaeological units and individuals professing a maritime archaeological capability. The IFA's validation system provides a benchmark against which informed choices can be made.

## Health and Safety requirements and the contracting of divers

Marine archaeological work may involve the use of divers and it is important to consider the legal responsibilities of clients who place contracts for diving projects; the contractors, divers and supervisors undertaking the work and the vessel operators whose actions and activities could affect the safety of the team.

The Health and Safety at Work etc Act 1974 forms the basis for much of the legislation covering health and safety at work. It allows the Government's Health and Safety Executive (HSE) to propose specific regulations where it considers they are necessary to control risks arising from specific hazards.

The main set of regulations that apply to diving are the Diving at Work Regulations 1997 (SI 1997/2776). It is important that anyone involved in a diving project, from the client for whom the work is being undertaken to the diver undertaking the work, is familiar with them.

The regulations are 'goal setting' in that they do not specify in detail how diving at work should be carried out. The employer has to plan and manage the work to protect the health and safety of everyone taking part as far as is 'reasonably practicable'.

The HSE has produced a series of Approved Codes of Practice (ACOP), for different sectors of the commercial diving industry, giving practical advice on how to comply with the diving regulations. An ACOP for scientific and archaeological diving is available (see below **Appendix 1: Diving and HSE**).

Anyone involved in archaeological diving operations must be deemed 'competent' to undertake the task. Those diving will also require HSE-approved certificates of medical fitness and first aid training, as well as diving qualifications appropriate to the environment of the diving operation (lake, river or sea etc), the tasks to be carried out, and the equipment to be used. The diving operation must be carried out under the auspices of a diving contractor registered annually with the HSE. Organisations paying (or giving expenses) to recreational

divers for archaeological work underwater are likely to be in breach of the regulations. The divers themselves would also be in breach of the regulations.

Further information and advice on the regulations governing diving at work is available from the HSE (see below **Appendix 1**).

## Collecting known information

Increasingly more information on marine archaeological sites is becoming available as greater resources are being made available. Information on known sites can be obtained by consulting the new national and local inventories, although the inconsistencies in such records should be acknowledged. Information may also be available from local maritime interest groups and museums. In some cases, information held in private or semi-official hands may be difficult to gather because of a traditional suspicion of authority amongst many sea users (eg occasionally fishermen and recreational divers).

Information on the location of areas of seabed protected under the Protection of Wrecks Act 1973 can be obtained from the DCMS or the ADU. The presence or absence of these designated historic wreck sites does not necessarily mean that other sites do not exist which require (or merit) attention. In such cases it is important to consider circumstantial evidence which may indicate whether such remains will be present and affected by any development proposals. For example shipwreck sites and land archaeological sites now underwater because of sea level change may be located in the vicinity of gravel banks that are the target for aggregate dredging. A proposed dredging area adjacent to a known shipwreck may contain debris from the shipwreck or other unrecorded archaeological material.

In the case of a proposed development the initial archaeological study area should cover all possible development options including peripheral areas incorporated for access, working areas and moorings. Sites and areas of archaeological or palaeo-environmental potential should also be recorded where they border the study area, to provide a broader contextual setting for the development. In addition, a flexible attitude should be retained in the assessment so that any 'far-field' effect of the development (ie occurring some distance away) can be identified.

## Relative importance of archaeological material underwater

The importance of a site and its possible contribution to the understanding of defined areas of study should be assessed in consultation with relevant specialists. Not all

archaeological sites are of equal importance. An easily identifiable nineteenth-century wreck site in an area with a long history of ship loss, covered in prolific surface finds of amorphous iron debris may be in poor condition, but still important. A site buried beneath sediment with no surface disturbance may be in good condition but may not have a similar level of importance. It should also be borne in mind that well-preserved sites might have great amenity value apart from any historic importance, especially when access is facilitated through proximity to well-known sport diving areas. In addition, marine sites may have a special marine biological importance as habitats.

### Assessing archaeological potential

There are a number of strategies that can be employed in order to assess the archaeological potential of an area. Inferences can be made from historical evidence and reference made to the presence of sites and features on land in adjacent areas. Some idea of the area's past can generally be gained from evaluating the known evidence of maritime activity and occupation prior to rises in sea level (Firth *et al* 1997). The concept of a 'maritime cultural landscape' encourages taking a broad view of sources of information which may indicate the presence of sites, for example early maps and charts, place names and folklore (Hunter 1994).

The possible presence of submerged land surfaces because of shallow depths in and around the proposed area should be considered. In addition, the use of predictive survey in areas of potentially good preservation of archaeological evidence should be assessed. Certain combinations of chemical, physical and biological characteristics are known to indicate the good preservation of archaeological material (Oxley 1995).

Where information on known sites is poor, or the potential for previously undiscovered sites is high, attention must be paid to how 'potential' is determined and decisions on preservation or destruction can only be made if sufficient information is gathered to make such decisions reasonable and sustainable. Once an idea of the potential of an area has been gained it is useful to evaluate the nature and extent of any impacts (eg the level of mineral extraction or commercial fishing) which the archaeological remains may have been subject to in the past.

No formal guidelines exist for assessing marine archaeological potential and therefore the appraisal of known material and/or sites in the marine zone will necessarily remain, for the time being, the best available source of data. Museums, both national and local, may hold information on local research into the origins of finds recovered by fishermen or items found on the beach.

