

Maritime

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Resource Assessment

Introduction

Maritime matters are all too often neglected in the archaeological studies of the British Isles: the opportunity to contribute to a regional resource assessment and to a research agenda is thus to be welcomed. It is a subject which may be studied by archaeological investigation both on land and at sea, as well as by non-intrusive methods such as geophysical survey or through the study of historic documentary and cartographic sources, maritime place names, iconographic evidence, port-books, charts from the UK Hydrographic Office and maps provided by the Ordnance Survey. The maritime

historic environment is not just concerned with boats and ships, but with looking at the land from the sea and vice versa. It is a very diverse subject which covers a wide array of different site types including the coasts and rivers worked by the boats, the harbours they berthed at, the shipyards that built them as well as the trade and industries that they supported; something that is occasionally directly evidenced through the discovery of cargo within wrecks. It is concerned with the study of former terrestrial landscapes and coastlines which have been submerged due to changes in the sea level or coastal erosion. It is also a study of the history of those who lived on or by the sea, through trade, fishing, shipbuilding, piracy, enduring the threat of storms, floods and foreign invasions. Deriving one's living from the land can be hard, but from the sea it can be unforgiving: as a consequence, coastal communities often have more in common with other coastal communities than with settlements inland.

The south-east corner of England has a long coast, cut by tidal estuaries and creeks: it has been much altered by rising sea levels, erosion and the silting of rivers, creeks and harbours. Maritime archaeologists must plot the coastal change century by century if they are to record and understand the landscapes and seascapes settled, navigated and exploited by our predecessors. Study of the maritime historic record therefore encompasses waterfront archaeologists, nautical archaeologists, terrestrial archaeologists, geoarchaeologists and hydrologists working within and across all periods, on land, on the foreshore and underwater. This chapter first briefly looks at some of the studies that have been undertaken on the terrestrial landscapes that have been lost to the sea, though this is a subject which is covered in greater depth within the Geological and Environmental Background chapter. A more detailed review is offered of the evidence for maritime transport from this region. Finally, consideration is given to the broader contexts and environments in which those vessels operated: the maritime landscape, maritime centres, maritime industries and maritime defences.

Submerged Landscapes

During the earliest phases of human occupation in Britain, even periods of high sea-level did not always lead to complete isolation. For much of the Lower and early Middle Pleistocene, Britain remained connected to Europe across a substantial land bridge along the axis of the Wealden Anticline, a 100km-wide neck of land which includes the South and North Downs and their equivalents on the French mainland (Gibbard 2007). Nevertheless, dramatic global sea level changes resulted in the transgression of the sea and the flooding of large terrestrial and coastal areas. Today, parts of the ancient coastal zone are submerged, together with prehistoric and historic human artefacts (Gregory and Manders (eds) 2015). The coastal and intertidal exposures of submerged forests (Reid 1913), peats (Hazell 2008) and channels revealed after storms and at low tides informed early scientific studies. Alongside this, in the 20th century, the intensification of seabed trawling, private collection from the foreshore and the development of professional archaeology has led to a more developed understanding of these lost landscapes (Pope and Bates 2016).

Research, heavily supported by English Heritage (now Historic England) through the Aggregates Levy Sustainability Fund (ALSF, discussed further below), has enabled a more accurate understanding of the distribution of ancient terrestrial deposits offshore, and their potential to preserve traces of ancient human activity. For example, the Seabed Prehistory Project (Wessex Archaeology 2008a) combined use of high

resolution geophysical and geotechnical surveys, dated deposits and remnant landscapes from pre-Anglian to post-Devensian times, to allow the reconstruction of the changing prehistoric landscapes and to provide a better understanding of when and if these sites would have been exploited by humans in the past. Investigations in the eastern English Channel area (c. 30km offshore south-west of Beachy Head, West Sussex), associated with this ALSF funded project, revealed evidence of sub-aerial exposure of deposits dating to the late middle Palaeolithic Devensian period from which in-situ archaeological material may be gathered (Wessex Archaeology 2008b).

Recent work undertaken by Danish researchers has drawn together and compared the available datasets in an interactive GIS and enabled the identification and mapping of areas with the potential to produce in-situ archaeological sites (Gregory and Manders (eds) 2015). This work produced a general hypothesis that evidence of prehistoric activity will be found in the vicinity of palaeovalleys and palaeochannels, which are relatively apparent in the geophysical data (Fischer 2004). No in-situ archaeological sites were uncovered during the eastern Channel study, and unlike the Danish study, the area was not big enough to allow the allocation of any site location model. Despite this, the study provided a useful 'snapshot' of a multi-layered palaeochannel system, with sediments covering a time span from the Saalian (Complex) to the Holocene/early Mesolithic period (Wessex Archaeology 2008b).

Further work on submerged landscapes was undertaken as part of the Hoo Peninsula Historic Landscape Characterisation and Historic Seascape Characterisation. Within this study information about archaeological deposits situated within fluvial deposits deriving from the migrating River Medway and River Thames and marine deposits associated with fluctuating sea levels was drawn together and examined (Hazell 2011). The combination of fine grained alluvium (preserving organic remains) and the sand/gravel deposits (lacking abundant biological remains, but suitable for Optically Stimulated Luminescence dating) makes the Hoo Peninsula ideal for detailed palaeo-environmental investigations into submerged landscapes and the Characterisation project identified a number of areas where further research would produce good results (Hazell 2011).

The Aggregates Levy Sustainability Fund (with Dr J Flatman)

The Aggregates Levy Sustainability Fund made a major contribution to maritime research in the marine zone in general, and in the coastal area of this region in particular, through a number of initiatives in the programme that ended in 2011. The English Heritage objectives for the ALSF were to develop capacity to manage aggregate extraction landscapes (including marine aggregates), to deliver benefits of knowledge gained through past work in advance of aggregates extraction, to reduce physical impacts of current extraction where these lie beyond current planning controls, to address effects of old mineral planning permissions and to promote understanding of the conservation issues arising from the impacts of aggregates extraction on the historic environment. Several projects that deal with maritime archaeological issues were undertaken, including:

- 3280 / 3281 / 4521: The Depositional and Landscape Histories of Dungeness Foreland and the Port of Rye (Long, Waller and Plater 2007)
- 3322: Artefacts from the Sea (Wessex Archaeology 2007a)

- 3323: England's Shipping (Wessex Archaeology 2007b)
- 3324 / 3594 / 3877: Wrecks on the Seabed / Multibeam Sonar (Wessex Archaeology 2007c)
- 3362: Re-assessment of the archaeological potential of continental shelves (Dix, Quinn and Westley 2008)
- 3364: High resolution sonar for the archaeological investigation of marine aggregate deposits (Dix 2008a)
- 3365: Modelling Exclusion Zones for Marine Aggregate Dredging (Dix 2008b)
- 3645: BPMAPA Protocol for Reporting Finds of Archaeological Interest (Wessex Archaeology 2017)
- 3767: On the Importance of Shipwrecks (Wessex Archaeology 2006)
- 3837: Rapid Archaeological Site Surveying and Evaluation in the Marine Environment (Bates 2007)
- 3876 / 4600 / 5401 / 5684: Seabed Prehistory (Wessex Archaeology 2009a and b)
- 3916: Identifying Shipwrecks of Historic Importance lying within Deposits of Marine Aggregate (Bournemouth University 2007a)
- 3917: Mapping Navigational Hazards as areas of Maritime Archaeological Potential (Bournemouth University 2007b)
- 4632: Transition Zone Mapping for Marine-Terrestrial Archaeological Continuity (Contiguous Palaeo-Landscape Reconstruction) (R Bates, M Bates, Dix and Henstock 2009)
- 4716: Maritime and Marine Historic Environment Research Framework (Adams et al., 2013)
- 4740: Assessment of Archaeology within Marine Aggregate (Satchell 2007)
- 5083: Refining Areas of Maritime Archaeological Potential (AMAPs) for Shipwrecks (Bournemouth University 2009)
- 5223: Aircraft Crash Sites at Sea (Wessex Archaeology 2008a)
- 5224: Development of a Regional Sediment Mobility Model for Submerged Archaeological Sites (Dix 2010)
- 5254: England's Historic Seascapes: HSC Method Consolidation (Cornwall Council 2008)
- 5383: Marine Class Description and principals of selection for aggregate producing areas (Wessex Archaeology 2008b)
- 5555: England's Historic Seascapes: Demonstrating the Method (SeaZone Solutions Limited 2011)
- 5653: AMAP2 – Characterising the Potential for Wrecks (SeaZone Solutions Limited, University of Southampton 2012)
- 5671: Developing Magnetometer Techniques to Identify Submerged Archaeological Sites (Cornwall Council 2010)
- 5693: Assessing Boats and Ships 1860-1950 (Wessex Archaeology 2011)
- 5736 Historic Seascape Characterisation (HSC): Hastings to Purbeck and Adjacent Waters (SeaZone Solutions Ltd, Maritime Archaeology Ltd 2011)
- 5737: International Marine Aggregates Management Strategic Review (Flatman and Doeser 2010)
- 5750: Our Marine Historic Environment (Virginia Dellino-Musgrave 2011)

Some of these projects are directly concerned with this region, and thus merit further comment here. Rye/Dungeness (3281) produced an environmental history for evolution of the port of Rye and its environs during the last 3000 years, detailing landscape changes associated with development of the sand and gravel beaches, as well as a large-scale survey of Dungeness Foreland, outlining a depositional history for gravel beach formation, storms, sediment supply and landscape change during the last 5000 years. These studies were multidisciplinary, with archaeologists working with geologists and historians, and the Archaeology Data Service (ADS) provides an important primary archive for the digital datasets arising from all ALSF-funded projects.

