Maritime and Marine Historic Environment Research Framework:

The Neolithic and Early Bronze Age

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1. Introduction (FS)

Maritime themes have long been established in both Neolithic and Early Bronze Age research in England. From Crawford's (1912) identification of the western seaways as a critical conduit for prehistoric communication, through Childe's (1946, 36) description of those seaways as 'grey waters bright with Neolithic Argonauts', to Case's (1969) seminal paper on the mechanics of moving domesticated cereals and animals from the continent to Britain. This early archaeological awareness of the importance of maritime activity is not surprising if we pause to remind ourselves of the island nature of the British Isles. However, since the early works of Crawford and Childe, maritime themes have dipped in and out of scholarly consciousness, as archaeology oscillates between large scale grand narratives and small scale accounts. In this process of switching focus, all too often maritime themes have slipped out of view.

Oxley (2005, 1) has suggested that a major reason for this is the development of an unfortunate divide between maritime and terrestrial archaeology over the last thirty years. This has resulted in compartmentalisation of research questions where in fact there needs to be integration. As such, although this review sits within a maritime research framework, it makes a deliberate effort to integrate research themes and concerns from the broader sweep of Neolithic and Early Bronze Age studies. In addition, this document ought to be read in conjunction with the recently published rapid coastal zone assessments and regional research frameworks, as these series of documents provide crucial additional information on the state of the discipline. For this reason the consultation process is seen by all members of working group as essential part of formalising the content for the final document. Thus, what is presented should be seen as a series of suggestions and thoughts, indicative of material emerging from the literature, recent investigations and other research frameworks. It is recognised that this will need to be modified and adapted in light of comments received from the wider archaeological community. Thus, if you have any comments please do not hesitate to contact the authors.

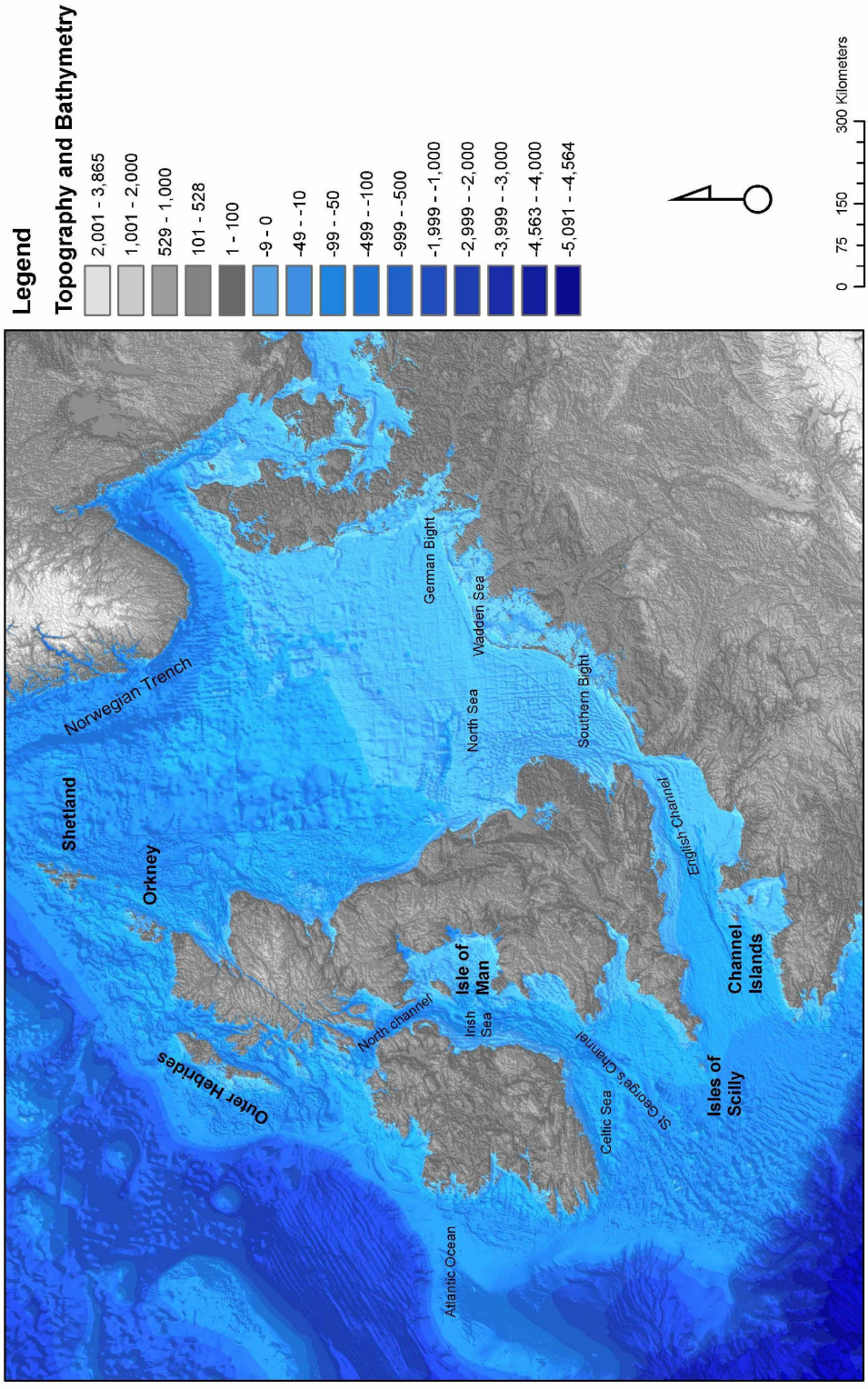


Figure 1 Map of the British Isles and associated maritime features (bathymetry and topography drawn from GEBCO)

2. Definitions, chronology and process (FS)

As recent debate has made clear (Thomas 1997, 2009; Pluciennuk 1998; Garrow 2010; Sturt 2010), any attempt at establishing a research framework for the Neolithic and Early Bronze Age needs to carefully consider issues of chronology, process and definition. For Neolithic studies in particular, the act of determining what we mean by Neolithic, when this form of society begins and via what process/es it is established has proven notoriously controversial (Thomas 2008, Sherridan 2006). Importantly, no matter which way we choose to read the material the shift to a Neolithic way of life did require contact with the continent and thus involved seafaring and maritime activity (discussed in more detail in sections 3, 4 and 5 below).

With regard to dating of the Mesolithic/Neolithic transition, recent work by Whittle et al. (2008) indicates a date of c.4000BC for the earliest evidence. However, it must also be noted that we also have dates for Late Mesolithic activity within Eastern and Northern England for the same millennium (Sturt 2006). As such, the period with which this chapter is concerned has no definitive start date, more an indicative temporal horizon. As such, the mechanisms behind this transition, the date it occurred and the part that seafaring played within it must remain a key maritime research theme.

Just as defining a start to the early Neolithic is problematic, so to is the shift to the Early Bronze Age. Here the broad temporal horizon given for the transition lies around 2200 BC (Pollard 2008), with the Early Bronze Age seen to end at around 1500BC. Again, these dates are indicative, with regional chronologies revealing differences in the timing of the transition and the duration of different periods. However, just as in the Neolithic, the role of seafaring, voyaging and communication with other parts and of Britain, Ireland and the continent will emerge as research questions of central importance and are discussed in detail in sections three and four.

Broad Research Issues

In order for our understanding of both transitions to move forward there is a general need for the following:

1. Increased absolute dating of sites, assemblages and environmental sequences.
2. Expanded isotopic and genetic investigation of human osteological, faunal and floral material (for reasons discussed below). Whilst these data are controversial, it is only

through continued research that the suitability of these techniques to address questions of mobility, diet and connectivity may be answered.

3. Coastal Evolution (FS)

3.1 Characterisation of Research

In comparison to Palaeolithic and Mesolithic studies, work on the Neolithic and Early Bronze Age often pays minimal attention to issues of coastal evolution, other than in the context of conservation, or within very specific geographic areas (e.g. the Fens, Solent, Severn or Humber regions). In many ways this is understandable, as the rate of sea-level change had slowed considerably by c. 4000 BC for much of the British Isles (see Shennan et al 2002, Shennan 2008). Thus, there is a temptation to fall back on quotations, such as that made by McGrail (1983, 304), that by c. 4000 BC the coastline of Britain was well established and little has changed since.

However, whilst McGrail may well be *broadly* correct, reliance on such statements serves to mask the large impact that even small shifts in relative sea-level can have on coastlines. It also serves to hide the fact that the shifting form of coastal configuration through the Holocene is far from well resolved, and remains an active area of research by oceanographic, earth and climate scientists (Lambeck 1995, 2001; Peltier 2004; Peltier et al 2002; Shennan et al 2000, 2002, 2006, Brooks et al 2008, Beres 2007; Waller and Long 2003). It is crucial that Neolithic and Bronze Age researchers remain engaged with this field of research, as variation in outputs from different modelling exercise, and observations from sea-level index points, mean our understanding of palaeogeography is constantly changing.

3.2 Sea-Level Change

Sea-level change can be seen as the function of four primary factors; eustacy, isostacy, tectonics and the interplay of these three factors with more localized variables (e.g. hydrology). All four of these inputs vary through both space and time. This means that resultant relative sea-level change is non-linear in nature, and thus harder to predict than may be first imagined. From an archaeological perspective this is significant as it means that we have to become familiar with the fact that sea-level change is not constant, and will be expressed differently at a range of different scales.