### Geographical Information Systems (GIS)

Marine information systems based on the principles of GIS are increasingly used in coastal zone management and marine science applications, taking advantage of the common factor of position data to enable diverse data-sets (such as the salinity, temperature and biological characteristics of marine sites) to be inter-compared (Wright and Bartett 1999).

Marine and coastal archaeology projects are increasingly taking up the challenge of GIS for the purposes of management and research. Such applications allow:

- archaeological, environmental and historical data sources to be readily integrated
- rapid computer analysis to facilitate the interpretation of complex variables
- examination of relationships that would otherwise be difficult ie historic charts and modern imagery
- site interpretations to be readily generated for lay audiences

Recent examples, in the UK and overseas, of such initiatives include historic shipwreck assessment (Mather and Watts 1998) and coastal area investigations (Allen *et al* 1993).

#### Marine archaeological assessments: summary

- the number and variety of organisations involved in marine archaeology requires wide consultation
- the relative merits of geophysical survey and/or fieldwork should be considered
- significant Health and Safety implications are involved in diving at work
- it is important to consider the relative importance of submerged archaeological sites

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### Conservation strategies

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#### Codes of practice

Codes of practice are of considerable help in establishing and maintaining a good relationship between archaeologists and developers. The *Code of Practice for Seabed Developers* (Joint Nautical Archaeology Policy Committee 1995) sets out recommended procedures for consultation and co-operation between seabed developers and

archaeologists. This is currently available from English Heritage, Swindon (see below **Appendix 1**). The purpose of the *Code* is to provide a framework within which concerns for the maritime archaeological heritage and the interests of other sea users can be reconciled.

**Code of Practice for Seabed Developers: summary**

- developers should acknowledge the potential scientific value of archaeological evidence and make every effort to report unexpected finds promptly
- developers should take account of the need for archaeological survey and investigation in advance of development
- at the earliest opportunity developers should seek informed archaeological advice
- organisations responsible for inventories will make records available to developers
- where consultation indicates that important archaeological remains exist, developers may make provision for survey by appropriately qualified archaeologists
- such survey will be designed to ascertain the archaeological potential before development commences and what action should be taken to preserve any important archaeological remains located
- consideration will be given to the physical preservation of important remains but, where development is unavoidable because of economic or social needs, survey and investigation may be an acceptable alternative

## Opportunities for encouraging access

The Nautical Archaeology Society (NAS) is active (in the UK and overseas) in presenting the aims and goals of archaeology and providing a structured training programme in the principles and techniques of archaeology underwater (see below **Appendix 1**). The stated aims of the Society are to advance education in nautical archaeology at all levels; to improve standards of conservation, recording and publication and to encourage the participation of the public. To this end the NAS publishes the *International Journal of Nautical Archaeology* and has developed a training programme designed to produce competent fieldworkers with sufficient background knowledge to be an asset to any project (Dean *et al* 1995). The Society has also developed an initiative called *Adopt a Wreck* aimed at those diving groups, clubs or individuals who regularly dive a particular site, and have developed more than a passing interest and are keen to get involved in research or site survey.

## Respect Our Wrecks

The rise in popularity of recreational pursuits (eg SCUBA diving) can impact archaeological resources whether in the form of accidental damage, the inconsiderate collection

of 'souvenirs' or deliberate acts of vandalism. In the UK this has led to increasing concern over interference to those military sites which involved the loss of life on the so-called 'war graves'. However in response to calls for prohibitive restrictions on access to some of these sites the three main diver training organisations (British Sub-Aqua Club, Sub Aqua Association and the Professional Association of Diving Instructors), in collaboration with a range of other interested parties (Receiver of Wreck, Ministry of Defence, Joint Nautical Archaeology Policy Committee, have produced a voluntary code of practice for recreational divers. Called *Respect Our Wrecks* the campaign aims to encourage non-intrusive recreation, better reporting of new finds and safer diving (JNAPC 2000b).

## Assessing impact

Understanding the process of the development or proposal is essential in assessing the implications of any impacts on the archaeological remains present. All activities have an impact and there is a need for objective data on the relative merits of using particular processes. For example, there will be a difference between the nature of the impact from the use of suction dredgers as opposed to grabs. It is also important to recognise that modern dredgers are designed to be unresponsive to seabed anomalies. The chances of detecting archaeological material that is exposed while still *in situ* will be very limited.

In the assessment of the extent of a possible impact it is important that details of the location of activities are fully considered. This includes areas likely to be affected by processes associated with the activity (eg anchoring, trenching, spoil dumping, plant bases and storage areas), and areas likely to be affected by changes in hydrography.

Activities in the marine environment can have impacts some distance from the development site because of the dispersal effect of tides and currents. These so-called 'far field effects' may be due to the alteration of the sediment balance or deposition characteristics of an area. At least one Environmental Assessment has acknowledged this possibility and included it in the assessment. In this case the parameters of the archaeological study were set using the boundaries of the modelling studies carried out earlier to assess the impact of dredging in terms of likely distribution of sediments or the possibility of coastal erosion (Macdonald 1994).

## Management *in situ*

A growing area of interest is the protection and appropriate use (ie management) of marine archaeological sites *in situ*. However, well-documented examples of stabilisation to mitigate against natural or human impacts are rare.