Artefacts from the Sea (3322) focused on an initial study region between the western Solent and River Tees, using documentary sources (antiquarian journals), National Monuments Records and ten local authority Historic Environment Record databases. A database was produced containing approximately 2300 records of small finds recovered from the sea. Exclusion zones on the seabed have also been suggested, in an attempt to rationalise the amount of seabed being excluded from dredging licence areas.

Rapid Archaeological Site Surveying and Evaluation in the Marine Environment (3837) considered a rapid geophysical survey methodology for enhanced investigation of marine sites in sensitive aggregate areas, using enhanced multibeam sonar with a spar-buoy, and a deep-tow arrangement. This was tested on the protected Stirling Castle wreck (1703) in the Goodwin Sands. Such technology allows multiple returns to the site, and monitoring of its condition, while also generating good quality data: the work is much faster than geophysical survey on land. Historic palaeolandscapes have also been mapped using these remote sensing techniques, but mostly outside the region. There is a strong case for carrying out such work on the north Kent coast, while the study of the submerged palaeo-River Arun off the Sussex coast shows the high potential of this approach.

England's Historic Seascapes (HSC) (5254 and 5555) sets out a method for mapping the historic character deriving from human activity in the marine environment within a Geographic Information System (GIS) using historic charts, maps and associated documentary sources alongside modern marine data. It is guided by the principles of Historic Landscape Characterisation (HLC) to define areas of the maritime environment as 'types' of historic seascape, allowing historic trends, processes and patterns of activity to be understood within modern seascapes. The methods from five pilot projects undertaken across the UK were reviewed and the most useful elements from each were identified. The methodology was finalised in 2008 and has since been implemented in a number of areas, including at a national strategic scale over areas west from Hastings: Historic Seascape Characterisation (HSC): Hastings to Purbeck and Adjacent Waters (5736). This resulted in a GIS-based characterisation of the project area, extending from Hastings, East Sussex, to Purbeck, Dorset and seaward across the adjacent waters to the Median Line to

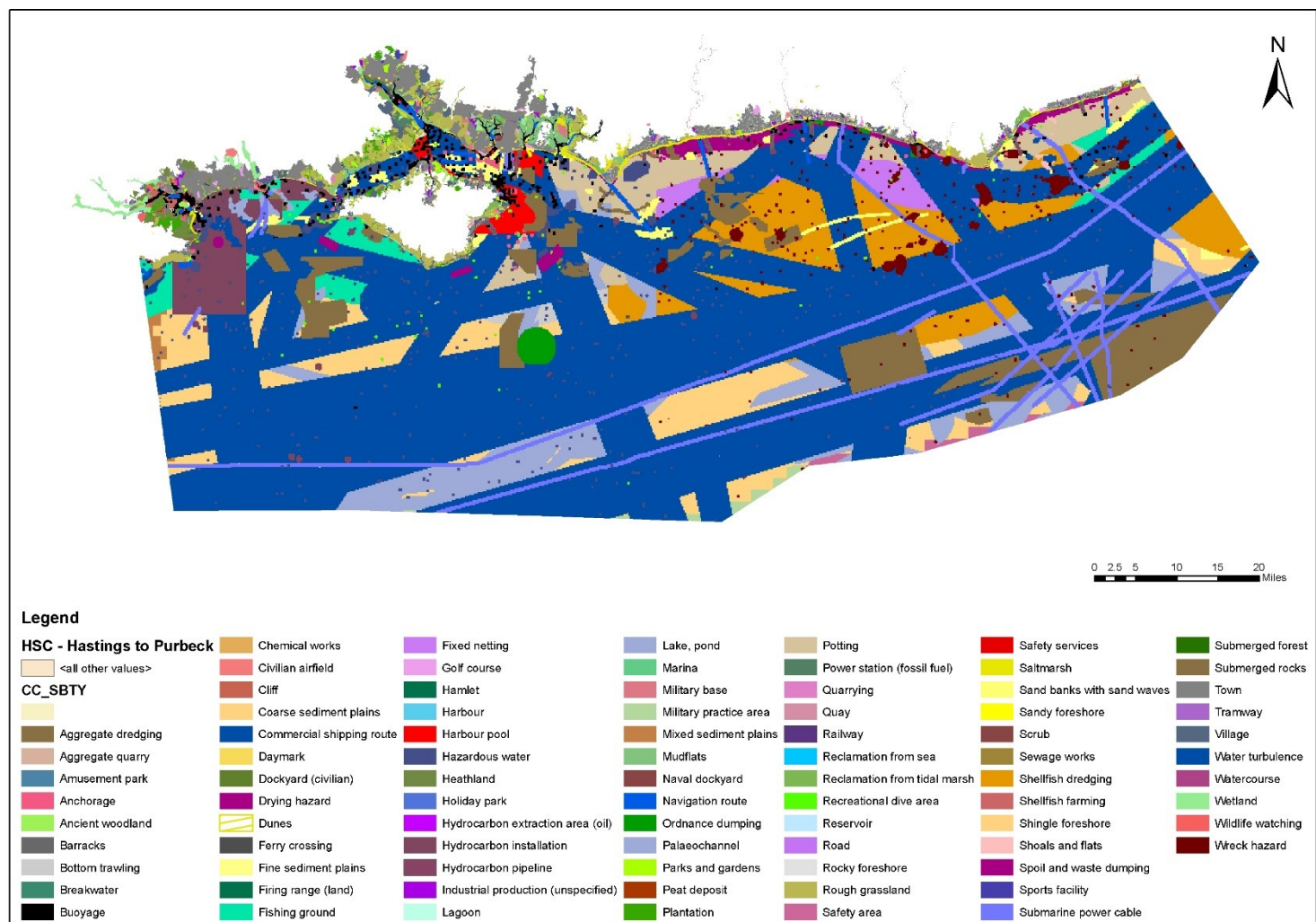


Figure 1 Coastal and conflated sub-character types from the Hastings to Purbeck Historic Seascape Characterisation (SeaZone Solutions Limited, Maritime Archaeology Ltd 2011)

France. The characterisation comprises the project's output HSC GIS and a series of national and regional perspective Character Type text descriptions linked to that GIS.

Nautical archaeology in south-east England: a resource assessment

Unlike maritime archaeology, which is a very wide umbrella-term covering the study of ships, ports, shipping remains, cargoes, submerged sites and landscapes, nautical archaeology specifically deals with the remains of ships, including both wrecks and hulks, above and below the low water mark. Some 8500 years ago, the Straits of Dover were finally breached, cutting off the British peninsula from the European mainland (Wenban-Smith 2007). From this point onwards, the history of the island and the development of the south-east corner of the British Isles took on an increasingly maritime outlook. All immigration, invasions, overseas traffic and trade depended on boats, barges and ships, and the skills to build and operate them: thus, it can be argued that the study of such craft is central to an understanding of our island's history. Indeed, the subject is arguably crucial to any historical evaluation of the coastal counties bordering the 'Narrow Seas' dividing Kent and Sussex from continental Europe.

Initially, such studies were based on rather meagre documentary sources (e.g. Oppenheim 1907; 1926a; Friel 1995) and on the representational evidence, as recorded in paintings, carvings in wood and stone, town seals, stained glass windows, or as graffiti (e.g. Farrel 1979). Since 1910, the Society for Nautical Research has published many papers in its journal (*The Mariner's Mirror*) that have significantly advanced the subject of, for example, medieval sailing ships (Greenhill 1995), as has consideration of the many contemporary depictions of Noah's Ark (Unger 1991). But such research needs to be related to the physical evidence provided by the remains of the actual vessels – the attempted integration of these contrasting data-sets is not without its challenges but is nonetheless a profitable avenue.

That said, the nautical archaeology of south-east England has had a rather slow and erratic course. Until recently, such study was often considered as a side-line or a sub-discipline, the practice of which was conducted outside the general remit of archaeological endeavour. This 'separateness' was clear even in the administration of the resource: it was only in 1990-2 that the National Monuments Record (NMR) set up its Maritime SMR (Sites and Monuments Records), while English Heritage's statutory curatorial responsibility was only extended to cover archaeology in English territorial waters as a consequence of the National Heritage Act 2002, when it continued the shipwreck monitoring work begun by the Archaeological Diving Unit in 1986.

As for the nautical archaeological resource itself, early investigation can be traced back to at least the 18th century. Logboats were discovered in the marshes near Maidstone in the 1720s, one of which was sufficiently well-preserved to float, and was thus subsequently reused (McGrail 1978: no.80). Then there was the discovery of Roman pottery by fishermen from the Thames Estuary off the north Kent coast (Pownall 1779), suggesting that at least one Roman vessel grounded on the Pudding Pan Sands. More recent research carried out by divers from the University of Southampton (in particular Michael Walsh), in association with oyster fishermen of Whitstable, tried to map the

distribution(s) of the material, and isolate clusters that might indicate the presence of a wreck or wrecks (for detail go to the University of Southampton web pages at: <http://www.arch.soton.ac.uk/Research/PuddingPan/>).