A number of different models for the Holocene inundation of the north west European continental shelf are currently available. These vary between large-scale Glacio-isostatic adjustment (GIA) models (Lambeck 2002, Peltier 2002) and more localised records of subsidence and change (Shennan and Horton 2002, Shennan et al 2002, 2006; Brooks et al 2008, Waller 1996, Waller and Long 2002). Significantly, no one model is correct. The exact history of inundation is far from clear and will vary considerably at a regional level. For example, work by the Shennan et al (2000, 2002) and Shennan (2008) indicates submergence of the Brown bank off Kent by c. 5000 BC (shown in figure 2 below), while the recent North Sea Research Framework (2009) argues that it may have persisted as a series of low lying islands well into the Middle Neolithic. In addition, large scale models often have to work from a basis of modern bathymetric data, and thus those areas within which large scale sediment accumulation or erosion have taken place during Holocene will be inaccurately modelled. A prime example of this is the fenland region, which at 4000 BC would have seen a shoreline far inland of its current position (Waller 1996, Sturt 2006) rather the shoreline extended out into the current north sea indicated in both Lambeck (2002) and Peltier's (2006) GIAs.

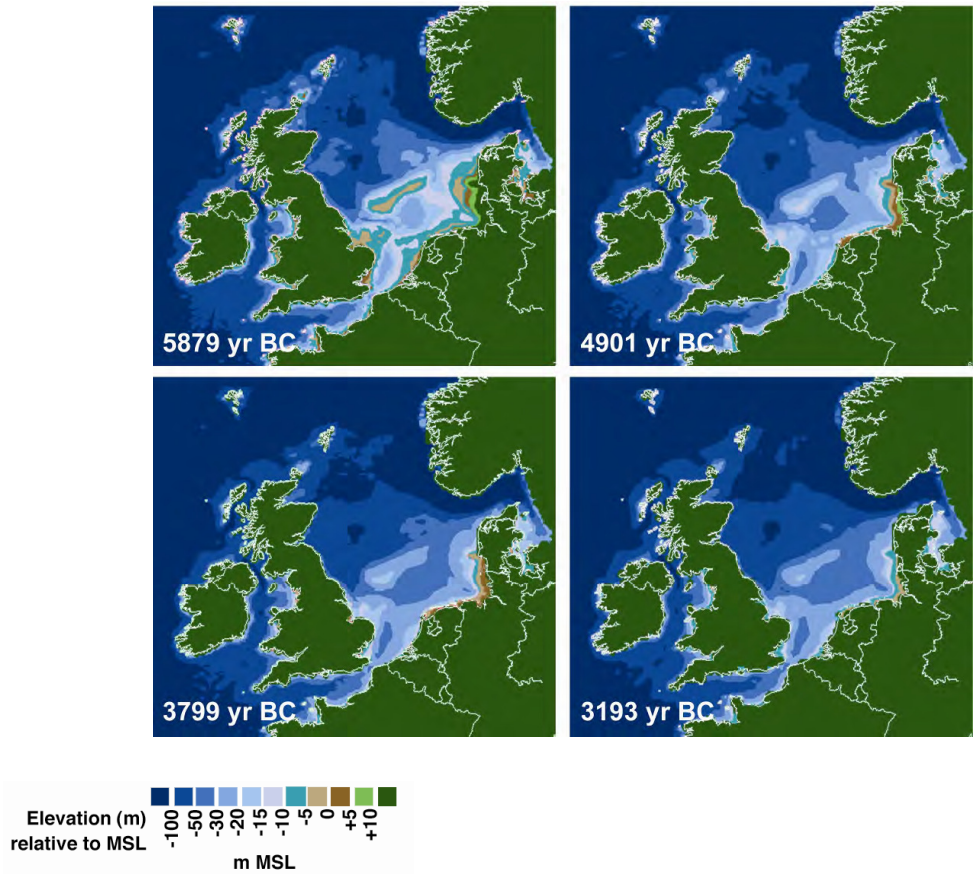


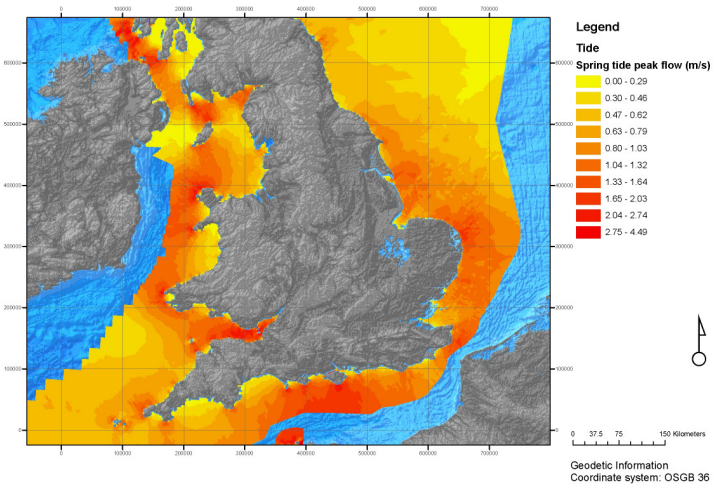
Figure 2 Palaeogeographic maps of north west Europe (after Shennan 2008, 38)

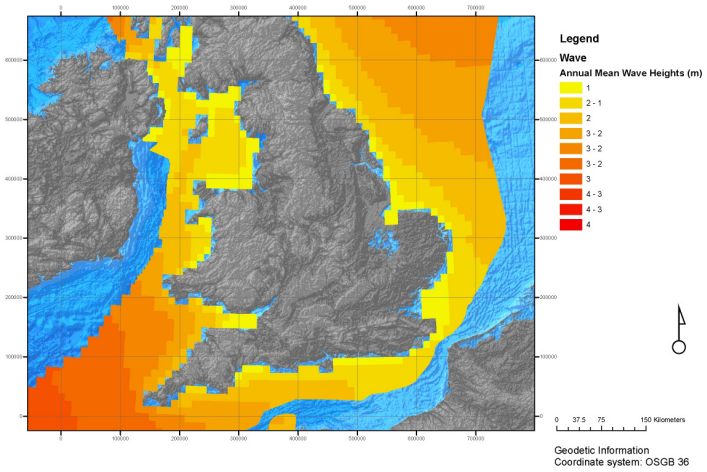
These variations between models ensure that understanding changing palaeo-shorelines must remain a key research question for Neolithic and Early Bronze Age researchers. As Coles (1998, 1999, 2000) has cogently argued, this is not simply a matter of marking out the spaces where people could have lived in the past, but of recognising the social significance that inundation and changing coastal configuration may have had on populations living at the time. Thus, it is important to recognise that the goals and demands of archaeological research do not always mesh directly with those in the earth sciences. Fine-grained questions of landscape perception and societal response require integration of multiple proxy data sets to a degree not always required or desired in other disciplines.

3.3 Marine conditions

We must also recognise that this variable history of inundation not only tells us about variation in landmass configuration, but also informs us as to potential 'behavioural changes' in the seaways of prehistory. Palaeo-tidal modelling work (Uehara et al 2006) provides the opportunity for archaeologists to move beyond consideration of inundation alone, and to begin to think more directly about the changing conditions of seafaring in the past. Within prehistoric studies this is a feature of the sea that we frequently fail to engage with. Submerged prehistoric landscapes have, deservedly, become a focus of attention but potentially at the expense of discussion of the characteristics of the sea and seafaring. This need not be the case as the data used for the identification of the former can be used to better understand the latter.

Recent years have also seen increased availability of digital data that archaeologists can use to better understand the marine environment. Whilst outputs from palaeo-tidal, environmental and climate modelling research are increasing (e.g. the work of the PMIP projects), modern data on tide, wind and wave conditions can be used to attune researchers as to the broader character of English waters. Figure three below presents the modern wind, wave and tide data made available by BERR (2009). As noted above, this can not be used as direct correlate for past marine conditions. What it does allow for is a greater appreciation of how bodies of water behaviour within the major marine basins surrounding England. Such images are clearly powerful interpretative aids and point to the need for more widely accessible, and archaeologically attuned, palaeo-oceanographic models of past maritime conditions.





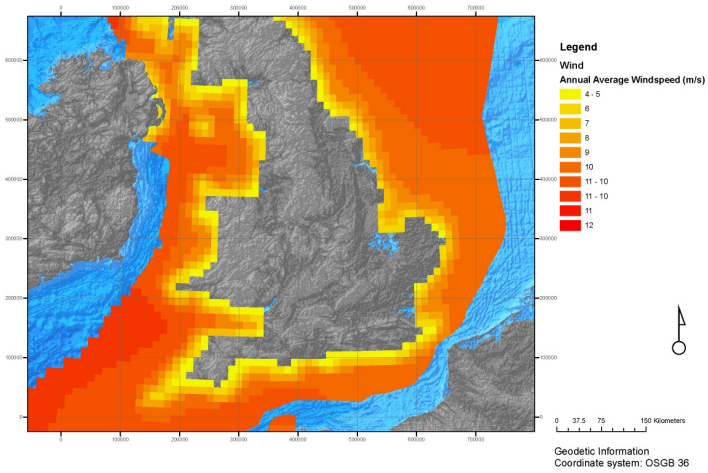


Figure 3 Charts showing modern marine conditions data available from BERR (2009)

3.4 Research Questions

A number of important research questions emerge from the theme of coastal evolution. These incorporate a range of issues relating to relative sea-level change; progradation and inundation, variation in marine conditions, and the need for integrated sea-level, palaeo-hydrological and environmental modeling work. The three topics listed below are not seen as definitive and it is hoped they will be added to through the consultation process.

Progradation, inundation and RSL change

Shennan and Barlow (2008, 21) note, there are now over 12,000 sea level index points for the British Isles. Whilst in many ways this represents a substantial data set, it is also one which benefits from continued expansion in terms of resolving regional scale records of changing coastal configuration. This leads to the following two research questions:

> CEQ1: How did regional variations in sea-level change, erosion and deposition reconfigure the coastline of England during the Neolithic and Early Bronze?
>
> CEQ2: How did past communities engage with this changing coastal configuration?