Past experience also deals mainly with shipwrecks and there has been limited research into the effectiveness of the strategies used (Oxley 1998a). Progress is being made (particularly overseas) in the field of multi-user, marine environmental resource management which includes the integration of the shipwreck heritage (Cuthill 1998, Kaoru and Hoagland 1994). There is also a useful line of research into site formation studies, particularly in the quantification of impact processes and the ways that this data can be incorporated into formation models that might be projected to indicate future trends (Ward *et al* 1999).

Further work is necessary to indicate the most appropriate and cost-effective strategies for the widest range of marine archaeological environments. Supportive research into the nature of marine archaeological environments and site monitoring procedures is also lacking, and systematic trials of stabilisation techniques should be carried out before recommendations can be made as to effective strategies. Methods tried include sandbagging (Martin 1995), the laying down of barrier textiles followed by back-filling, and the strengthening of wreck structures using scaffolding and bolts. The offshore oil industry has developed various strategies to mitigate impacts such as trawling on pipelines and other structures. This sector may be a further, useful source of ideas and techniques for protecting marine archaeological sites.

### Accidental discovery of archaeological remains

Contingency plans have recently been developed by some local authorities in recognition of the considerable cost implications if a find of major archaeological significance is made accidentally on their coast or in neighbouring coastal waters (Allen 1995). It is important that the implications of accidentally discovering archaeological material are fully realised. Proposals for development must include procedures that will adequately signal the discovery, contain contingency plans for the reporting of the find to a relevant competent agency and adequately cover all the procedures for recording exposed archaeological remains.

In the first instance the relevant national heritage body should be informed (eg English Heritage, Historic Scotland, Cadw or EHS), followed by the archaeological officer of the local authority and those responsible for local and national site inventories. It is also in the interests of developers to make themselves aware of the potential cost of the investigation of archaeological remains in marine environments and any conservation, excavation or mitigation strategies which may subsequently be necessary.

Guidance on the first aid treatment of archaeological materials recovered from the sea can be found in Robinson (1998).

### Reporting systems for marine finds

Chance discoveries by divers normally go unreported and thus valuable information is lost to the archaeological community. The principal reason for this unsatisfactory situation is that there is no statutory requirement to report information about finds and sites to archaeological authorities or museums. Also there is a widespread lack of awareness amongst the public, in particular sport divers, of the importance, value and fragility of the marine archaeological heritage.

Many local authorities, recognising the inadequacies of conventional reporting systems when it comes to marine finds, have developed proposals for co-operation between local museums, local archaeological bodies, the Receiver of Wreck and the national recording and inventory facility (Highland Regional Council 1995). Such schemes need to be sympathetic to the requirements of legislation, in particular the role of the Receiver of Wreck under the Merchant Shipping Act 1894 and the collection policies of the museums concerned.

#### Accidental discovery: summary

- do not disturb the remains more than is necessary
- inform relevant heritage body and the Receiver of Wreck
- consider conservation implications of raising the material
- consider implications of further disturbance to the site

### Avoidance

At an early stage, it may be feasible to avoid archaeological sites whose importance is unknown. Recently temporary exclusion zones have been proposed by dredging companies around chartered wrecks located within the dredging area. On one particular site in the North Sea a chartered wreck is present for which no details are known. In respect of this the client has agreed to leave a 500m exclusion zone around the wreck until surveys are carried out to find out more about the site (Civil and Marine Ltd 1993, Macdonald 1994). These exclusion zones will remain in place until the wreck has been assessed and its archaeological significance determined by a competent archaeological authority. The effectiveness of these strategies remains to be seen and on the site in question, as far as is known, there has been no actual archaeological evaluation to date.

### Desk-based study

The initial desk-based study will consist of updating the existing archaeological database through the consultation

of a variety of primary and secondary source materials (IFA *Standard and guidance for archaeological desk-based assessment* 1999). The following sources should be consulted and where they are not available or judged to be not relevant this should be made explicit. Where possible the archaeological implications of the results of studies undertaken by other consultants should be monitored.

- Relevant NMR data, including the maritime sections
- Local SMR data, with references followed as appropriate
- Cartographic and documentary records, including available county editions or Ordnance Survey maps at scales of 1:10,000, 1:10,560 or 1:2500, tithe maps and pre-Ordnance Survey maps, estate maps, geological survey maps, and charts held in local Records Offices, local museums or the MoD Hydrographic section, Taunton
- Secondary published sources, including historical and general archaeological sources, national and local archaeological journals
- Studies relating to sea level change
- Oblique and vertical aerial photographs held by English Heritage, the relevant Royal Commissions, local authorities and the MoD Hydrographic section, Taunton
- Excavation archives and collections of material held in local museums, local groups or individuals (eg fishermen)
- Other information and local knowledge available from geologists, geomorphologists and engineers working on the development (eg borehole or geophysical data)
- Statutory, local planning authority designations and archaeological policies

## Watching briefs

Watching briefs are the standard response to a general, non-specific archaeological potential recognised in the development area. They are undertaken by an experienced archaeologist who is present during the development to detect and record surprise discoveries, notify the relevant authorities and advise on further action (IFA *Standard and guidance for an archaeological watching brief* 1999). It is appropriate that the requirement for *in situ* inspection by suitably qualified archaeologists of any deposits identified during development work should be written into future proposals for development in the marine zone.