A truly pioneering study of nautical archaeology was conducted in 1820 when a large clinker-built vessel of late medieval type was uncovered below 6m of sand next to the River Rother, near Rye (East Sussex). The discovery was subject to a detailed record by William McPherson Rice, a naval architect, who also described a wide range of finds associated with the ship (Rice 1824). The vessel now seems to be of early 16th-century date (Fenwick 1978, 260). The hull remains were even lifted and transported to London for public display but then deteriorated through inadequate provision of conservation facilities. There was rather less academic input when the wreck of a later 16th-century merchantman was discovered off Whitstable (Kent) a generation later. Much of its cargo of 2700 tin ingots was salvaged in a major diving project overseen by the Duke of Wellington, as Lord Warden of the Cinque Ports, but with little thought for the hull itself (*Journal of the British Archaeological Association* 2, 1847: 361-2). By chance, the remains of this wreck were rediscovered over 150 years later by the Port of London Authority during a channel clearance operation, and are now, at last, the focus of a detailed study programme. Moving back to the south coast, part of a (presumably medieval) clinker-built boat was noted when exposed on the foreshore near Bexhill, East Sussex, in 1857, but not excavated until thirty years later (Mon. no. 414455), a pioneering example of inter-tidal zone archaeology. Finds of more logboats were made along the river systems as dredging or river-widening work progressed, at the rate of about one every ten to fifteen years, from at least the mid-19th century onwards.

In the early years of the 20th century, the recording of the County Hall Roman Ship (Riley and Gomme 1912; Marsden 1994) and the Woolwich late medieval Ship (Salisbury 1961) on Thames-side sites in the ancient counties of Surrey and Kent respectively provided sound models to build on. The 1960s and 1970s saw the development of recreational SCUBA diving, leading to many more discoveries offshore: the extent of the nautical archaeological archive suddenly increased dramatically, leading to recognition of the rich but inadequately protected archaeological resource surviving in our coastal waters. The investigations were not always undertaken by trained archaeologists, but pressure from organisations such as the Committee for Nautical Archaeology helped set in place the Protection of Wrecks Act (1973). Although this act was very much seen as a compromise between initiating some measure of archaeological controls without unduly threatening existing rights of salvage, it has led to the protection of 72 Vessels in British waters. Those protected under this legislation include British warships sunk during the Great Gale of 1703 in the Goodwin Sands and a British East Indiaman lost in the Thames Estuary in 1809.

Meanwhile, back on terra firma, the 1960s and 70s saw major redevelopments that impacted upon the terrestrial maritime archaeological resource. The response was mixed. In the ancient port of Dover, Herculean efforts led to the discovery of the *Classis Britannica* fort there (Philp 1981), while vessels were disturbed during main drainage works at Eastbourne (Hutchinson 1994, 191), Rye (Lovegrove 1964) and Sandwich (Trussler 1974) between 1963 and 1973, but with rather less support for the archaeological recording than was appropriate. To the north on the London waterfront,

no less than four wrecks were 'investigated' during river-wall replacement work from 1962-71, but with never more than a two-week window set aside for archaeological recording (often substantially less, e.g. Marsden 1994; 1996): this was not a model approach to export to the rest of the region. Indeed, it was the work on the Saxon vessel uncovered on the Graveney marshes in 1971 that set the new standards, not least with the prompt and detailed publication by Valerie Fenwick (1978). This project was also a major catalyst for the establishment of the short-lived, yet highly-influential, Archaeological Research Centre at the National Maritime Museum. Although disbanded in 1985, several former staff members continued to make a real contribution to the subject, most notably Professor McGrail (e.g. McGrail 1978; 1987) but also Ian Friel (curator of the Littlehampton Museum, e.g. Friel 1999) and Gillian Hutchinson (e.g. 1994).

A second major influence on the maritime archaeology of the South-East, although once again technically outside the current county boundaries under consideration here, lies in the waterfront archaeology programme conducted in Greater London since 1971. The recording of harbour works and vessel remains of Roman, Medieval and later date in the City, in Southwark and in Kingston-upon-Thames has provided evidence of the range of maritime features that could be anticipated elsewhere: indeed, several of the sites were in the ancient counties of Kent and Surrey. The Museum of London staff also included several persons who have contributed directly to the maritime archaeology of Kent and Sussex, including Peter Marsden (Marsden 1985; 2003) and Damian Goodburn, who amongst many other projects, contributed to the research on the Dover Bronze Age Boat. And it is with that internationally-significant project that this summary review concludes: the dramatic discovery in 1992 of a c.12m-long vessel dating to c.1600 BC in a silted up palaeochannel exposed during redevelopment works under the A20 in the heart of Dover. Its excavation, study and publication by Peter Clark and his team (2004a and 2004b), together with its conservation and display mark a milestone in the development of maritime archaeology in the region and the nation.

The vessel can now be seen in the Dover Museum, one of several sites in the region which have developed maritime themes over the last 30 years, reflecting increasing public interest in such matters. Chatham Dockyard is another that has attracted much interest and research: the discovery of some 245 giant timbers from the 18th century British warship HMS Namur led to the opening of the Command of the Oceans exhibition within a sunken gallery underneath the Wheelwright's Shop. Others include the Brighton Fishing Museum, the Fishermen's Museum and the Shipwreck and Coastal Heritage Centre in Hastings, the Dolphin Yard Sailing Barge Museum near Sittingbourne, Kent (destroyed by fire in 2008), and maritime museums in Newhaven and Shoreham (Marlipins) in East Sussex, and Deal, Ramsgate, and Whitstable in Kent.

Finally, mention should also be made of the recent Historic England guidance on Ships and Boats:

<https://historicengland.org.uk/listing/selection-criteria/wreck-selection/>



Figure 1 The Dover Bronze Age boat under excavation. Kent County Council

Nautical Archaeology underwater, on land and in the inter-tidal zone (including a summary of marine management practice by Dave Hooley)

Nautical archaeology is not, however, just a synonym for underwater archaeology, since although vessel remains can be investigated by divers operating in the open sea, as in the case of the protected wreck of the *Hazardous* lost in 1706 in Bracklesham Bay, West Sussex (Owen 1988), many vessels have also been found above the low-water mark. Examples here include the *Amsterdam* 1749 (Nash 1985) and the *Anne* 1689 (Hepper 1994), beached on the East Sussex coast near Hastings as a consequence of storms or enemy action respectively and both now protected wreck sites. Obviously rather different methodologies and approaches are required when recording such vessels, not least because most of the remains investigated off the coast or on a naturally-eroding foreshore lie outside the remit of terrestrial planning legislation (the National Planning Policy Framework applies to all Local Authority Planning Areas to mean low water) and the threats to their survival are often not development-related. However, the Marine and Coastal Access Act 2009 introduced a new system of marine management and established an independent body, the Marine Management Organisation (MMO). The MMO is an executive non-departmental public body (NDPB) and reports formally to Parliament through the Secretary of State. The principle objective of the MMO is to make a significant contribution to sustainable development in the English marine area of the UK Territorial Sea (to twelve nautical miles offshore) and the adjacent area of the UK Continental Shelf (to a maximum of 200 nautical miles offshore). In doing so the MMO prepares marine plans and acts as the appropriate marine licensing authority.

The marine licensing system covers a broad range of activities, such as schemes for wind farms and for new marinas as well as dredging and aggregate extraction and

projects directed at historic or archaeological sites. The MMO in determining an application must have regard to 'the need to protect the marine environment', which is defined as inclusive of any site (including the remains of any vessel, aircraft or marine structure) which is of historic or archaeological interest. The UK Marine Policy Statement, jointly published by all UK Administrations in 2011, recognises the need to protect and manage marine cultural heritage according to its significance. In order for the MMO to determine the significance of seabed historic or archaeological sites, Historic England is the primary advisor to the MMO for all marine works requiring consent that affect the marine historic environment. Since the 2009 Act marine archaeology has increasingly been conducted through the planning process, utilising contract-archaeologists as opposed to the previous situation where it was more commonly undertaken by sports divers working in their own time.

There are, in addition, major site types where nautical archaeological remains can be anticipated on what are now terrestrial sites, and therefore can be recorded by 'dry-land' archaeological teams, in advance of redevelopments. These sites can be represented by coherent vessel remains discovered in silted-up palaeochannels or former estuaries, as was the case for the Bronze Age Dover Boat (Clark 2004a), or by disarticulated vessel remains, perhaps re-used in waterfront revetment structures, as has been the case on many Thames-side sites (Goodburn 1994; Marsden 1996; Milne 2003, 165-174). Vessel fragments can also be recovered from inter-tidal or submarine sites, such as the two rudders trawled up from Rye Bay in the 1980s (Marsden 1994). One was an 11th–12th-century side-rudder over 6m long, and consequently represents a ship of some size for that period. The other was a stern rudder c.4.5m long, representing a later 14th or early 15th-century ship of a quite different design (Marsden 2003). These finds also represent two major catastrophes: if a ship lost its rudder in a storm, it could all too easily be wrecked subsequently.

Wrecks and Hulks

It is also worth stressing the differences between 'wrecks' and 'hulks', since there is a significant archaeological distinction. Wrecks are vessels lost by accident, storm or enemy action during their working life, and may thus have sunk complete with their contents, cargo and crew, creating the oft-quoted 'time capsule' scenario where all the material recovered can be shown to be of one date. The archaeological potential of such sites is thus considerable, provided of course that the hull remains relatively coherent and that the assemblage has not been dispersed by strong currents beating against rocky shores. Sudden storms, treacherous sand banks and enemy action have all played their part in the sinking of thousands of vessels off the English coast: according to the National Record for the Historic Environment, documentary records can account for at least 100 medieval wrecks, over 500 16th and 17th century wrecks and some 2,000 18th-century wrecks in the seas off Kent and Sussex alone. Although less than 1% of these reported losses have been 'ground-truthed' by archaeologists, if just a tenth of them survive, they represent a major archaeological resource, albeit one that is hugely expensive to record in any detail.