Sea-level and environment:

Variations in sea-level not only impact on the altitude at which sea joins land, but result in changes to associated hydrological regimes and environments. As such, archaeological understandings of the impacts of sea-level change need to move beyond palaeo-shoreline reconstruction and towards integrated paleo-environmental and palaeo-hydrological modeling.

> CEQ3: What are the broader impacts of RSL change on coastal environments and hydrological regimes during the Neolithic and Early Bronze Age?
>
> CEQ4: How did people engage with these changes?

Sea-level and Seafaring

As noted above, variations in sea-level combined with broader changes in climate will have altered the texture of past seaways. As such, the following question is of interest to researchers into the Neolithic and Early Bronze Age of England.

CEQ5: To what extent (if any) did changes in sea-level and climate through the Neolithic and Early Bronze Age change the nature of prehistoric seaways?

4 . Maritime settlement and Marine exploitation (FS)

The nature of Neolithic and Early Bronze Age regional settlement patterns and use of marine resources are hotly debated topics. Consideration within this document is further complicated by the fact that inundation, progradation and erosion means that a maritime and marine research framework must also engage with the following; sites that were coastal in the past, but are now located inland (e.g. sites within the Fens), sites which were further inland but now lie on the coast and are threatened by coastal erosion, and the problems of identifying exploitation of marine resources in prehistory. In order to ease this discussion the following sub-sections first explore broad themes for England as a whole, before offering more detailed regional analyses.

4.2 The nature of the record

In an attempt to offer an insight into the extent of the Neolithic and Early Bronze Age record a search of the National Monuments Record (NMR). This search extended to the limits of English territorial waters and moved up to 20km inland of the current coastline. As discussed below, whilst this gives a broad sense of the known record around our current shoreline, it does not provide direct insight into the nature of coastal activity in the past, and nor should it be interpreted as such. Figure four (below) shows the exact nature of this search area, whilst figure five displays the results for the Neolithic and Early Bronze Age at a national level.

As table one indicates, significantly larger numbers of records were recovered for the Neolithic, as opposed to the Early Bronze Age. In part this illustrates a problem inherent within this chapter, in that it draws together data for over two thousand years of activity. Whilst today we are happier to see this data as representing a continuum of change over time, in the past the trend has been to more markedly divide material between the Neolithic and Bronze Age. Frequently, these two broad classificatory units represent as much detail as can be extracted from records held in the NMR, HERs or SMRs. As such, attempts to engage with the chronological finitude of change can be stymied. For this reason, regional resource

assessments are critical in that they offer the opportunity for localized knowledge to be disseminated at a national level.

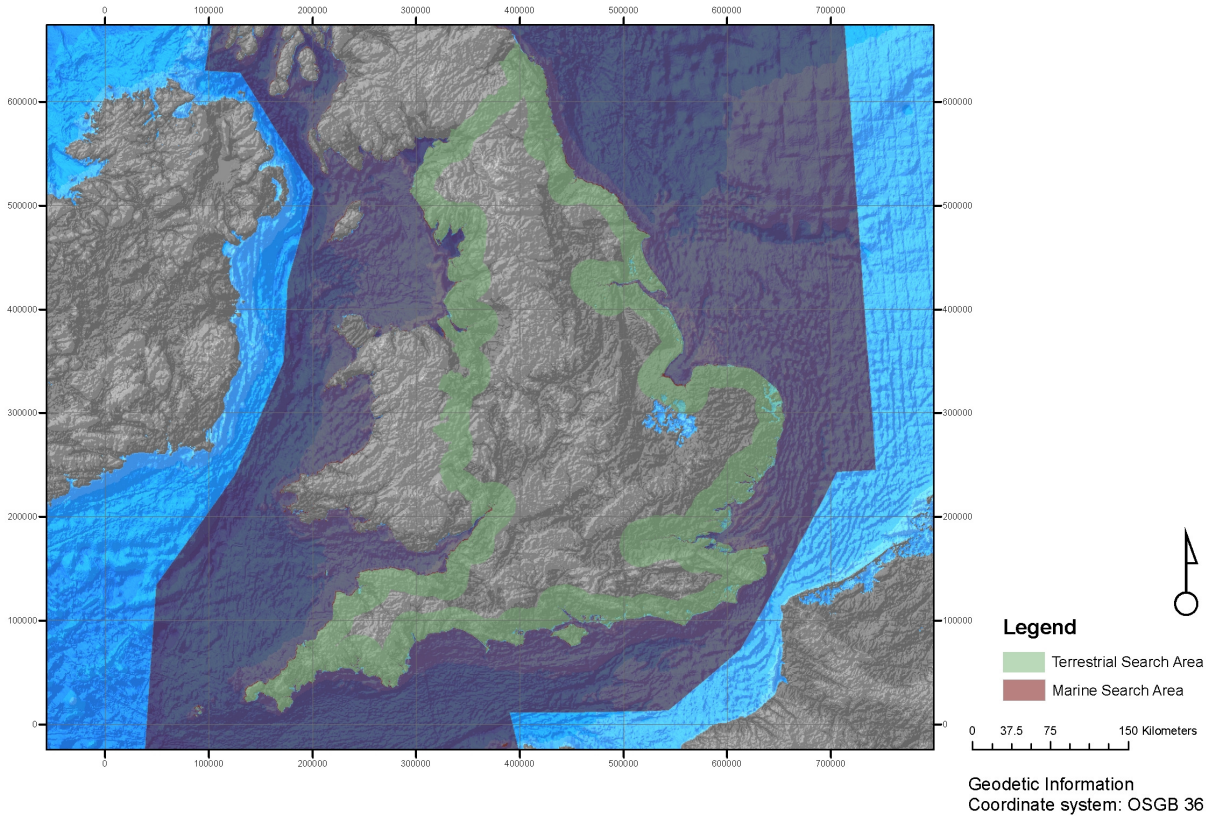
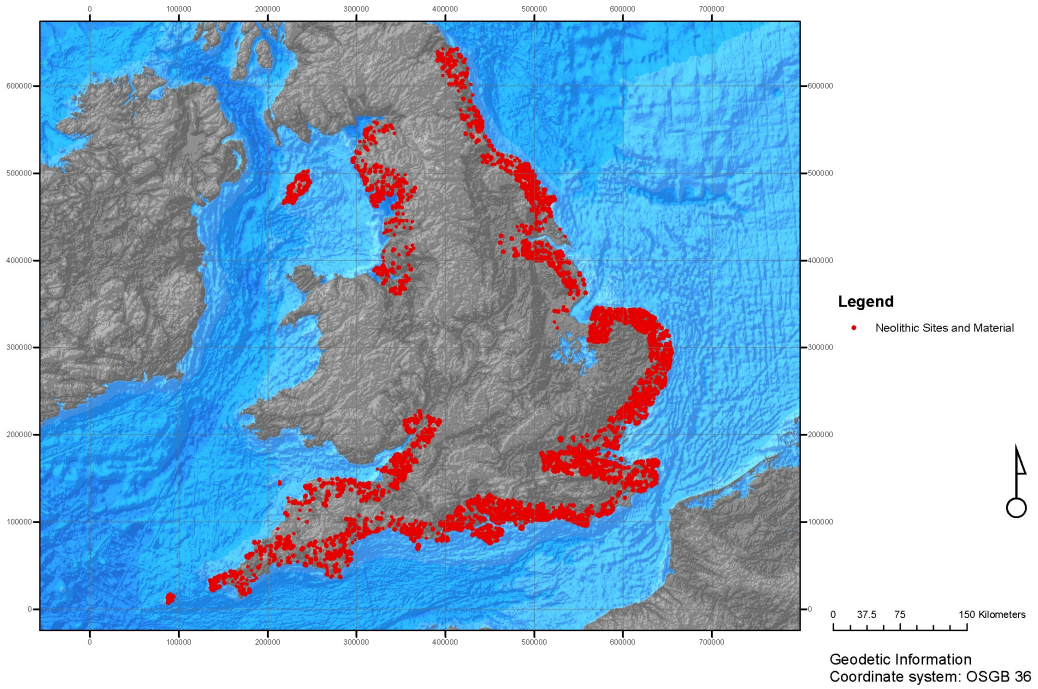


Figure 4 Map showing NMR search area for the Neolithic and EBA MMRF

Period/Data Type	Point	Polyline	Polygon
Neolithic	2649	26	2252
EBA	229	6	304

Table 1 Results from the search of NMR records for the Neolithic and Early Bronze age for the areas given in figure 4.



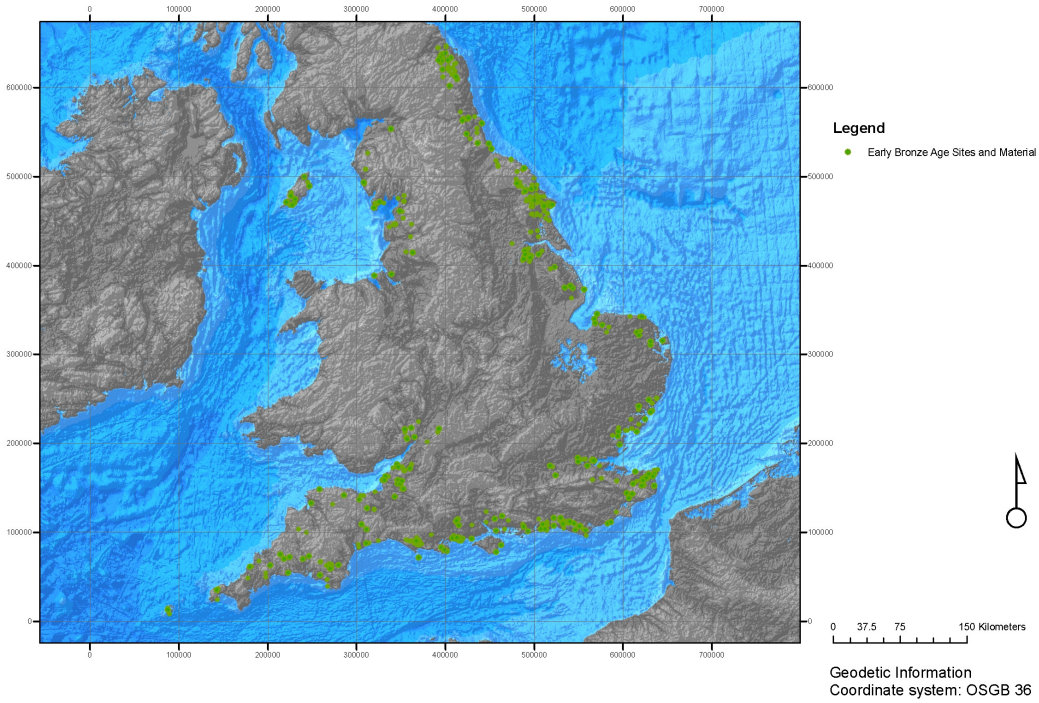


Figure 5 Maps showing the distribution of Neolithic and EBA records held in the NMR for the search area given in figure 4.