The practical implications of suggesting watching briefs for marine operations are considerable and they will seldom be an effective or satisfactory sole response to the

estimated archaeological potential of an area. For example, diving during the operation of plant (such as dredgers) is particularly hazardous, and whilst work is under way it is unlikely that archaeological inspection can be carried out safely or effectively. Dredged spoil may be deposited directly onshore (in the case of beach replenishment schemes) or fed into barges for transport and dumping offshore (as a result of maintenance dredging). It may be practical to inspect spoil pumped ashore but not that transported out to sea. In the former case the chances of recognising archaeological evidence may be reasonable but it would not constitute an acceptable archaeological mitigation.

Despite these problems, an archaeological watching brief will often be built into the programme with a contingency for diving inspection and the recording of any archaeological material that is detected. This work should be carried out by a suitably qualified archaeological organisation with experience of watching briefs. Health and safety must be a primary consideration and in all cases the responsibilities and powers of the archaeologist should be clearly defined and communicated to all those involved.

### Conservation strategies: summary

- *Codes of Practice* have proved useful in establishing good relationships between archaeologists and developers
- initiatives are required to encourage appropriate access, involvement and education
- more attention should be paid to the management of marine archaeological sites *in situ*
- procedures are lacking for the reporting of finds and for coping with accidental discoveries

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## Evaluation techniques

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Not all land based archaeological techniques can be directly transferred underwater but it is fair to say that a greater standard of archaeological work is achievable underwater than is commonly believed. As far as is known, no archaeological evaluations along the lines of those recommended in the relevant IFA *Standard and Guidance* (IFA 1999) have been carried out on marine archaeological sites. As experience and practice increase detailed evaluation guidance will be developed and disseminated.

The importance or significance of sites must be assessed before any intrusive (archaeological or geotechnical) evaluations are permitted because such activities may unwittingly damage archaeological deposits (see above **Assessing archaeological potential**). Visual evaluation, or seabed inspection of identified features will often be the only effective way of estimating archaeological importance (Fig 3). Intrusive methods which involve the disturbance of the archaeological context of a site may be necessary to evaluate the date, nature, extent, condition and preservation of the archaeological evidence. Such strategies, which include coring or sampling of sediments and trial excavation, should only be undertaken after the development of an acceptable project design.

A comprehensive description of the techniques and methodologies commonly used in the practice of archaeology underwater can be found in other publications (Green 1990, Dean *et al* 1995). The following section summarises some of the basic survey methods and their effectiveness for locating or identifying marine archaeological sites. It should be noted that there is often a considerable difference in effectiveness between a technique which is common practice and one which is still in the experimental stages.

### Position fixing

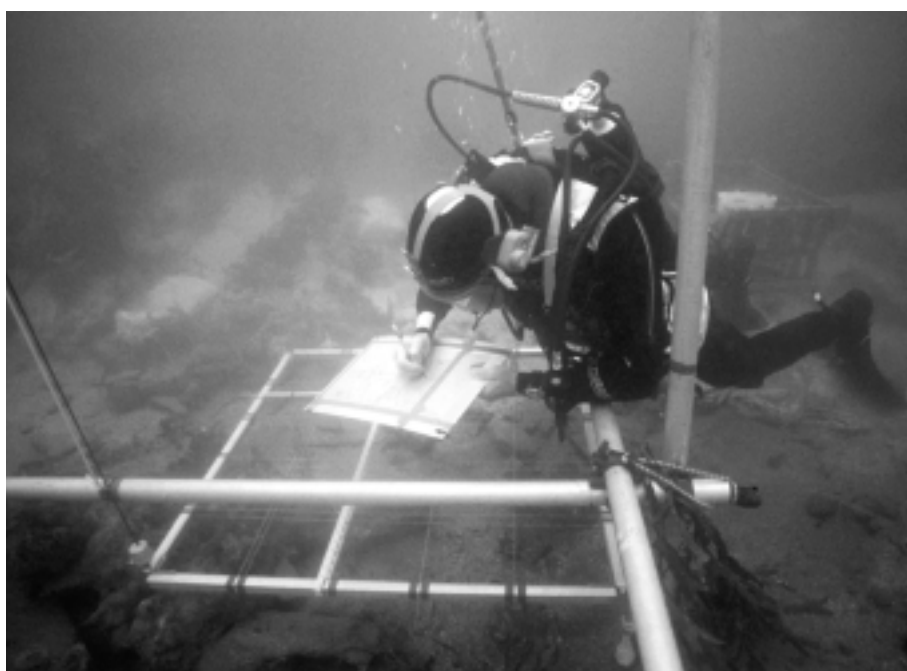
Establishing and recording adequately the position of archaeological remains (and the track of survey vessels) is essential in marine archaeological work. It needs to be as accurate and reproducible as possible to enable sites to be relocated. At sea identifiable and charted features

may not lie immediately adjacent to a site, so accurate position fixing can be problematic. On both maps and mariner's charts the position of an archaeological site is normally expressed as a coordinate in either degrees and minutes of latitude and longitude, or as a National Grid reference.

The use of Global Positioning Systems (GPS), including the more precise Differential systems (DGPS), are widespread in the marine zone. Users should, however, take care when using GPS-derived positions on charts and maps that have been generated from other data. When doing so it is likely that corrections will be necessary.