Again, it is not just the individual vessels and their associated contents that could be so archaeologically significant, but also the 'group value' of wrecks in the plural. For example, the vessels lost in the Thames Estuary off the north Kent coast not only show a remarkable potential date range (from the Roman period to the mid-20th century),

but also a staggering variety of vessel types, by no means all of which are British. According to the National Record for the Historic Environment database, there are (or were) sailing barges, brigantines, schooners, tugs, cutters, colliers, drifters, trawlers and paddle steamers: an evocative picture of the busy and varied life of the river.

Finally, there are the 'catastrophe cemeteries', those vessels all sunk together in a great storm, as in November 1703, or in war. In 1666, for example, there was the Battle of St James' Day, between the English and the Dutch: at least six English fire ships sank in the Estuary (*Providence, Land of Promise, Abigail, Blessing, Fortune, Great Gift*), the large warship *Resolution*, and at least one Dutch fire ship. A more recent example is provided by a First World War surrendered German submarine that was beached on the mudflats of the Medway Estuary, after breaking free when being towed off for scrap. The Second World War is also represented, not just by several aircraft crash sites, but by at least two destroyers (*HMS Venetia* and *HMS Blanche*), some motor torpedo boats and a minesweeper. There were also several trawlers conscripted by the Navy for minesweeping duties, with fatal consequences; the Battle of Britain was not just about Spitfires, but about fishing boats too.

In contrast to a 'wreck', a 'hulk' is a vessel abandoned at the end of its operative life, often in a creek or similar backwater, where it is stripped bare of its contents and superstructure, usually just leaving the basal hull timbers. Although not superficially as dramatic a discovery as a wreck, the archaeological dividends are considerable. Such vessels are usually encountered on what are now dry-land sites, the creek having subsequently silted up, and can thus be recorded by standard terrestrial methodologies and procedures (with the addition of a pump). Attention can thus be more readily focused on the complexities of the hull structure, on parent log and parent tree studies, on examination of seam fastenings and seam waterproofing and so forth. There is much to be gained from hulk studies, and it should be remembered that our knowledge of ancient ships would be much the poorer if we only relied on the evidence from deep-water wrecks: far more hulks have been recorded, studied and published in more detail than wreck sites. Hulks such as the Graveney Saxon vessel (*Fenwick 1978*) and the Sandwich medieval merchantman (Milne 2004), for instance, were major discoveries, both unexpected in their particular 'dry-land' locations. Careful mapping of our palaeo-coastlines will help to ensure that such finds are less of a surprise in the future: what can be safely predicted is that many more such hulks – often found in groups in the nautical equivalent of 'attrition cemeteries' – will be located as more redevelopment takes place on riverside, estuary and coastal sites.

Boats, 'barges' and ships

The final definitions to be considered, when assessing vessels in antiquity, are those of the small boat, boat, 'barge' and ship. These terms are used here as guidelines to focus research rather than as 'legal' definitions. They are taken to represent particular socio-economic types of vessel, each one operating in rather different environments, and built with particular needs in mind.

- A small boat would be built and owned by a waterside family or community, for working on an inland waterway as an all-purpose craft: it could be rowed, paddled or poled.
- A boat would be larger, and thus better suited to estuarine or coastal work, as

a fishing or trading vessel for example, that could be rowed or sailed.

- A 'barge' is here used to describe a wide-beamed, flat-bottomed vessel specifically designed to accommodate bulky cargoes, usually on inland waterways: propulsion would be provided by oars, poles or a sail, or possibly by towing, if there were suitable towpaths.
- Ships, by contrast, were designed to cross the open sea or voyage around the coastal waters, either as warships, as merchantmen or as less specialized, all-purpose vessels. Such craft required greater resources to build and larger crews to operate, be they rowed or sailed. Although the size of boats and 'barges' remained more or less the same over the last 2,000 years, the size of the largest ships increased dramatically from the 13th to 14th centuries onwards.

From all this it follows that ships will usually (but not always) be discovered as wrecks by underwater archaeologists diving offshore, whereas the remains of boats and 'barges' (either as hulks or as vessel fragments) are more likely to be recovered by terrestrial archaeologists working on sites that are now inland. So, in order to compile a truly representative cross-section of the vessel-types from each historical period, a combination of work underwater, in the intertidal zone and on land is required.

Small boats

Our region boasts a fine assemblage of such vessels, built in the remarkably long-lived 'logboat' tradition, which lasted from the prehistoric period, through the Roman and into the 13th century. Although derided by some archaeologists (e.g. Marsden 2003, 227), these robust and superficially unsophisticated vessels were the vernacular boats of the inland waterways of Europe: the distribution across our region shows clear clusters on the Arun, Wey and Thames, as well as in the marsh-lands, levels and lagoons, representing the spread of extant environments where the remains of such boats are likely to survive. These craft opened up those waterways and landscapes for those who lived and worked there: the importance of such craft to those societies needs to be stressed, as does the remarkable 'continuity' such a structural tradition implies. Examples have been recovered since at least the 18th century, with most of the recorded discoveries ranging from 1834 to the late 20th century. Professor McGrail (1978) has listed most of the key logboat finds from south-east England:

- Amberley I, II and III; River Arun (Sussex) 1964 (TQ01881341); two fragments from boat 2.6m long; 4.6m fragment from a second vessel dated to c. 7th century AD 1310 BP +/- 70 (McGrail 1978 nos. 1-3)
- Burpham I, River Arun (Sussex) 1858 (TQ 0285 0780); fragment 4m long (McGrail 1978, no. 23)
- Burpham II River Arun (Sussex) (TQ 0333 0819); exposed but not excavated in 1862 (McGrail 1978, no. 24)
- Byfleet River Wey (Surrey) 1907 (TQ 06 61); 3m long (McGrail 1978 no. 26)
- Hardham I and II, River Arun (Sussex) (TQ 0458 1700 and TQ 0476 1711); two more or less complete logboats up to 4m long found during dredging in 1964; the second vessel may date to the 3rd century (McGrail 1978, nos. 54-5)
- Harham III; River Arun (Sussex) (TQ 052 172); fragment less than 3m long found during dredging, 1964 (McGrail 1978, nos. 56)
- Maidstone; River Medway (Kent) (TQ 70 53); several found in marshes in c.

- 1720, one re-used as vessel (McGrail 1978, no. 80)
- Molesey I, River Thames (Surrey) (TQ 154 684); 4m long found during fishing in 1877 (McGrail 1978, no. 97)
 - Molesey II, River Thames (Surrey) (TQ 13 68); 4.5m long and dredged up in fragments 1891-2 (McGrail 1978, no. 98)
 - Murston, River Swale (Kent) (TQ 9240 6590); 3.5m long and found in 1924 (McGrail 1978, no. 100)
 - North Stoke near River Arun (Sussex) (TQ 0213 1029); up to 10m long; reused as bridge support identified in 1834; now in British Museum (McGrail 1978, no. 103)
 - Pevensey, Hooe Levels (Sussex) (TQ 69 07); observed in c. 1890 (McGrail 1978, no. 109)
 - Pulborough near River Arun (Sussex) (TQ 04 18); 9m long; found in 1901 in Lower Street (McGrail 1978, no. 115)
 - Sandwich Bay, River Stour (Kent) (TR 36 58); found in 1936 (McGrail 1978, no. 119)
 - Seasalter (Kent) (TR 0865); 6m long; observed on tidal mudflats in 1970 (McGrail 1978, no. 122)
 - South Stoke (Sussex): may be Burpham 2? (McGrail 1978, no. 129)
 - Walton on Thames (Surrey) (TQ 0990 6710); c. 6m long and found in 1966 (McGrail 1978, no. 142)
 - Weybridge, at the confluence of River Wey and Thames (Surrey); found in 1892 (McGrail 1978, no. 158)
 - Weybridge (Surrey): fragment of small late medieval clinker-built boat excavated in 1931 from the riverbank and now in Weybridge Museum (Hutchinson 1994, 198).
 - Wisley, River Wey (Surrey) (TQ 0632 5988); 3m long found in 1907 (McGrail 1978, no. 168)
 - Worthing, (Sussex) (TQ 139 019); 5.5m long and thrown up onto the strand after storm in 1843 (McGrail 1978, no. 171).

Boats

This class of vessel is rather poorly represented in our region:

- 12th–14th-century Eastbourne (Sussex) Monument no. 411899; clinker-built boat c. 4m wide, exposed during sewer laying operations in Eastbourne, 1963 (Hutchinson 1994, 191).

For vessels of this size-class recorded elsewhere, see, for example, the 8m x 3m fishing boats from Poole, Dorset, represented by disarticulated framing elements excavated from a 15th-century foreshore boatyard (Watkins 1994), up to the Magor Pill boat from the River Severn, a 13th-century river craft some 14m long by 3.7m wide (Nayling 1998).

'Barges'

No examples of ancient 'barges' have been found in this region. For vessels of this size-class recorded elsewhere see for example the scheduled Roman lighter from New Guys House, in Southwark (Marsden 1994, 97-104); for medieval river vessels see the

13th–14th century barge fragments from Kingston-on-Thames (Good et al. 1991, 108-11, 143-6), the two late 14th-15th century barges wrecks from Blackfriars, London (Marsden 1996, 55-106) and sections of 16th- and early 18th-century 'western barges' from Southwark (Goodburn 2002, 84-9).

Ships

This listing summarises principal sites already identified on land or in the inter-tidal zone (either by their contents or the hull remains), together with underwater sites designated under the Protection of Wrecks Act 1973 (pre-fixed PWA) that enables designation of sites up to twelve nautical miles off shore. The list excludes the large number of vessels known to have sunk off the Sussex and Kent coasts, the locations of which have yet to be identified.