4.3 Settlement & Subsistence

Understanding settlement and subsistence in the Neolithic and Early Bronze Age is complicated by the nature of the record. For the Neolithic occupation is most frequently attested to through the presence of lithic scatters and pit sites (Garrow (2010)). This ephemeral signature is often hard to interpret in terms of what it means with regard to permanence or mobility. As such, it seems prudent to be open to both possibilities, the presence of permanent settlement and a continuation of more mobile ways of life. As discussed in the regional studies below, evidence for both forms of existence appear to emerge from the record, particularly as we move from the earlier Neolithic into the later periods.

For both periods, monumental architecture has often been taken as the first port of call in attempts to interpret past activity. Again, along the coastal strip many of the cases discussed below appear to indicate a relationship between coastal and terrestrial landscapes with regard to site location. Taken on its own, the arguments that derive from monument location analysis can seem insubstantial. However, when tied to the broader lithic scatter and settlement site location data more robust analyses are forthcoming (Cummings 2009).

As contentious as the nature of settlement may be (permanent or mobile), the discussion that surrounds pales in contrast to that had on the topic of marine inputs into diet and subsistence strategies. Since Richards and Hedges (1999) isotopic analysis indicated a dramatic move away form marine resources in the Neolithic, the role of fish and shellfish in diet has been a point of contention (Milner et al 2004, Richards and Schulting (2006). Arguments have varied between interpretations that fish and marine resources became taboo (Thomas 2003) and that the material record for consumption of marine foods has been under valued (Milner et al 2004). The existence of this debate is important as it ensures that a key maritime research question must be what role did marine resources play in the diet of Neolithic and Early Bronze Age people? It is only through doing further work that we can better understand this variability in the record, with one likely outcome being, that just as with the ‘start’ of the Neolithic being regionally variable, matched to this is variation is dietary practices.

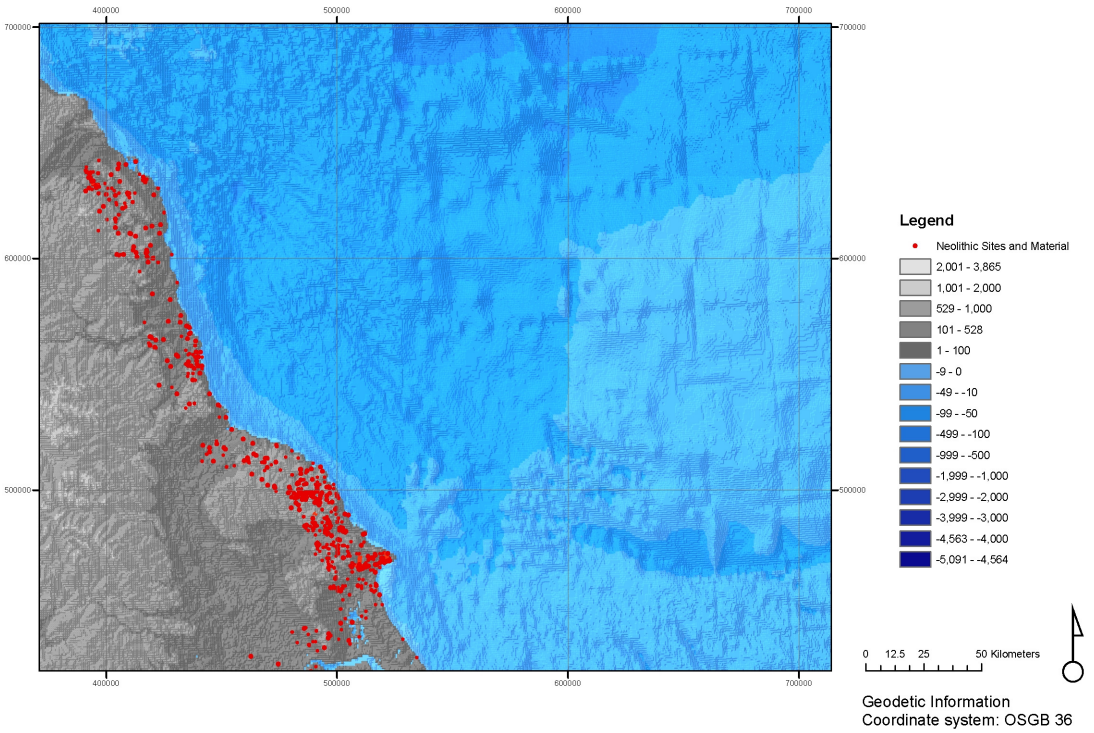
4.4 The North East:

Both Petts and Gerrard (2006) and Tolan-Smith (2008) have offered comprehensive reviews of the Neolithic and Early Bronze Age of North East England. Within these documents a stress is placed upon the role of estuarine as opposed to open coast locations with regard to prehistoric settlement and subsistence activity (Tolan-Smith 2008, 65). From a maritime perspective this is significant as it forces us to recognize that evidence gained from coastal and marine locations can only be properly understood when integrated with that from more traditional terrestrial environments. As discussed above, prehistoric land use is likely to have included use of a range of different ecotones and as such sites cannot and should not be understood in isolation. Figure six below makes this apparent as records stretch inland from the coast up valley's and estuaries.

Within the context of North East England it is worth noting the relatively rare occurrence of a potential Mesolithic through to Early Bronze Age midden site at Cowpen Marsh in the Tees estuary and a preserved Neolithic fish trap (Tolan-Smith 2008, 65) in a stretch of submerged forest off Hartlepool. Both sites represent relatively fortuitous but very important finds, and help to indicate the need for increased survey within inter-tidal and sub-tidal regions. The submerged forest and peat deposits offer valuable palaeo-environmental data in and of themselves, while physical preservation of structures such as fish traps and middens provide crucial counter evidence to discussion of diet and society in Neolithic and EBA Britain. Furthermore, as Petts and Gerrard (2006, 22) note, the vast of majority of data that we do have for the Neolithic and EBA of the North East of England lies inland at elevations near 100m OD. This tends to create a narrative of land use and society which focuses on these more elevated regions. Thus, the site of Cowpen Marsh and the submerged forests of Hartlepool increase in significance in that they help to flesh out a picture which is potentially flawed and imbalanced.

In addition to the sites mentioned above, extensive work in the Humber wetlands (Van-de-Noort and Ellis 1993, 1995, 1997), and on the submerged peat beds of Cleethorpes (Clapham 1999), has revealed what in-depth investigation of coastal and wetland deposits can offer. Importantly this stretches beyond traditional archaeological understandings of past activity and into improving how we model environmental change. Furthermore, work by Van-de-Noort (2003) and Chapman and Chapman (2004) on seafaring on the margins of the Humber estuary during the Bronze Age shows how we can integrate extant terrestrial data to inform interpretations of maritime activity. This is particularly significant if we acknowledge that the North East is not known for significant quantities of prehistoric coastal sites (Tolan-Smith

2008).



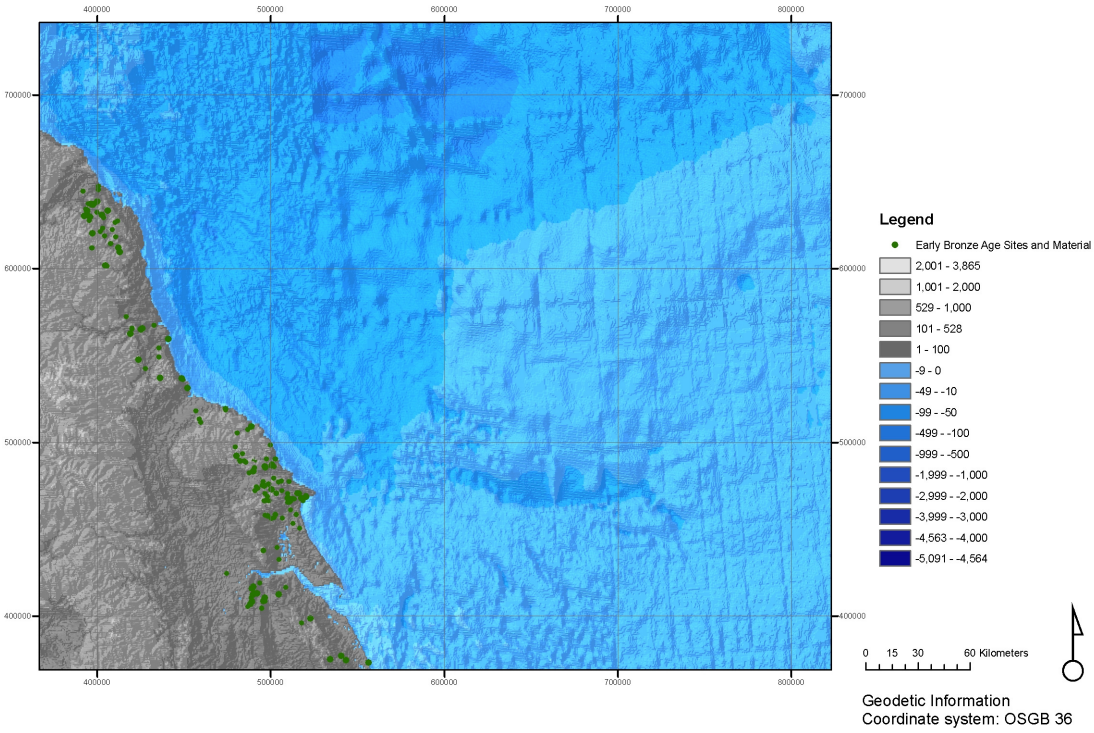


Figure 6 Maps showing the location of Neolithic and Early Bronze Age records from the NMR in the North East of England.