### Geophysical survey

Increasingly frequently geophysical surveys for the purposes of archaeological evaluations in marine environments are being undertaken. Such surveys have been carried out by archaeologists with specific research questions, and in co-operation with private or commercial surveys where archaeological interests are included as one area in a more general survey (ie for development purposes). In development control the limitations of existing commercial surveys not undertaken for archaeological purposes should be taken into account. Geophysical survey undertaken for archaeological development control purposes should be supervised by archaeologists with geophysical expertise. Recent research has indicated that commercial survey data can be of use to archaeologists dependent upon the survey equipment and the methods of interpretation used (Draper-Ali 1996).



*Figure 3 Planning frame survey on the Duart Point designated historic wreck site situated in the Sound of Mull, Scotland (Colin Martin, University of St Andrews)*

Geophysical surveys require systematic and detailed planning based upon the anticipated archaeological remains in the target area, site conditions, and the characteristics of the survey techniques and position-fixing system to be used (Bell and Novak 1993). Guidelines on the initial surveys of project areas to determine the presence of potential archaeological resources have been drafted by the US Department of the Interior Minerals Management Service (MMS 1994).

#### Geophysical survey: summary

- choose optimum instrumentation in relation to survey area, environment and goals
- control position fixing
- plan survey lanes taking into account layback of sensor behind the vessel

### Visual search techniques

Visual search methods are probably the easiest method of site location to understand and use but underwater visibility is often poor, making visual searches difficult to carry out efficiently. Seabed search, either by divers or remotely operated vehicle (ROV), is seldom a practical option as a technique for the location of new archaeological sites in a particular area unless the area is very limited (eg the line of a pipe or cable). Visual underwater surveys using divers are affected by the amount of time a diver is able to remain underwater. Factors that limit a diver's time are physical endurance (cold will cause exhaustion and loss of concentration) and nitrogen narcosis which significantly affects mental ability at depths below 30m. As depth increases the amount of time allowed for a 'non decompression' dive decreases rapidly. 'No decompression' time is the amount of time a diver can spend at the bottom and return unaffected to the surface.

It is important that any underwater search is organised to ensure that diving time is used effectively. Techniques of diver survey are described in Dean *et al* (1995).

#### Factors to be determined before undertaking a diver survey: summary

- the extent of the search area
- the type and size of the object being searched for
- time allowed for searching
- depth
- the legal implications of 'Diving at Work'

### Still and video cameras

If a camera is towed behind a boat or mounted in a ROV then it is possible to observe large areas of the seabed from the surface. Satellite and radio links can mean that the observer does not even have to be on the survey vessel. In shallow water underwater photography can be limited by the attenuation of light and the light-scattering effect of suspended particles (Fig 4). In some cases it may be necessary to have the camera very close (ie millimetres) to the subject being photographed.



Figure 4 Archaeologist using surface supplied breathing gas and helmet-mounted video for survey on the Designated Historic Wreck site of the Resurgam submarine (1880), with an Remote Operated Vehicle (ROV) (Archaeological Diving Unit, University of St Andrews)

### Magnetic

Underwater magnetometers are useful for locating magnetic anomalies caused by large ferrous objects and structure such as iron ships, cannon and shot. The simplest magnetometers give an audible signal when the field strength changes. More sophisticated devices will produce actual values. The sensor can be towed and

readings recorded, from which an intensity map is drawn up for interpretation (Fig 5). The latter processes are often carried out some time after the survey itself.

It is important to be aware that a large target far from the detector can give the same strength signal as smaller objects closer to the detector, so the distance of the detector from the seabed needs to be known. Natural features such as rock formations containing iron may also affect the survey.

## Metal-detectors

Metal-detectors have the advantage over magnetometers in that they can detect non-ferrous metals, such as gold, silver and bronze. For this reason they are used by treasure hunters underwater to search for items with an intrinsic value. As is the case on land, a metal-detector can be a very useful tool for archaeological survey of a site, particularly for intensively searching small areas. Hand-held underwater metal-detectors register the