Bronze Age

- Langdon Bay, Dover (PWA: TR 3414 4176), Middle Bronze Age 1150BC, c. 360 items, including three types of axe, of which some 50 were of the median winged type, rapier blades, spear heads, pins, bracelet fragments and a knife blade (Muckelroy 1981, Fenwick and Gale 1998, 26-7)
- Dover, Kent Bronze Age Boat Remains of a c.12m long vessel dating to c. 1600BC, comprising at least six massive planks joined with cleat construction and sewn together with yew withies, recorded during building works below the A20 in 1992 (Clark 2004a; 2004b).

Roman

Four possible wrecks of merchant vessels are represented by Roman artefacts recovered from the seabed:

- Tiles from the Channel off Hove (East Sussex) (Wessex Archaeology 2013)
- Pottery from the Thames Estuary, with Samian Ware from Pudding Pan Sands Dating to c. AD200 (Smith 1909)
- Mortaria from Ooze Deep (Dean 1974)
- 1st-century Mortaria from Herne Bay (Hartley 1977, 6).

Examples of the ships that worked the coasts and rivers of the region have been excavated at Blackfriars and County Hall in London, just to the north of the Assessment Area (Marsden 1994). The role of the *Classis Britannica* (Mason 2003) is of particular importance to the region in the 1st and 2nd centuries: bases have been excavated at Dover (Philp 1981) and identified at Lympne, while a possible ship-building site for the fleet has been tentatively identified in what is now the Romney Marsh area (Milne 2000).

Anglo-Saxon

- Metal fastenings, clenched nails and individual roves, from 5th–7th century graves, representing a clinker-built ship-building tradition in Kent a century earlier than the famous 'Sutton Hoo' Mound 1 ship burial of c. AD 625 (Brookes 2007b)
- Graveney Ship, Kent: substantial remains of a clinker-planked, robustly-framed, double-ended, undecked vessel some 14m long were disturbed during drainage works in marshland; they were recorded, researched and published in an

exemplary fashion (Fenwick 1978); now dated to c. AD 895+/-2

- Sandwich Bay, Sandwich Kent: Monument no 1193961; a watching brief conducted in 1993–4 during sewer excavations recorded timberwork from a possible vessel, dated by C14 to c. 970–1160 (Hearne and Perkins 1995).

Medieval and later

- Late 14th century, Sandwich, Kent (TR 335 581): hulk laid up in silted-up creek disturbed by the digging of a deep sewer trench, near Sandown Bridge; timbers recovered represent substantial late medieval clinker-built merchantman in excess of 25m long (Trussler 1974, Milne 2004)
- Pre-16th century, Rye East Sussex; fragments of two clinker-built sailing ships were disturbed (but not destroyed) during sewer pipe excavations to the north of the town in 1963 (Lovegrove 1964)
- Late Medieval shipyard assemblage: Smallhythe, Kent (TQ 892 300): 164 iron fastenings and joggled frame element representing clinker-built vessels recovered from 15th-century slipways on former bank of estuary (Bellamy and Milne 2003)
- Brighton Marina, East Sussex (PWA; TQ 33280294): late 15th-century ordnance recovered from sea around Brighton Marina including a bronze hackbut, presumably from a wreck dated to c. 1475 (Fenwick and Gale 1998, 60-2)
- Early 16th century, East Matham, near Rye, East Sussex (TQ 278868): a vessel of late medieval type c. 20m long was uncovered in 1822 (Rice 1824; Fenwick 1978, 260)
- 16th-century Tudor wreck, possibly a French cargo vessel stranded off Sandwich, Kent in 1542 (Mon no 144029: TR 36 SE 429; Receiver of Wreck Amnesty 2001)
- 1574, Gresham Ship: Princes Channel, off Whitstable, Thames Estuary, Kent; armed Elizabethan merchantman, initially with cargo of over 2,000 tin ingots salvaged in 1845. Substantial parts of the hull were subsequently revealed during channel clearance by the Port of London Authority in 2003, from which dendrochronological study has provided a construction date of c. 1574 (Auer and Maarleveld 2014)
- 1656, *London* The Nore, Thames Estuary (TQ 89848 80963): the *London* was a 2nd rate 'Large Ship' built in Chatham in 1656 during the Interregnum. She was known to have formed the English Squadron sent to collect Charles II from the Netherlands and restore him to the throne. The *London* blew up on passage from Chatham in 1658. Its wreck contains elements including structural timbers, artefacts and cannon (Historic England National List 1000088)



Figure 2. Wreck of the 'VOC Amsterdam', East Sussex (Marshall Pearce. Creative Commons)

- Dutch cargo ship, lost in the Goodwin Sands, Kent in 1636: bronze ordnance was recovered from the wreck at the time by the men of Ramsgate (Lord Warden of Cinque Ports, Admiralty Court/ Centre for Kentish Studies CPW/AS 1632–42, fol. 26, 29, 33)
- 1667 *Charles V* Chatham, Kent (TQ 76100 70300) was burnt by the Dutch while acting as a guardship at Chatham in 1667
- 1667, HMS *Resolution* Norman's Bay East Sussex (PWA: TQ 60 SE 30); British warship built Harwich, lost in the Great Storm of 1703
- 1678, HMS *Lenox* Sheerness, Kent (TQ 89940 75010); a 70-gun 3rd rate ship of the line, launched from Deptford in 1678 and sunk as a breakwater near Sheerness in 1756 (Lavery 1983)
- 1678, *Anne*, Pett Level, East Sussex (PWA: TQ 89771362): British warship 3rd Rate, built in Chatham, lost during Battle of Beachy Head, 30th June 1689 (Marsden and Lyon 1977, Fenwick and Gale 1998, 94-5)
- 1678, *Restoration*, Goodwin Sands, Kent (PWA: TR 44315709): British warship 3rd rate, built Harwich; lost at sea in the Great Storm, 26th Nov 1703 (Fenwick and Gale 1998, 100-1)
- 1678 *Northumberland* Goodwin Sands, Kent (PWA: TR 4431956803); a 70-gun 3rd rate ship-of-the-line, built in 1679 and lost in the 'Great Storm' of 1703. It was first discovered in 1979 after investigation of a fisherman's net fastener (Historic England National List 1000058)
- 1680, *Stirling Castle* Goodwin Sands, Kent (PWA: TR 4468 5864), British warship 3rd Rate, lost at sea in 1703 storm (Fenwick and Gale 1998, 96-7; Perkins 1999, 2003)
- 1698, *Hazardous/ le Hazardeux*, Bracklesham Bay, West Sussex (PWA: SZ 8056 9536), built in Port Louis, France: 3rd Rate French warship: captured by British; rebuilt Portsmouth 1704 as 4th Rate; lost at sea in a storm in 1706

(Owen 1991; Fenwick and Gale 1998, 134-5)

- 1727 *Grantham*, Folkestone Kent (PWA: TR 2396 3598); English built ship which was lost in 1744. It was an East Indiaman Ship which would have carried both passengers and cargo (Wessex Archaeology 2013)
- 1737 The *Rooswijk*, Goodwin Sands, Kent (TR 4948758840); Dutch East Company (VOC) vessel stranded en route from Texel to the East Indies in 1739. The vessel is described as a 'retourschip', a specific type of Dutch East Indiaman which was designed to withstand lengthy voyages of eighteen months to three years (Historic England National List 1000086)
- 1747, *Amsterdam*, Bulverhythe East Sussex (PWA: TQ 778 083); Dutch East Indiaman outward bound, badly damaged by winter storms, was forced to beach in January 1749 (Marsden 1985, Fenwick and Gale 1998, 76-7)
- 1787, South Edinburgh Channel, Thames Estuary, Kent (PWA: TR 2526 8616); Swedish merchantman (Fenwick and Gale 1998, 78-79)
- 1796 *Hindustan* Margate, Kent (TR 26200 76800); an East Indiaman of the East India Company, made three complete journeys but was lost on the fourth, wrecking at Margate in 1803 (Wessex Archaeology 2013)
- 1797, *Admiral Gardner*, Goodwin Sands, Kent (PWA: TR 4513 5304); British East Indiaman, sunk in a storm in 1809 en route to Madras (Fenwick and Gale 1998, 80-81; Larn and Larn 1995).
- 1803, *Diana*, East Dean, East Sussex (TQ 39060 01230); Brig, sunk during a voyage from Porta to Hamburg in 1803
- 1806, *Britannia*, Goodwin Sands, Kent (TR 46746 52625); an East Indiaman for the East India Company, made only one journey before being wrecked during a gale in 1809 (Wessex Archaeology 2013).

Victorian–modern

The NRHE lists some 4,000 entries for Victorian and modern wreck sites off the Kent and Sussex coast, ranging from fishing boats to a torpedoed liner. There is no room here to analyse this huge group: suffice it to say that the research potential for studies of British shipping is considerable. It is also worth noting the international perspective, for many of these vessels were foreign craft passing through the straits: the group includes vessels such as the Danish sailing ship *Thomas Lawrence*, wrecked some ten miles off the Hastings coast in 1863 on route to the Danish Virgin Islands (Marsden 2003, 233-4). In terms of the nautical heritage of our particular region, mention must also be made of English ships that foundered abroad: the brig *Isabella*, although built in Shoreham, West Sussex, was wrecked on the west coast of the United States in 1830, in the Columbia River near Fort Vancouver, for example (Delgado 1997, 207).