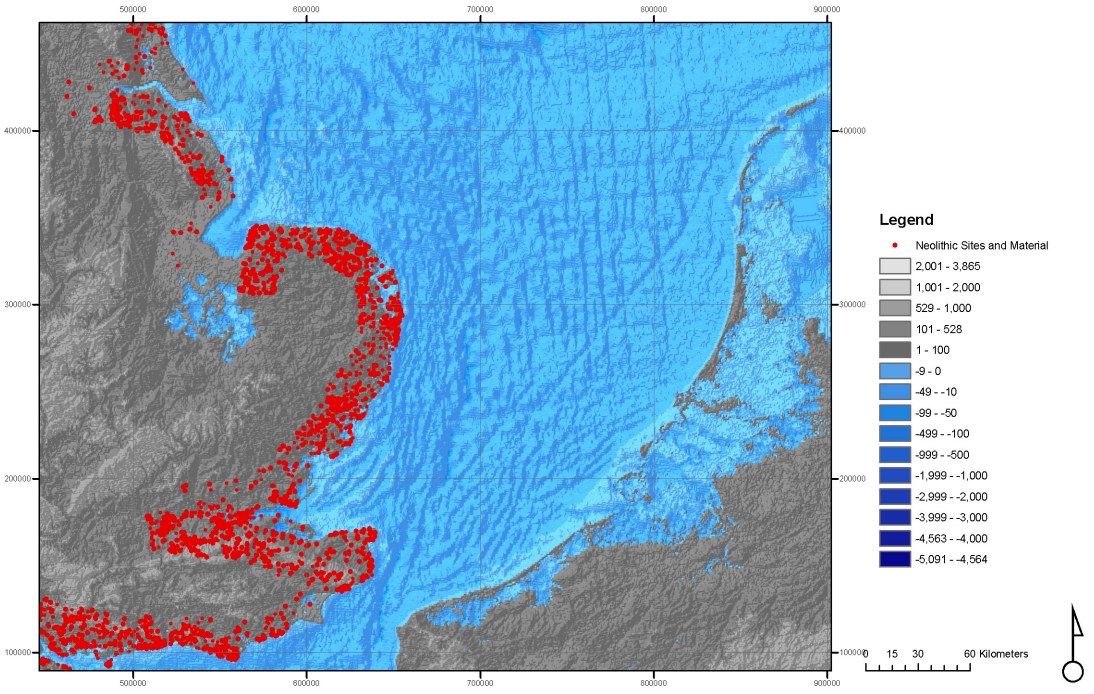
4.5 The South East

The broad area defined as the South East here incorporates a varied record for prehistoric activity. From the intense fen edge settlements to the lesser investigate costal strip north of the wash. Buglass and Brigham (2007) note that the stretch of coastline from Cleethorpes through to the Wash has little evidence for Neolithic and Bronze Age activity, but this is largely due to a lack of systematic survey. However, there is continued presence of submerged forest remnants at Mablethorpe and Sutton on the Sea (Tann 2004, 17), indicating the potential for preservation of sites and palaeo-environmental deposits. Figure 7 below provides an inaccurate picture of the record for Neolithic and Early Bronze Age coastal activity, as the 20km coastal buffer used to extract data from the NMR did not operate from palaeo-geographical models. As such, the evidence from the fenland region is not represented.

However, during the Neolithic and Bronze Age (Waller 1998, Sturt 2006) the fenland basin would have inundated to differing degrees, creating an extension of the North Sea into East Anglia. As the work of the Fenland Survey demonstrated (Hall 1996) the paleo-shoreline of the fens is littered with lithic scatters and evidence for Neolithic and Bronze Age activity. This serves as stark reminder that a maritime research framework needs to engage with those areas which no longer directly associated with the coast, as well as those that still are or that have been inundated. In fact, it can be argued, that the submerged deposits of the fens, Severn and Humber regions offer us some of our best chances to explore the process of inundation and societal response. Here, at the fen margins, we do not encounter the same problems that we see offshore in the exploration of submerged landscapes, but do gain the opportunity of well preserved environmental and organic sequences. As such, continued work within the fenland landscape emerges of central importance for understanding Neolithic and EBA maritime activity in eastern England. Recent work by Mark Knight and Chris Evans (forthcoming) demonstrates the fine grained nature of the sequence recoverable and the significance of interpretations to be made.

Away from the wash, the south east has played host to some of the most significant coastal finds. Within remit of this chapter the site of Sea-Henge (Brennand and Taylor 2003; Pryor, 2002) is particularly worthy of note. Here, at Home-next-the-Sea, a significant Bronze Age monument in the form a timber circle with central inverted tree trunk was uncovered in 1998. More recent work within the vicinity of the Sea-Henge site has uncovered a series of tracks and post groups have been identified (Norfolk Environment and Archaeology Division

2003). Whilst enigmatic as individual sites these serve as another reminder of the potential of coastal deposits for revealing types of activities not frequently encountered within terrestrial contexts. Thus, while few Neolithic or EBA settlement sites have been found along the coastal margin (Robertson et al 2005) the expansive coastal marshes along the Norfolk, Suffolk, Essex and Kent coasts must still be seen as of high archaeological significance. The presence of large coastal barrow cemeteries (such as that at Salthouse on the north Norfolk coast) and numerous coastal flint scatters (Robertson et al 2005) add to the sense of the importance of the coastal landscape to Neolithic and EBA social groups, as does recent work on the Stumble by Essex archaeology. However, the work of Everett et al (2003) in the Suffolk rapid field survey of the Suffolk coast and intertidal zone urges caution as to being too optimistic as to what we gain from investigation of coastal areas due to the difficulties in identifying and dating these sites and the impacts of anthropogenic changes to the landscape.



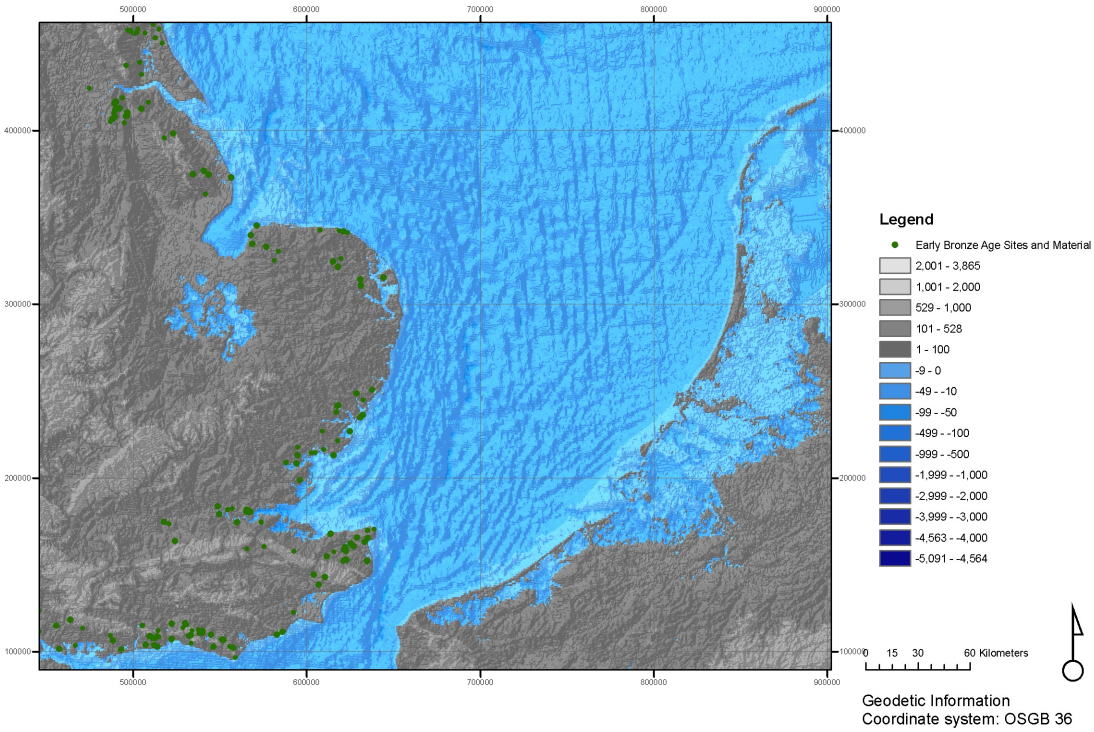


Figure 7 Maps showing the location of Neolithic and EBA records of the South East of England