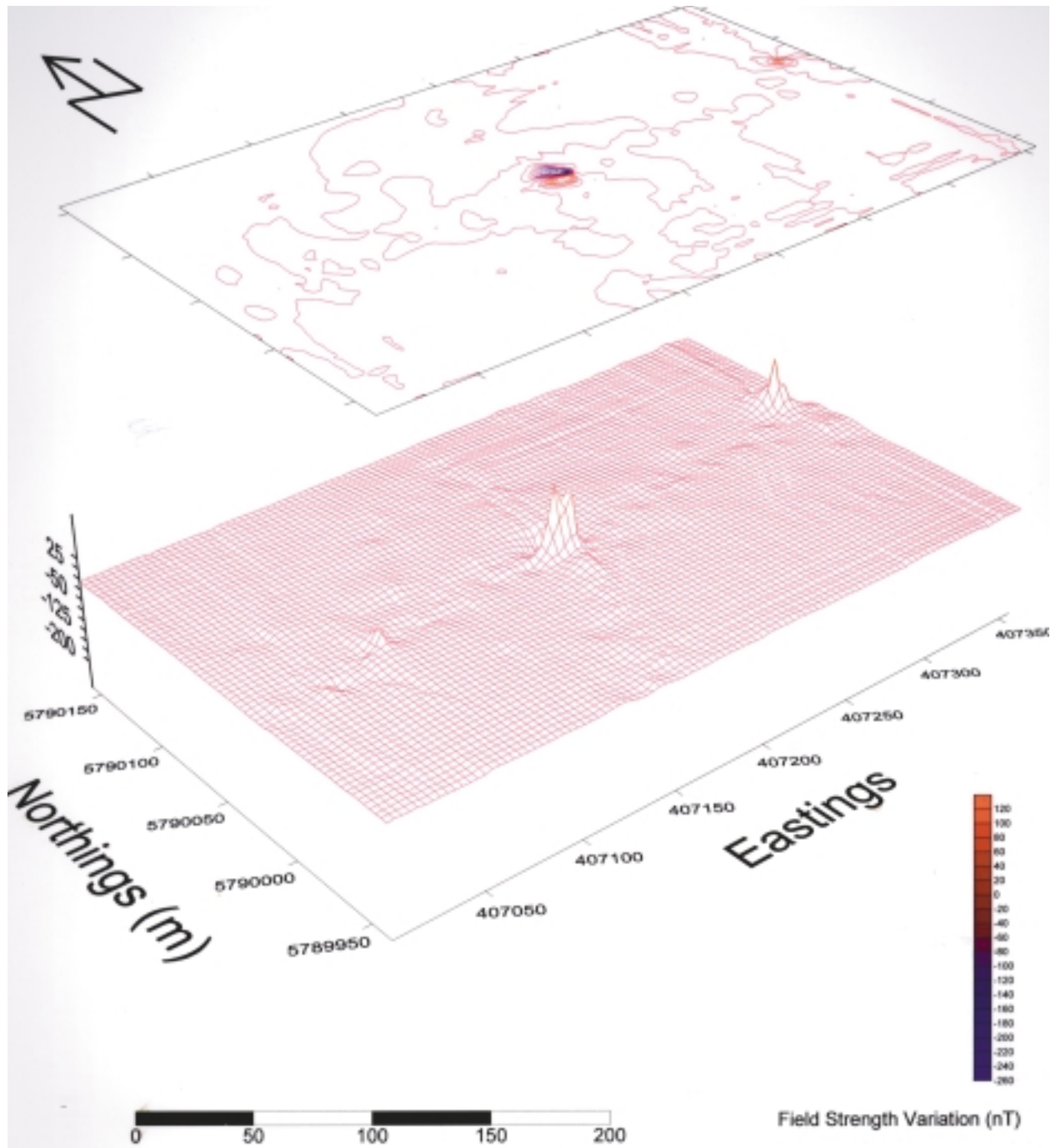


Figure 5 Geometrics 880 magnetometer survey: designated wreck site at Dunwich Bank, Suffolk (Archaeological Diving Unit, University of St Andrews)



presence of metals by an audio or visual signal and they have a limited detection range. Towed forms of metal-detector do exist but the very short range of detection makes them of limited use for archaeological surveys (Green 1990).

### Sonar-based systems

Any active sonar system from a simple depth sounder to more sophisticated side-scan sonar rely upon the behaviour of sound waves in seawater. Active sonar systems transmit sound energy and receive the returning echoes from obstructions. Sonar systems do not actually measure depth or distance but the time it takes for the transmitted sonar pulse to travel from the unit to the target and return. The accuracy of the sonar depends on the ability to measure this time precisely, and the range is related to travel time by the speed of sound in water.

Sonar-based survey systems are becoming very sophisticated in terms of the post-processing of the returned acoustic signals. It is claimed that some sonar systems have the capability to discriminate between different seabed environments eg between immature, mature and dead kelp cover. Such techniques may prove useful in the future for identifying signatures of the various types of archaeological feature, thus enabling large areas of seabed to be effectively mapped in a short time.

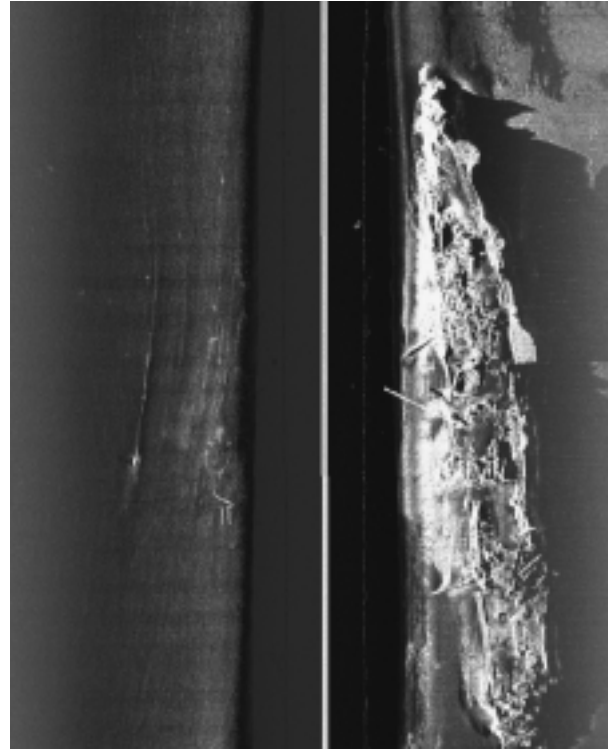
### Echo-sounder

Echo-sounders are one of the simplest acoustic systems. They are based upon the return of sound signals bounced off the seabed vertically below a vessel. In this configuration they are usually used to collect bathymetric (or depth) data (see Fig 5). A wreck or any other feature standing above seabed level can usually be seen on an echo-sounder trace (Green 1990) but such a system is limited because of its beam width which gives a very narrow search path. In other words the survey vessel will have to pass directly over the target. By careful line spacing and search planning, however, this method is useful in pinpointing the exact position of a site once its general location has been determined.