The marshy creeks and backwaters of Kent and Essex became the graveyards of many vessel hulks, particularly after World War II. One such assemblage was recorded at Whitewall Creek in advance of a new approach road leading to the Medway Tunnel in 1992–3 and can stand as our example here. Eighty-two vessels were listed, and a 'representative selection' recorded. They ranged from Thames sailing barges, swim-headed barges, lighters, World War II mine-sweepers, concrete lighters and a Medway Conservancy heavy lifting barge: the date range was from c. 1860 to c.1940 (Milne et al. 1998).

Maritime Economy – the Post Medieval period (Luke Barber)

The coastline of Kent and Sussex provided an important communication link that greatly enhanced the economy of both the coastal fringe and interior. A number of elements have contributed to this maritime economy, including trade, transport, specific industry and fishing. Historical overviews of coastal and riverine ports have been given for Kent and Sussex that chart their general evolution and trade (Lawson 2004a; Killingray and Compton 2004; Farrant 1999). Kent's main exports from the later 17th century consisted of corn, fish, wool, timber, copperas, fuller's earth and lime with imports including coal, dairy produce and from the Continent, wine, sugar and bricks. Specific trading ports have been subjected to a number of historical studies in the region such as those on Thanet (Andrews 1953), Faversham (Andrews 1955), and in Sussex (Farrant 1976) but the little archaeological work that has taken place remains isolated (Bradley and Phillpotts 2006), although recently significant archaeological excavation has been undertaken at Dover Western Docks (ASE in prep).

Dockyards were situated all around the region's coast though the largest were all in Kent. The naval dockyards here were the largest industrial establishment between 1500-1700, exploiting Wealden timber and cannon (MacDougall 2004a) with sites at Smallhythe, Woolwich and Chatham. Many of the small early yards went out of use and by 1600 Chatham was by far the most important, along with its outpost at Sheerness developed from the 1660s (Banbury 1971; Coad 1989; MacDougall 1987 and 2001; Palmer 1993). Shipbuilding in the Thames and Medway also included merchant and fishing vessels and there was an increase in timber ship building between 1800 and the 1860s. A comprehensive survey of Kent's barge building industry has listed 39 building/repair yards though only three remain active and extant remains at the others are rare (Eve and Worley 1999). From the 1820s iron steamers were built in Thames shipyards, which encouraged a marine engineering industry (Arnold 2000). By the 1870s iron shipbuilding in Kent fell due to competition from the north-east, and finally stopped in 1915 (Killingray and Crompton 2004). Sussex ports, such as Shoreham, also contained shipyards though most were involved with the construction of smaller vessels and the trade had severely shrunk by the start of the 20th century. Despite this Shoreham saw a brief revival building concrete ships as a result of the Great War (Kelly 2005). Many of the ship/boatyards in the region have since been lost to later development and even the largest have closed (Chatham's yard closed in 1984). Excavations at waterfront sites, such as that at Rotherhithe have shown the potential these sites have for producing evidence of post-medieval river walls, shipyards and other bankside industries (Heard 2003).

Fishing was a major industry in the region (Lawson 2004; Killingray and Compton 2004). Many fisheries were seasonal and operated on a small scale, usually working local waters although some also worked further afield. Important fishing ports included Gravesend, Hastings and Rye, though the industry slumped in the war years 1792-1815 and did not recover until the 1850s, when railways allowed quick transport of fish to market and some ports did well e.g. Ramsgate (Powell 1987). In the late 20th century decline set in again with fishing for the local market becoming the norm. Most

ports involved with the industry have surviving features such as the



Figure 3 Barge hulks at Hoo Saltings (Stefan Czapski. Creative Commons)

the net lofts at Hastings, but little work has been done on the industry. The oyster industry was also of importance to the region, particularly in the 19th century. Wild oysters were trawled in places such as the north Kent coast (Goodsall 1965) and off Beachy Head in East Sussex, and there were numerous artificial oyster beds created for farming. These are often visible on OS maps and many still survive as earthworks. It is commendable to see that the beds at Chichester have been the subject of an archaeological survey (CDAS pers. comm.). Remains are also to be found in north Kent, including 19th-century packing sheds, workshops and offices at Whitstable, oyster beds off Seasalter beach and a 19th-century brick-lined pond at Milton Creek, Sittingbourne (Eve undated).

Another aspect of the post-medieval maritime economy is the cross-channel ferry industry. Rye had cross-channel passengers between the 17th and 18th centuries and early in the 19th century Dover increased its crossings to four times a week (Killingray and Crompton 2004). However, the great expansion in the industry came with the railways. Between 1843-44 the South-Eastern Railway was the first to link its rail service to cross-channel steamers at Folkestone and the London Brighton and South Coast Railway were doing the same at Newhaven. In 1928 the first dedicated car ferry had been introduced and by the 1930s Southern Railway (an amalgamation of the earlier rail companies) had 16 ships at Dover and Folkestone alone. Growth of the

cross-channel passenger and freight traffic resulted in the rapid growth of ports like Dover in the second half of the 20th century. Such growth has resulted in dramatic redevelopment of the port facilities which have often removed earlier installations. The opening of Eurotunnel in 1994 and subsequent establishment of the high-speed rail-link has added a new dimension to the service (Goodenough 2004). A less obvious aspect of the cross-channel communication industry are the cross-channel cables such as the submarine telegraph to France opened in 1851 and linking London to Paris by phone in 1891 (Killingray and Crompton 2004).

Smuggling was rife in Kent and Sussex, most notably in the 18th-early 19th centuries when large, organised gangs such as that at Hawkhurst were common. The 'industry' has been romanticised at such places as St Clement's caves, Hastings and has attracted some historical research (Waugh 1985). Between 1817-31 the Royal Naval preventative force was stationed at regular points around the coast (Killingray and Crompton 2004) in an attempt to stop the illegal trade. Despite the amount of folklore, no archaeological work has been undertaken on the hideouts of the smugglers or the outposts of the preventative force.

Maritime Archaeology in south-east England: possible research themes

As the preceding section has shown, while the archaeological potential represented by vessel finds in the region is great, it has been no means been fully realised. The catalogue is clearly unrepresentative, as the spread of entries under each category and the chronological distribution confirm. The full study and publication of each of the vessels is the exception rather than the rule, as our bibliography painfully records. But this is just the first of the challenges, for maritime archaeology is not just about ships, but about the coasts and rivers they worked, the harbours they berthed at, the shipyards that built them, the trade and industries they supported, and the societies that lived on and by them. It is perhaps best defined as the study of the material remains of vessels, together with the associated harbours, all set in their appropriate environmental, geographical, social and political context. It is a broadly-based subject, integrating work by geo-archaeologists, waterfront archaeologists, and nautical archaeologists, and collecting data from terrestrial, urban, inter-tidal and underwater sites. For the relevant periods, it will also take consideration of cartographic and iconographic evidence as well as maritime place-name and port-book studies. Many recent projects, including a number of the ASLF funded projects discussed above, have begun to address this point more widely. For example; The North Kent Coast Rapid Coastal Zone Assessment Survey (RCZAS) comprised a programme of HER enhancement and a Desk-Based Assessment, alongside field investigation. One of the main aims of this study was provide feedback on the quantity, quality and character of monuments and sites likely to be encountered on the north Kent Coast (Wessex Archaeology 2002 and 2004).

Given that the counties of south-east England have such a long coast, being bordered by the Channel to the south, the North Sea to the east and the tidal Thames to the north, not forgetting the navigable rivers such as the Medway, Swale, Arun, Ouse, Wey and Rother, it is difficult (some would say pointless) to try to separate out aspects of the region's maritime development from the general picture. There is indeed a strong

case to be made for fully integrating maritime studies into the general historical development of such a region. However, for the purposes of this discussion, we will focus primarily on the last 2,000 years in an attempt to provide pointers and direction for a 'regional maritime research agenda', still a relatively novel concept in the UK.

Changing vessel-building traditions and vessel-building sites

To introduce some of the key themes, the following summary lists some of the main changes in vessel construction over this long period. This draws our attention to the impact such changes would have had on location, form and operation of the associated vessel building yards as well as on the contemporary port and harbour facilities, not to mention the changing levels and range of resources needed, and the changing skills and manpower.

Prehistoric period:

- Logboats (plus the occasional sea-going plank-built vessel in the Bronze Age)

Roman Period:

- Initially most of the coastal and cross-channel traffic was organised by the *Classis Britannica*: such provisions changed in the later Roman period, during the time that the so-called 'Saxon Shore Forts' developed– the term 'fortified ports' might better describe those particular coastal settlements. A robust carvel-style vessel-building programme was introduced alongside 'native' logboat and/or skin-boat traditions, clearly utilising very different vessel construction sites and methodologies

Saxon Period:

- The arrival of the Anglo-Saxons by sea in double-ended, undecked clinker-built ships that could be rowed and/or sailed: the development of the 'beach market' network on the open foreshore and then the associated 'wics'

Saxo-Norman period:

- Development of the loose federation known as the 'Cinque Ports': coastal settlements engaged in fishing, trade and piracy. Clinker-built ships of increasingly specialised form and increasing size, and gradual transition from the open beach markets to the more specialised merchant ports engaged in cross-channel trade. Small boats still built in the logboat tradition, but larger boats and ships were all clinker-built, i.e. logboat-wrights and shipwrights working in different locations

Later medieval period:

- The Cinque Ports coast after the Great Storms of the late 13th century saw increased changes in harbour design and location, with the accelerated development of 'merchant ports' (rather than open beach markets), and large clinker-built ships being constructed. With the abandonment of the logboat tradition, small boats were also now clinker-built; i.e. boat- and ship-wrights working in same tradition with same resources, but to different scale. Although both could technically be working together in the same yards, the deeper draft of the larger ships presumably required shipyards to have direct access to deeper water. There is archaeological evidence that vessel-breaking, vessel

repair and vessel building were all closely-related activities in this period and shared the same sites (Watkins 1994)

Cinque Ports in the 15th–18th century:

- Development of new shipbuilding technologies producing large carvel-built, multi-decked, multi-masted ships: clinker-building was only used for small boats, and river barges; i.e. boat-wrights and shipwrights now two very different traditions working with different resources and using different skills, and therefore on different construction sites. Also increasingly clear was the distinction between yards used to build war-ships (e.g. Chatham, Kent) and those building large merchant ships, although techniques, resources and skills required were broadly the same, since the larger private yards could sometimes be used to build extra war-ships as required. Many of the harbours that were once suitable for relatively shallow-draft shipping could no longer accommodate the largest contemporary ships without considerable (costly) modifications

18th-19th century sailing ships and the industrial revolution:

- Small boats were clinker-built; river barges (where still wooden) increasingly utilised carvel techniques, but large ships were now steel-hulled and steam powered; thus boat-wrights, barge-wrights and shipwrights were all utilising radically-different traditions, skills and resources, and therefore on very different construction sites. Also, the many vessel-breaking sites associated with the end of the wooden-sailing ship tradition were on different sites to new ship-building yards. A new generation of much larger artificial harbours was required to accommodate the largest ships of the day.

Changing maritime landscapes

The prime concern for maritime landscape archaeologists working in the South-East is to establish the form and navigability of coasts and estuaries in antiquity, as the debate on the Wantsum Channel shows (Grainge 2006; Perkins 2006). A primary objective is therefore the compilation of a working curve for historic sea-level change relative to the land, so that the high and low tide values can be ascribed to the coastal and estuarine contours on (hopefully) a century-by-century basis. Working alongside this long-term research aim must be the associated changing coastal morphology model: sand banks form, promontories erode, estuaries and lagoons silt up, the tidal head of rivers alters, the extent of useable open foreshore changes. The Romney Marsh Research Trust (RMRT) facilitated just such research in their study area for over twenty years, in an exemplary fashion (e.g. Eddison 1995; Eddison et al. 1998; Long et al. 2002). Such models will help predict where deep-water ports, fishing settlements, shipyards might or might not be located, and thus where vessel fragments and hulks might also be found.

A major mapping project is therefore proposed, plotting the coastal changes across the region initially at c. 200-year intervals over the last two millennia. The series of coastal models would be compiled from regressive map and chart analysis (for land and submarine contours), soil survey maps, sedimentary analysis, modified with borehole logs, dated excavation data and inter-tidal zone survey (e.g. Allen et al. 2004). This approach could be piloted in study areas such as Romney Marsh or the Wantsum Channel, after which the coastal map series produced would serve as the

chronological base maps for the regional HER centres, so that the subsequent plotting of finds and sites would be directly related to the 'correct' contemporary coastal morphology. Once the pilot studies have been produced, the revised methodology could be extended to other areas of the coast and also back in time into the prehistoric period. It is accepted that such studies will not be without their problems and uncertainties, due to the many variables that need to be taken into consideration, but it is only by identifying and addressing the problems that progress on the related research themes will be made.

Changing maritime centres

Such regional models will also inform coastal settlement studies: because the coast of Kent and Sussex has changed (is changing) so dramatically, so too have the location and form of the associated towns. The Cinque Ports provide an ideal grouping for research into medieval maritime settlement dynamics, the comparative origins of urbanization and the complexities of settlement interaction (Burrows 1888; Murray 1935; Oppenheim 1907; 1926a). They share a geographic location and a unique, if loose, constitutional identity. However, it is well known that their individual origins, development and fate differ dramatically. Another distinct benefit is that their immediate 'hinterland' is readily identifiable, stretching from Seaford in East Sussex to Brightlingsea in Essex, since 31 settlements in the economic shadow of the principal ports had joined the federation as 'limbs' by 1668. Although the influence of the Cinque Ports spread further than that zone (as trade with London, Great Yarmouth and Gascony clearly shows), the identification of the 'Federation Hinterland' provides a well-defined geographic region within which the *relative* development of the Head Ports can be sensibly evaluated. There has been valuable work on some of these individual ports: an excellent study of New Winchelsea (Martin and Martin 2004) for example (but not on its harbour), major projects under way on Rye (RMRT 2006), Sandwich (Clarke 2005; Richardson 2004; 2006; and Clarke and Pearson 2010) and Romney (Ward 1952; Draper and Meddens 2009) and some important studies in Dover (Biddle and Summerson 1982; Harris 2006; Parfitt et al. 2006; Philp 2003; ASE in prep.) and in Hastings (Coombes and Lyne 1995; Rudling et al. 1993). All this bodes well for the future, and suggests the time is now ripe for beginning a new, wider study, looking at all the towns *as a group*, set in their full coastal, economic, social, political and topographic context. In addition, research has also been undertaken on other sites beyond the Head Ports, such as at Faversham (Wilkinson 2006), Littlehampton (Bradley and Philpotts 2006) and Seaford (Gardiner 1995), for example.

Regional studies of Roman ports could also have value, since this period also saw similar fluctuations in the fortunes of the contemporary maritime centres at, for example, Reculver, Richborough, Dover, Lympne, Pevensey and Chichester (Pearson 2002; Wachter 1995). It also witnessed a change in sea-level relative to the land, in the form of a marine transgression (May and Hansom 2003) that would have impacted upon the viability of the associated harbours so crucial to the maintenance of Britannia's link with the European mainland and to Rome itself. The relationship of each of those ports to the changing coastline and tidal levels needs to be explored and established.

There are other issues that the study of such maritime centres also needs to consider. An obvious research priority for the South-East would be the form and development of

harbour works: with the exception of Dover, few ports can at present contribute to such a debate on archaeological grounds alone. The situation in London and elsewhere on the Thames was much the same some 30 years ago: it was only the extreme pressures of urban redevelopments there that exposed many ancient harbour sites over a relatively short time period (Milne 1985; 2003). Should the demands for flood defence or urban renewal increase in the region, then a similar programme of developer-led waterfront excavations might ensue: until then, there is considerable scope for exploratory survey and evaluation work to establish the possibilities.

Other research themes requiring attention include consideration of maritime urban topography (Bill and Clausen 1999), maritime buildings, which can include churches, as a recent paper has shown (Cohen 2008), lighthouses – the Dover pharos is a prime example – and other seamarks (Naish 1985). A revealing study of discarded ballast reused as building material was recently conducted in King's Lynn, in Norfolk (Hoare et al. 2002): similar exercises might well be undertaken in our own region with profit.

Changing maritime industries

(including a contribution on environmental archaeology by Polydora Baker)

Once the coastal models suggested above have been developed and broadly established, then the navigability of the associated estuaries, creeks, rivers, lagoons and open coast can be determined. As discussed above, this will also facilitate the discovery of the boat and ship-yards that must have been a key feature of this coast. For example, geoarchaeological research has demonstrated that there was once a large sheltered lagoon on the Kent/Sussex border, the mouth of which was once protected by a fort of the *Classis Britannica*, at Lympne (Milne 1985). Given that terrestrial archaeologists have established many iron-working sites in the timber-rich Weald to the north, as well as the presence of slag-roads leading towards the now silted-up lagoon, it is not an unreasonable suggestion that the fleet vessels (requiring prodigious amounts of timber and ironwork) were built there (Milne 2000). The late medieval slipways in the shipyards at Smallhythe (Kent) are now several miles inland but were once on the open foreshore (Bellamy and Milne 2003), while the evidence for a shipyard recovered from an inland site in New Romney (Draper and Meddens 2009) was also excavated from what was once the shoreline. The location of vessel building sites changed in response not just to sea-level rise or harbours silting, but also to major changes in shipbuilding technology: from clinker to carvel, from sailing ships to steam-power etc. The Cinque Port coast should therefore boast many shipyard sites, often relatively short-lived. The surprise is how few have been found. There were also major shipyards on the Thames and Medway, both private and Royal (Banbury 1971): the best preserved of these are the yards at Chatham (MacDougall 1987; Oppenheim 1926b).

In addition to shipyards, with their associated smithies, rope-walks and sail-makers, there are other maritime industries for which archaeological research can make a real contribution. The key concern remains the fishing industry, especially in the medieval period when all of western Christendom ate fish on Fridays and fast days. It underpinned the initial development of the Cinque Ports themselves (e.g. Dulley 1969), and the role of fishermen (or perhaps they are better termed 'mariners' as their vessels were initially used for trade, for warfare as well as for fishing) has often been overlooked in the development of the economy and of the region's first towns. The

study of mid-Saxon Sandtun, for example, is of particular note (Hamilton-Dyer 2001; Gardiner et al. 2001). The archaeological study could examine settlement sites, such as the medieval fisherman's quarter in Dover, excavated by Canterbury Archaeological Trust (Parfitt et al. 2006); artefacts such as fishing boats, fish hooks and net weights (Steane and Foreman 1991); and the biological remains of fish (Nicholson 2006; Reynolds 2011), shell fish and other marine creatures, such as whales (e.g. Gardiner 1998; Riddler 1998; Sabin et al. 1999; see Bendrey 2008 (Isle of Thanet, Roman finds), Bendrey et al. 2006 (Townwall St., Dover); Poole et. al. 2010 (Bishopstone).