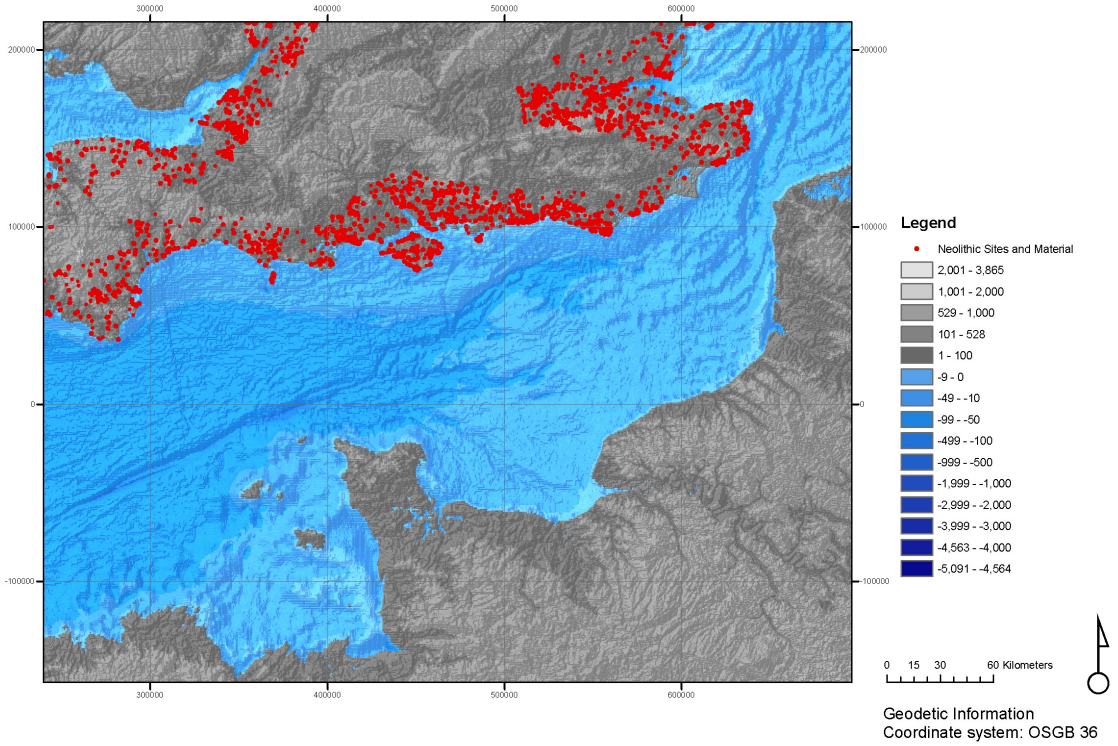
4.6 The Central South

Given the significant role of the river Thames and the Solent on past activity in the south of England, considerable detailed discussion has already been given to the archaeological record of this region, with the Solent and Thames Research Framework being of particular significance (Gardiner, forthcoming). Here, the research agenda focuses on issues developed in the discussion above. Particularly, the problems of identifying and characterizing Neolithic and Early Bronze Age settlement sites are drawn out. As figure eight (below) makes clear, there is a substantial record for both Neolithic and EBA activity along the southern coast. However, much of it relates to lithic scatter evidence which is difficult to definitively date and interpret.

However, the central southern region does play host to areas of previously noted high potential, whilst also featuring in key debates as to the nature of prehistoric contact with the continent (Bradley, forthcoming). First, Wootton-Quarr on the isle of Wight has been noted for the presence of Neolithic and EBA post built structures in the inter-tidal zone, associated with surviving peat deposits (Loader, forthcoming, Tomalin et al forthcoming)). As Bradley (forthcoming) notes, these are most likely associated with specialist activity in the coastal zone rather than settlement, but this does not reduce their significance. They certainly point to a Neolithic desire to access wetland resources, maintain access to the sea and continue activity within a region undergoing submergence.

Important lessons can be learnt from the twelve year English Heritage funded Wotton-Quarr project. There is no doubt that the dating of the Neolithic trackways (one at 4040 -3710 BC and three others ranging between 3790-334) and a late Neolithic/EBA structure (2910-2040 BC) is significant, as too is the work that has been done on the environmental record. However, the time invested in this research also needs to be noted. The material remains at Wootton represent some of our best recorded inter-tidal Neolithic finds, yet they are hard to access, only being reachable twice a year at equinoxal spring tides. Thus, whilst 'rapid' coastal assessments may give us a broad understanding of the potential of the coast, to understand prehistoric activity we need to engage in longer term, more substantive projects. Without, the Wotton-Quarr coastal project dating of Neolithic activity on the Isle of Wight relied on standing stone morphology and analysis of ephemeral lithic scatter data.

Second, and venturing outside of the strict chronological conventions of this chapter, the Langdon Bay, Moor Sands and Erme Estuary middle Bronze Age wreck sites, indicate the potential for discovery of evidence for prehistoric activity beyond inter-tidal and submerged settlements alone. This, when added to the plethora of barrows and lithic scatters points to the complexity of investigating prehistoric use of the south central coastal region. What does emerge is the prominence of activity in areas which command striking views of the sea (e.g. Portland) or mark the point of connection between substantial rivers and the open coast. The proximity of the continent also deserves mention, as there is a continued need to consider movement across the channel and southern north sea region and how this might relate to settlement, monument and scatter evidence.



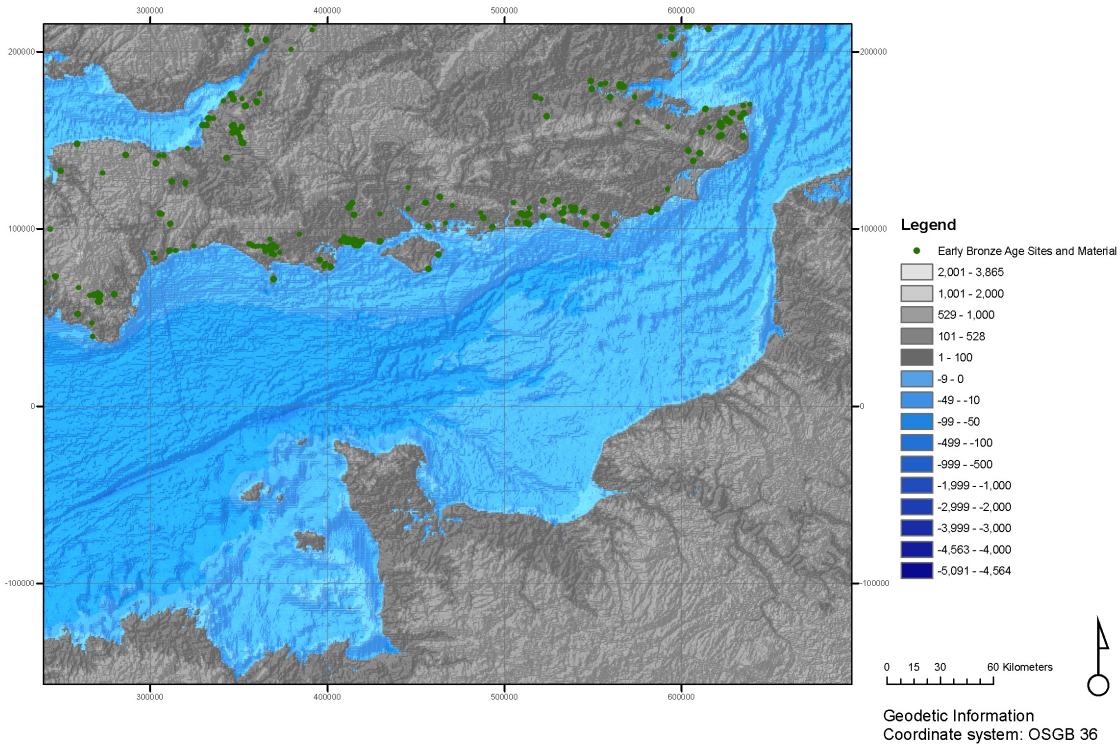


Figure 8 Maps showing the location of Neolithic and EBA records from the NMR for the south central region.