### Side-scan sonar

Side-scan sonar can be more useful to archaeologists as it displays data in a form similar to oblique aerial photographs. In this case the source of the sound beam is usually fixed to either side of a sensor (or 'fish') towed behind the survey vessel. Again, as with echo-sounding, the display represents the time taken for the sound pulse to travel from the unit to the target and return. This

distance is then plotted on electro-sensitive paper (or viewed on a VDU screen) with shading proportional to the echo strength so that stronger echoes produce darker lines. As the sensor is moved forward successive lines produce an image of the sea floor and a pattern of dark returns and shadows reveals the shape of any upstanding object (Fig 6). In addition to locating material from a wreck itself, side scan sonar may detect wreck marks produced by the wreck's effect on sediment characteristics in the vicinity such as patterns of sand and gravel generated by scouring.



*Figure 6 Side-scan sonar survey of the wreck of the former Trans-Atlantic 'Blue Riband' winning passenger liner Campania, latterly converted to one of the first aircraft carrying warships, situated in the Firth of Forth. The long sonar shadows to the right of the 190m long wreck indicate that some areas stand over 10m up from the seabed (Archaeological Diving Unit and School of Geology and Geosciences, University of St Andrews)*

### Sub-bottom profiler

Sub-bottom profilers (or penetrating echo-sounders) provide information about the material and the structure of the seabed itself. A high-energy sound beam is directed vertically downwards providing data on depth and nature of the sediment and any underlying features such as rocks, pipelines and sections of shipwreck below the seabed. It is fair to say that sub-bottom data are often difficult to interpret and recently trials have been carried out to compare the effectiveness of a number of different

types of equipment over underwater sites that had already been surveyed by conventional means (Quinn *et al* 1997).

### Intrusive investigations

Several methods of intrusive investigation can be used on marine archaeological sites but it must be realised that, because of the nature and mobility of marine environments, such sites can suffer significant damage due to the exposure of contexts and features. The same factors can also compromise coring for stratigraphic analysis due to the smearing of soft layers by the coring instrument or contamination by the introduction of extraneous matter (Dean *et al* 1995).

Probing can be used to locate sediments or structures beneath shallow surface layers and this technique may be useful in defining such factors as the limits of a site, the state of preservation of structural elements and the depth of burial. Since the operation relies upon sense of touch, the results of probing underwater can be difficult to measure and interpret. Probing must be carried out systematically with adequate position fixing.

Coring can be a cost-effective method of mapping deposits within a limited area but it is unlikely to provide adequate dating evidence or, in many cases, categorical evidence of the presence of archaeological material. Engineering boreholes are often not recorded in an appropriate way for archaeological purposes. This can be partly alleviated by the presence of a suitably qualified archaeologist during the coring operation to augment the engineering descriptions with archaeological observations. Diver-operated corers are generally only practical in shallow soft sediments. For harder or deeper sediments surface-operated coring systems are likely to be more effective.

Excavation is clearly the most damaging form of intrusive investigation. On land trial trenching is often used to test large areas for the presence of archaeological deposits, yet trial excavation by divers is usually time consuming, expensive and will in most cases be outside what can be claimed to be 'reasonably practicable'. Specific small-scale excavations may be necessary (and are practicable) to test identified deposits. Any excavations underwater should be carried out by experienced archaeologists who dive and who conform to Health and Safety legislation. The use of non-archaeologists, such as commercial or recreational divers, is not acceptable. There are many different techniques for underwater excavation which in general are similar to land excavation but employ different tools and take advantage of the unique properties of the underwater environment. Techniques of excavation are described in various texts (eg Green 1990, Dean *et al* 1995).

#### Marine archaeological evaluation techniques: summary

- Most, but not all, land-based archaeological techniques can be adapted for use underwater
- They make take a bit longer and thus be more expensive
- A wide variety of routine evaluation methods are available
- Geophysical and other remote techniques are rapidly developing

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## Conclusions

It is a time of rapid change in the field of marine archaeology in the UK and overseas. This publication aims to make a contribution towards establishing the best possible framework for the treatment and management of the marine archaeological resource. It should be explicitly recognised that archaeological evidence and sites exist beneath the sea and they must be managed effectively for the benefit of present and future generations. The marine archaeological resource transcends contemporary environmental boundaries and historically derived administrative limits.

Our aim must be to protect and conserve the marine archaeological resource but at the same time promote access for legitimate purposes such as enjoyment, research and education. To achieve these aims the following would be desirable

- sustained and comprehensive research into the nature, extent, condition and potential of the resource
- a greater understanding of the processes of change in marine environments
- development control procedures in the marine zone to be at least equivalent to those on land
- effective strategies and structure for promoting public education and access opportunities
- planning policy guidance to apply explicitly to archaeology within the UK territorial waters

Finally there is a critical need to develop procedures and opportunities for the training and education of archaeologists with the capabilities of working in the marine environment.