Where recovered in sufficient numbers and using appropriate sampling approaches and recovery methods, fish remains can inform on their importance in diet through time and in different types of site, the techniques used to catch fish as well as fishing grounds. They can also provide information about social organisation and status. Throughout prehistory, it appears that marine fish were rarely exploited in southern England, including coastal areas (see regional reviews by Serjeantson 2012; Hambleton 2010). Fish exploitation appears to increase in the Iron Age across Britain (Allen 2011; Locker 2007). Approximately 27 assemblages from 20 sites in the south-east document the exploitation of fish, with almost all yielding saltwater and/or estuarine fish (Locker 2007; Allen 2012; also, Thurnham Roman Villa, Hamilton-Dyer in Kitch 2006a; Tollgate, Kitch 2006b). Estuarine, coastal and sea fishing were undertaken, as indicated by species ranges though as yet there is little evidence for deep-sea fishing (Locker 2007; though see Hamilton-Dyer 2011, evidence for large haddock). Element distributions show that fresh marine fish were traded inland (Hamilton-Dyer 2011; Locker 2007). With few large Roman fish bone assemblages, it is not yet possible to determine social patterns of exploitation or consumption, though there is some evidence to suggest that consumption of marine foods was a privilege of the elite (Allen 2011; isotope evidence cited in Locker 2007, 143). Fish imports are evidenced by a few rare finds, including mackerel (at Bishopstone, Gebbels 1977) and it is possible that sea fish were raised in artificial ponds though the evidence is not conclusive (e.g. Fishbourne Roman villa, Allen 2011; Sykes et al. 2006; Locker 2007). In the Roman period, traded fish products may have included fish sauces (garum, allec, salsamenta, see Hamilton-Dyer 2008). Local production of allec (a bony sauce made of small clupeids (Herring family)) is suggested at the Roman villa at Beddingham, East Sussex (3rd century) (Jacques cited in Hamilton-Dyer 2008), and documented further afield, at Dorchester in the south-west, as well as London, Lincoln and York (see references in Hamilton-Dyer 2008; also, Locker 2005). This in turn provides evidence for fishing techniques and location, as the tiny, often juvenile fish would have been harvested in shoals, at particular times of the year and in specific locations (Hamilton-Dyer 2008). The remains of fish sauce amphorae also inform on trade (imports) in fish products (e.g. Isle of Grain, Kent, in Locker 2007, 142). Research on organic residues may also provide a potential avenue for identifying exploitation, consumption and trade in fish and other aquatic foods (see Brown et al. 2003; Brown et al. 2005).

In the regional review of Saxon to post medieval sites in southern England (Holmes 2013), 45 assemblages of fish bone from 28 sites in Kent, Surrey and Sussex are recorded as yielding fish bones but data are published/provided for twenty assemblages only. Of these, only nine assemblages have more than 100 bones, with only five yielding over 500 bones. Holmes' study (2013) confirms the intensification of marine fishing from the late Saxon period with increasing proportions and

diversification of marine fish in medieval to post-medieval sites (Holmes 2013, 32, 69; see earlier syntheses by Barrett et al. 2004; also, Poole 2011). As yet, given the poor recovery at most sites and consequent scarcity of substantial fish bone assemblages, it is not possible to determine the relative importance of fish in Saxon diet (Holmes 2013, though see Reynolds 2011). An exception is recent research at Lyminge which has provided a wealth of fish bone data, and which is shedding light on its relationship to Sandtun, the role of Saxon monasteries in the development of marine fisheries, and the relationship between sea fishing and status in the Saxon period (Gabor 2013; Reynolds 2011, 2016). For the medieval and post medieval periods, the larger fish bone assemblages from the South-East have until recently derived mainly from ecclesiastical and high-status sites, e.g. St. Mary Ospringe, Wall 1980; St. Gregory's Priory, Canterbury (Powell et al. 2001; Smith 2001); Nonsuch Palace (Locker 2005). Coupled with variable recovery, it has been difficult to evaluate the relative importance and range of fish in medieval and post-medieval diet in this region. However, publication/reporting of large assemblages from Townwall St., Dover (Nicholson 2006), Ropetackle, Shoreham by Sea (Jaques 2011) and Lewes (Jaques 2013), and from smaller settlements (e.g. Mersham, Kent, Kitch and Hamilton-Dyer 2006) has provided invaluable information about general trends in fish exploitation (fishing grounds, seasonality, trade) and local signatures of consumption. Other key lines of evidence in the study of fish exploitation are butchery and skeletal element distribution. These can indicate if fish were procured fresh or traded as stockfish (Barrett et al. 2008; Irving 1998; see also Coy et al. 2005a, 2005b, for the Mary Rose, Hampshire).

National syntheses of fish bone data from Saxon to Medieval sites in England by James Barrett and colleagues (Barrett et al. 2004, 2008, 2011; various chapters in Barrett 2013) have shown how marine fisheries have developed from Saxon times, including shifts from freshwater to marine fish, diversification of marine resources, the drivers for the intensification, and the impact of this on economic development. This has been followed by cutting edge isotope and genetic research, which is exploring trade networks and sources from which stockfish were procured (Barrett et al. 2011). In order to contribute further to such investigation, priority should be placed on implementing rigorous sampling strategies that will ensure the recovery of fish bones, where preserved, and their full publication (Campbell et al. 2011; Wheeler and Jones 1989).

Sea-salt-making is another coastal or estuarine industry of some importance (the fish had to be preserved, e.g. Irving 1998, Scotney Court, Kent), and there is evidence from the region going back to the Iron Age and through to the medieval period (Topping and Swan 1994; Champion, 2007, 110; Ridgeway 2000), while the Kentish copperas industry also merits attention here (Allen 2002), as does the Roman pottery industry (e.g. Monaghan 1987).

Changing maritime defences

There are two sides to this subject: defence against the sea, and defence against sea-borne invaders. The history of the first element is directly related to studies of coastal morphology and sea-level change, with the dramatic addition of major storm events (see section on Maritime Landscapes). Once again, the teams working on Romney Marsh are the leaders in the search for how much land has been won from or lost to the sea (Eddison 2000). As for our understanding of the landscapes of defence, be it

against Romans, Saxons, Vikings, Normans, French, Spanish, Dutch or Germans, the coast has been the front line all too often, but such research should be considered with due regard to changing coastal morphology. Moving offshore, any study of national naval matters will have some mention of Kent and Sussex, whether it's the *Classis Britannica*, the Cinque Ports or the Royal Navy (Mason 2003; Rose 1992; Rodger 1997).

Research agenda

It is suggested here that a full, integrated regional research agenda for maritime archaeology should be a priority for south-east England: some possible pointers for such work have been outlined above and may be summarised thus:

Regional themes

- Plotting sea level change over time
- Plotting coastal change over time, based on sea level change
- Development of maritime settlements in relation to each other and to sea level and coastal change

Site-specific themes

- Development of port topography and port buildings
- Development of harbours and landing places in relation sea level and coastal change and development of maritime settlements

Maritime themes

- Maritime industries (fishing, shipbuilding, salt etc.) in relation to both regional and site-specific themes
- Maritime defences, in relation to both regional and site-specific themes
- Maritime transport: excavation, research and publication of wrecks, hulks and vessel fragments

Methodological themes

- Audit of maritime-related finds (from land and underwater sites) in the region's museums and private collections

- Development of monitoring frameworks for underwater and intertidal zone sites
- Development of surveying/ prospecting methodologies for maritime terrestrial sites and for coastal, intertidal and fully marine environments.
- Evaluations and excavations of terrestrial (urban and rural) and wreck sites must apply best-practice sampling techniques for the recovery of fish bones, including recovery of large whole-earth samples and the use of appropriate mesh sizes (1mm and 2mm).
- Such a regional maritime focus should also feed directly into any environmental, defence, urban or period-based programmes.
- There is a clear need to encourage the publication of more vessel sites, be they underwater, intertidal or 'dry land'.
- Reviews of vessel fragments, ship fastenings, fish hooks, net weights and other maritime-related artefacts (e.g. amphorae relating to transport of fish products) languishing in museums or private collections, unstudied and un-catalogued: these studies should preferably be undertaken on a regional-basis.
- There is a surprising dearth of harbour and shipyard excavations on the Cinque Ports coast: perhaps some preliminary researches could be conducted to identify possible sites before deep drainage works destroys them unremarked.
- As for underwater wreck sites, the often-prohibitive costs and logistical problems associated with such projects argues strongly for a comprehensive long-term monitoring programme, rather than 'total excavation': a similar approach may will be required for sites eroding in the inter-tidal zone
- Finally, it is worth stressing the wider relevance of underwater archaeology, and the development of new and more efficient methodologies in that unique environment. Work below the low water mark is not just about maritime matters, for it can also provide information on submerged palaeo-landscapes and their associated terrestrial finds, since land surfaces pre-dating recent sea-level rises can be found offshore (e.g. Wessex Archaeology 2007d; Cowrie 2008; Gribble and Leather 2011). Finds including animal bones from these sites will be key in extending our understanding of early human presence in the Palaeolithic and Mesolithic periods (Worley 2013). Thus, divers seeking sunken vessels may well be in a position to record much older prehistoric material. There is therefore the continuing need to integrate marine, intertidal and terrestrial surveys, to extend the 'seamless' approach developed in neighboring Hampshire, for example. Divers in the region have also been responsible for discovering that most un-maritime of artefacts, aircraft, the residue of the hard-fought Battle of Britain (Wessex Archaeology 2008a). Thus, the archaeology of the seabed can and will contribute directly to the maritime archaeology of Kent and Sussex, but also to other quite separate subjects as diverse as prehistory and World War II

studies.

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