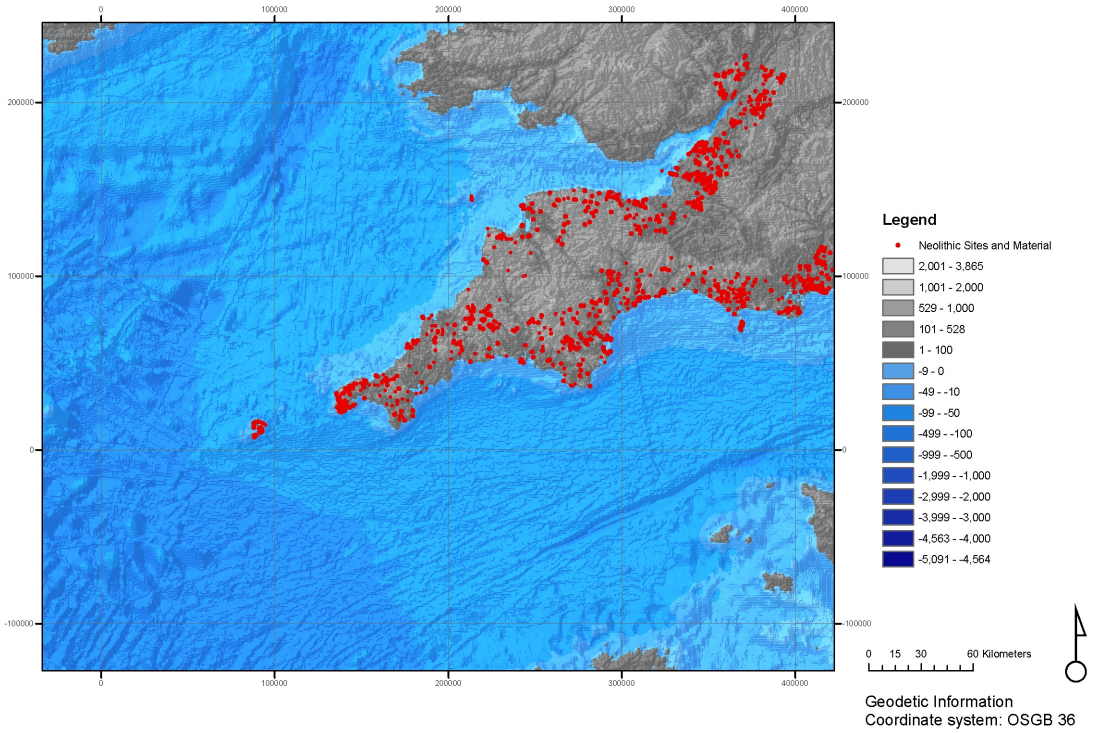
4.7 The South West & Isles of Scilly

As Pollard and Healy (2008, 75) note, the South West of England is host to a wealth of Neolithic and Early Bronze Age archaeology. In addition, Wilkinson and Straker (2008, 63) observe that within this region significant coastal change will have occurred, leading to a skewing of the record. This history of inundation is once again visible the submerged forest and peat deposits of the region, such as those of the Steart flats, and the more well known deposits of the Somerset levels (Bell, 2001). With regard to the terrestrial record, it is again a mix of lithic scatters, ephemeral pit sites, funerary monuments and individual find spots. From a maritime perspective it is the distribution and character of these finds in relation to the associated marine landscape which is of interest. As Crowther and Dickson (2008, 133) note, even within the Severn Estuary, an area known for its prehistoric record, little evidence for Neolithic activity can be seen on the coastal fringe, beyond intermitted artifact scatters in the inter-tidal zone (e.g. at Oldbury-onSevern, and Blackstone Rocks). The story is similar for the Bronze Age, with the most frequent sites relating to round barrows in proximity to the coastal strip. However, as noted in the discussion of the record from the Isle of Wight, this may in part be due to the difficulty in locating, identifying and dating material in the inter-tidal zone.

The Isles of Scilly stand as important reminder as to the seafaring abilities of Neolithic and Early Bronze Age people within this region. Here we see evidence for ephemeral settlement activity (Wilkinson and Straker (2008, 72)) in the form of lithic scatters, pits and changes in pollen profile (Johns et al 2004, 67). The nature of settlement is in unclear, with one possibility being periodic visitation from the mainland. The strong association with the mainland is reinforced by the presence of Carn Brea pottery at Neolithic sties. Work being carried out by Jacqui Mulville is currently examining the nature of submergence within the islands and its potential impact on our understanding of the Neolithic of the islands. It is significant to note that John's et al (2004, 67) make a strong case that further Neolithic evidence is likely to be found if additional survey and excavation is carried out.

Within the context of a maritime research framework this record of Scilly is of clear significance. The journey from mainland to Isles lies somewhere in the region of forty kilometers, at a point where the shelter provided by Ireland and continental Europe diminishes. As such, this is an island group whose contact sees negotiation of more pronounced wind and wave regimes than in the more sheltered coastal waters of mainland England.

With regard to subsitence, the south west provides evidence for sea fishing in the Bronze Age from material excavated at Brean Down in Somerset (Levitan in Bell 1990, 244). Interestingly, similar evidence has not been reported from Neolithic excavations within this region.



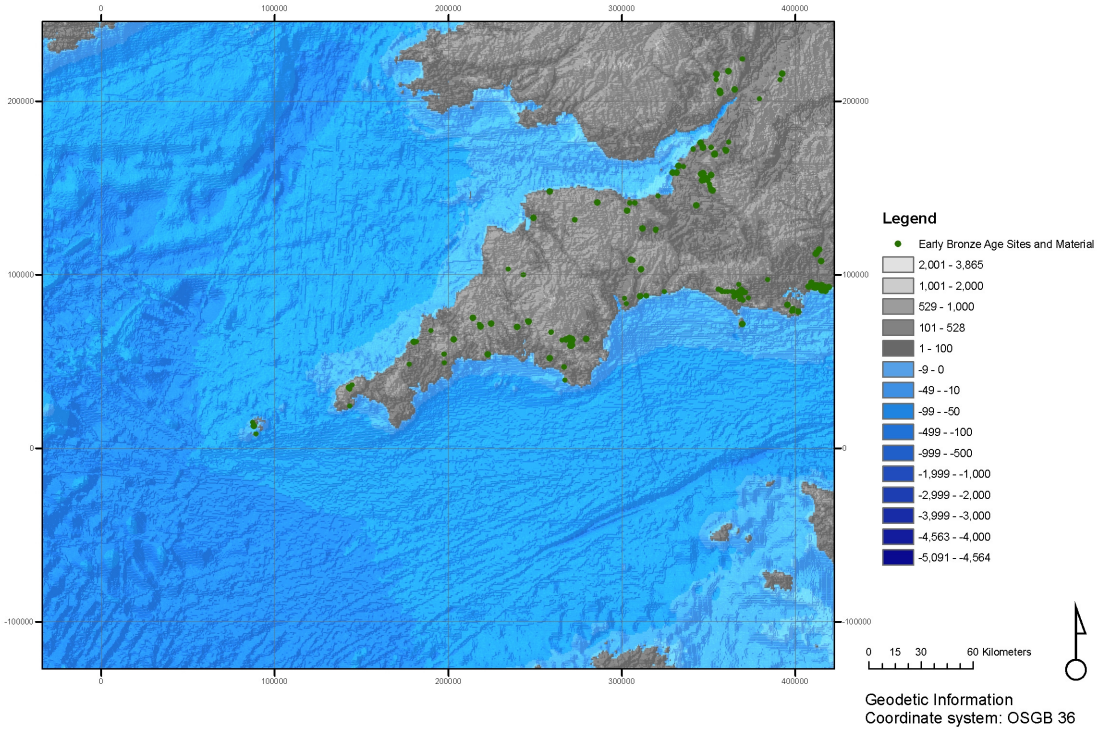


Figure 9 Maps showing the distribution of records for the Neolithic and Early Bronze Age in the South West Region.

4.8 The North West & Isle of Man

The record for Neolithic and Early Bronze Age activity from coastal North West England up until the region around Morecambe Bay appears ephemeral (see figure 10 below). As Johnson (2009, 72) notes, there is little evidence for monumental activity, with the majority of the record relating to lithic scatters. However, this sparse data should not be seen as insignificant, as it ties into discussions of how and when the Neolithic transition occurred. Significantly, although the evidence points to transitory or mobile activity, the pollen record clearly indicates forest clearance and cereal agriculture during the period 4000 – 3000 BC (Cowell and Innes 1994). However, there is also strong evidence for continued hunting practices at the site of Leaslowe bay, with auroch, red deer, dog and horse remains recovered from a third millennium midden (Griffiths 2007; Johnson 2009; Kenna 1986). Also of interest is the fact the same ephemeral record for coastal activity extends into the Early Bronze Age.

However, as recent work has documented (Cummings 2009), this ephemeral record of lithic scatters does not hold for the entirety of the North West region. Further to the north from Morecambe Bay upwards there is a pronounced monumental record in the form of Clyde Cairns. Interesting, although beyond the scope of this report, this record for monumental activity is apparent further to the south along the welsh coast. This leads to questions as to whether part of the reason for this variable distribution of monuments relates to the quality of the sea routes used for communication; with a dialogue existing between northern England/Scotland, the Isle of Man and Ireland across the Irish Sea, and Ireland and Wales across the southern Irish sea and Celtic seas.

Again, their appears to be a mixed story of ephemeral coastal settlement, a potentially meaningful relationship between sea and monuments, alongside pronounced evidence for mixed subsistence practices. In addition, the rapid coastal zone assessment of the north west (Johnson 2009) makes clear that while little evidence has been found for coastal and maritime activity for much of this region in the Neolithic and Early Bronze Age, this does not mean that further work will not help to explain what this record means in terms of histories of occupation and activity.