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## APPENDIX 1

### Further information and addresses

#### GENERAL

**Association of Local Government Archaeological Officers, Maritime Sub-Committee**, c/o Ms C Ingle, Heritage Conservation Group, Planning Division, Essex County Council, County Hall, Chelmsford, Essex CM1 1LF

**Association of Regional and Island Archaeologists**, c/o Stirling Council, Environmental Services, Viewforth, Stirling FK8 2ET  
Tel 01786 442752 Fax 01786 443003

**Joint Nautical Archaeology Policy Committee**, c/o Council for British Archaeology, Bowes Morrell House, 111 Walmgate, York YO1 2UA  
Tel 01904 671417 Fax 01904 671384 <http://www.britarch.ac.uk/>

**Nautical Archaeology Society**, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth PO4 9LD  
Tel/Fax 023 9281 8419 <http://www.nasportsmouth.org.uk/>

**Receiver of Wreck**, The Maritime and Coastguard Agency, Spring Place, 105 Commercial Road, Southampton SO15 1EG  
Tel 01703 329474 Fax 01703 329477  
<http://www.mcga.gov.uk/row/index.htm>

**Mineral and Waste Planning Division**, Department of the Environment, Transport and the Regions, Zone 4/B1, Eland House, Bressenden Place, London SW1E 5DU  
Tel 0171 890 3872 Fax 0171 890 3859 <http://www.detr.gov.uk/>

#### ENGLAND

Secretary, Advisory Committee on Historic Wreck Sites, Department for Culture, Media and Sport, Heritage Division, Third Floor, 2-4 Cockspur St, London SW1Y 5DH  
Tel 020 7211 6200 <http://www.culture.gov.uk/>

English Heritage, National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ  
Tel 01793 414910 Fax 01793 414926  
<http://www.english-heritage.org.uk/>

#### WALES

Cadw: Welsh Historic Monuments Executive Agency, 9th Floor, Brunel House, 2 Fitzalan Road, Cardiff CF2 1UY  
Tel 029 20500200 Fax 029 2050 6375  
<http://www.cadw.wales.gov.uk/>

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**The Institute of Field Archaeologists (IFA)** is the professional body for archaeologists. It promotes best practice in archaeology and has almost 1600 members across the UK and abroad. Archaeologists who are members of IFA work in all branches of the discipline: underwater and aerial archaeology, heritage management, excavation, finds and environmental study, buildings recording, museums, conservation, survey, research and development, teaching, and liaison with the community, industry and the commercial and financial sectors. IFA publications include a quarterly magazine, a Yearbook, numerous Standards and Guidance notes, and technical papers.

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Royal Commission on Ancient and Historical Monuments in Wales, Crown Buildings, Plas Crug, Aberystwyth, Ceredigion SY23 1NJ  
Tel 01970 621200 Fax 01970 627701  
<http://www.rcahmw.org.uk/>

#### SCOTLAND

Historic Scotland, Longmore House, Salisbury Place, Edinburgh EH9 1SH  
Tel 0131 668 8764 Fax 0131 668 8765  
<http://www.historic-scotland.gov.uk/sw-frame.htm>

Royal Commission on the Ancient and Historical Monuments of Scotland, John Sinclair House, 16 Bernard Terrace, Edinburgh EH8 9NX  
Tel 0131 662 1456 Fax 0131 662 1477  
<http://www.rcahms.gov.uk/>

#### NORTHERN IRELAND

Environment and Heritage Service, Historic Monuments and Buildings, 5-33 Hill Street, Belfast BT1 2LA  
Tel 028 9054 3037 Fax 028 9054 3111 <http://www.ehsni.gov.uk/>

#### DIVING AND HSE

**HSE Approved Codes of Practice, guidance publications on diving, and other HSE publications:**  
HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA  
Tel 01787 881165 Fax 01787 313995  
<http://www.hsebooks.co.uk/homepage.html>

**Copies of Diving at Work Regulations, and other legislation:**  
The Stationery Office, PO Box 276, London SW8 5DT  
Tel 0171 873 9090 Fax 0171 873 8200  
<http://www.hmso.gov.uk/index.html>

**Technical queries about diving competence and qualifications, contractors, diving first aid and medics etc.:**  
HSE, Diving and Quarries Section, 4th Floor - South Wing, Rose Court, 2 Southwark Bridge, London SE1 9HS  
Tel 0207 717 6592  
[http://www.hse.gov.uk/spd/noframes/div\\_qual.htm](http://www.hse.gov.uk/spd/noframes/div_qual.htm)

**Information on archaeological diving practice:**  
Maritime Affairs Special Interest Group, c/o IFA, University of Reading, 2 Earley Gate, PO Box 239, Reading RG6 6AU  
Tel 0118 931 6446 Fax 0118 931 6448  
<http://www.archaeologists.net>

**Archaeological Diving Unit**, University of St Andrews, St Andrews, Fife KY16 9AJ  
Tel 01334 462919 Fax 01334 462921 <http://www.adu.org.uk>

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Other technical papers available from IFA include:

- No 1** 1997 *Lesley M Ferguson and Diana M Murray Archaeological Documentary Archives*
  - No 2** 1999 *Mhairi Handley Microfilming Archaeological Archives*
  - No 3** 2001 *Margaret Cox Crypt Archaeology* (electronic publication)
  - No 4** 2001 *Ian Oxley The Marine Archaeological Resource* (electronic publication)
  - No 5** 2001 *John Hodgson Archaeological reconstruction: illustrating the past*
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