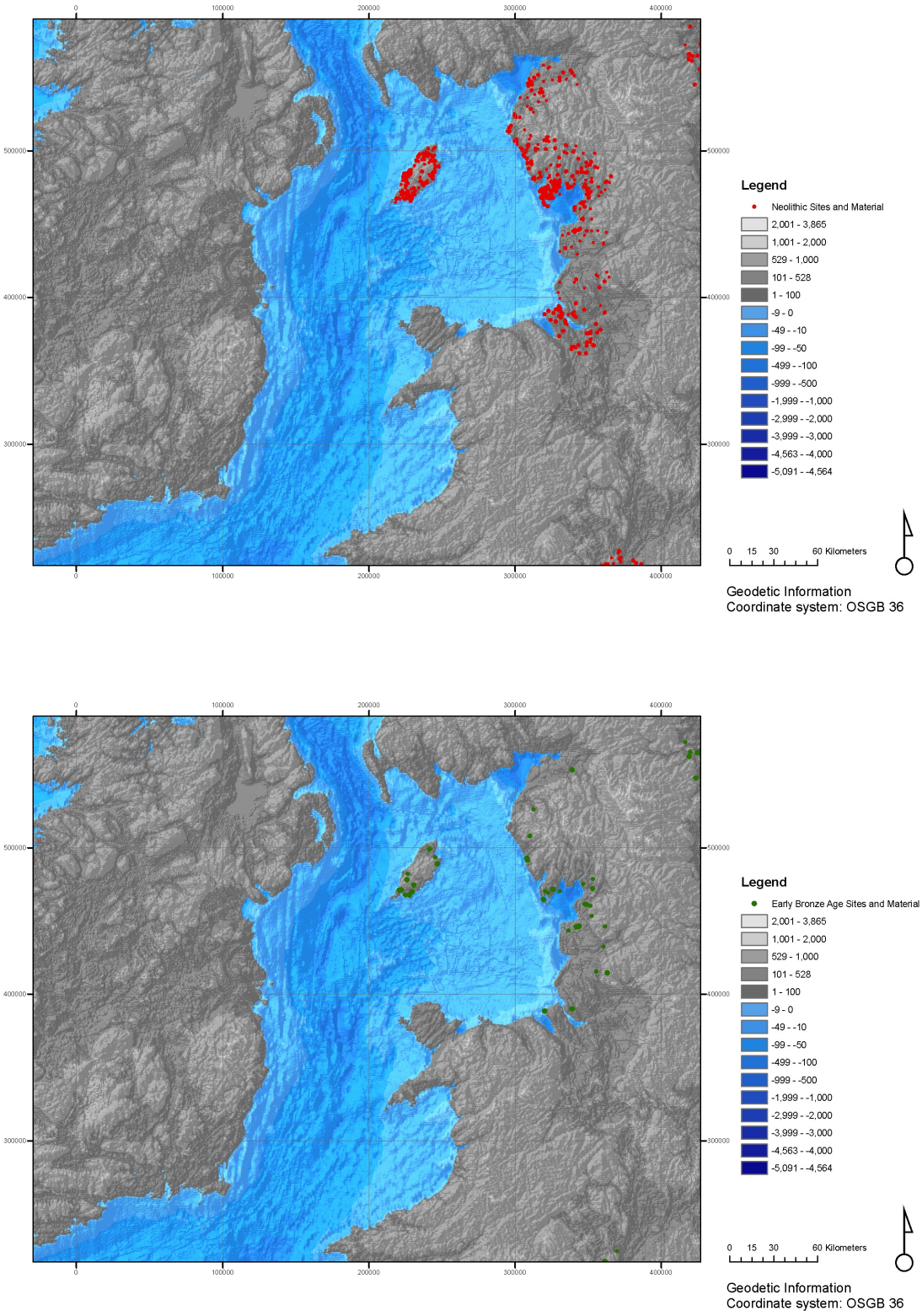


Figure 10 Maps showing the records for Neolithic and Bronze Age mateiral in the North West region.

4.9 Research Questions

As the above discussion has made clear, there are many questions relating to settlement and subsistence which would benefit from further research. In particular the following issues emerge as of paramount importance for all regions;

SSQ1: What role did marine resources play in the diet of Neolithic and Early Bronze Age people?

SSQ2: What evidence is there for costal visitation/inhabitation and how does this relate to potential communication via sea routes and use of marine resources? How does this relate to evidence for activity further inland?

SSQ3: How effective has rapid coastal assessment proven in identifying activity from this period in the inter-tidal zone?

The general trend is thus one of a frustrating lack of information of activity and settlement in the coastal zone. Thus although there is a perceptible backdrop of increasing permanence of settlement through the Neolithic and into the Bronze Age, along with a growing sense of division of space, the record from the coastal zone lags behind the rich data now being gleaned from terrestrial commercial archaeology. As such, it would appear that the role of maritime research within the context of this theme must be to flesh out how the coast was used and how inland and riverine areas relate to marine and coastal zones. Importantly, the work from Wootton-Quarr demonstrates that generating this understanding may not be easy or quick, but will most likely require a long term investment in survey and monitoring, matched with increased marine research. Given the limits of this document in terms of length it has not been possible to review each region as thoroughly as may be desired. As such, comments and critique will be warmly received to ensure that as reasonable a generalization as possible has been made.

5. Seafaring (RVdN)

5.1 Characterization or research

For the Neolithic and Early Bronze Age period, two types of boats are known from England: logboats and sewn-plank boats, albeit the archaeological evidence to date relate exclusively to the Early Bronze Age period.

Logboats, or monoxylous craft, are made from a hollowed-out tree trunk. The ends of these craft are usually rounded, but sometimes the stern included a fitted transom. Sean McGrail's (1979) study of the logboats from England remains the most important contribution to this topic through its thoroughness and comprehensiveness. McGrail lists 179 logboats, with dated craft ranging from 2030-1740 cal BC for the Branthwaite logboat, to the high Middle Ages. His analyses are primarily focused on aspects of boat-building technology and innovation, and on the reconstruction of the capacity of logboats.

More recent research has been predominantly focused on individual finds. For example, the claim for the oldest logboat from England is for a Neolithic burial near St. Alban's in Hertforshire. This, it has been argued, involved a logboat which had been burnt *in situ* (Niblett 2000: 159). Nevertheless, there is insufficient detail for a positive identification of the burnt wooden vessel as a logboat. Moreover, the charcoal from the vessel was radiocarbon dated to c. 3950 cal BC, some 1500 years before the oldest positively identified logboat in England (Lanting 1997/8: 630).

For the Bronze Age, several log-coffins share in their appearance similarities with logboats. The most important examples are the burials at Loose Howe and Gristhorpe in Yorkshire and Shap in Cumbria. One of the three wooden vessels found within the burial mound of Loose Howe includes particular boat-like details, notably a stem carved from the solid wood and a triangular shaped-keel (Elgee and Elgee 1949). However, Bronze Age logboats do neither have a keel nor a stem, and if the log-coffin was modelled on a known boat, it certainly was not a logboat (cf. McGrail 2001: 193). Boat-shaped coffins should, instead, be understood as an incorporation of symbols of travel in funerary behaviour (Grinsell 1940).

Lanting's (1997/8) meta-analysis of the absolute dates of European logboats from Europe, involving a total of over 600 radiocarbon and dendrochronologically dated specimen, has provided some remarkable insights into the origin of these craft around the North Sea. His conclusions for Ireland and Britain, based on 134 dated logboats, are that the earliest dated logboats are early Neolithic for Ireland, and early Bronze Age for Britain, implying that the British logboats developed from Irish precedents, rather than from continental Europe where logboats were in use from at least the eight millennium BC. In support of this argument, it should be noted that the oldest logboats from Britain, such as the Locharbriggs logboat from Dumfries in Scotland (2600-1750 cal BC) and the Branthwaite logboat from Cumbria (2030-1740 cal BC), are to be found on the Irish Sea side of the British mainland. The oldest British logboats from rivers that drains into the North Sea, such as the Chapel Flat Dyke logboat from the River Don near Rotherham (2020-1690 cal BC) and the Appleby logboat from the River Ancholme (1500-1300 cal BC), are somewhat younger. Logboats would have been paddled. These craft are suitable for travelling along the North Sea coast and deltas under favourable circumstances, and for visiting fishweirs which needed daily emptying; however, the notion that logboats were unsuited for the open sea is implicit in most discussions of these craft.

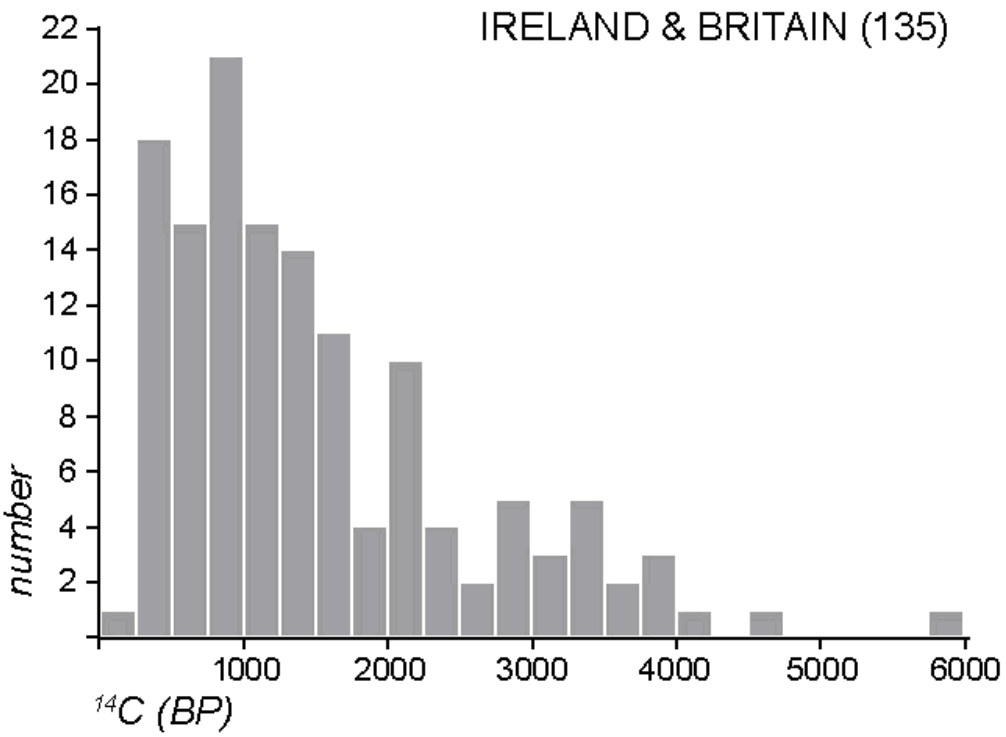


Figure 11 Number of dated logboats from Ireland and Great Britain (n-135) by century, after Lanting (1997/8)

The second type of craft known archaeologically is the sewn-plank boat. To date, the remains of ten such craft have been discovered in England and Wales, with five examples from the English Early Bronze Age. Sewn-plank boats are constructed from large oak timbers with beveled edges; planks are sewn or stitched together using twine or withies made of fibers from the yew tree. The planked hull was made more or less watertight by caulking any gaps between the planks with moss. A system of cleats, which were integral to the keel- and side-strake planks, or isle planks, through which transverse timbers were passed provided rigidity to the hull.

The sewn-plank boats from the English Early Bronze Age are, in chronological order, three boats from North Ferriby in the Humber estuary (F-3: 2030–1780 cal BC; F-2: 1940–1720 cal BC; F-1: 1880–1680 cal BC; Wright 1990; Wright *et al*. 2001); one from Kilnsea in the Humber estuary (1750–1620 cal BC; Van de Noort *et al.* 1999); and one from Dover (1575–1520 cal BC; Clark 2004). The preponderance of finds from the River Humber is, at least in part, the result of exposure of Bronze Age alluvial sediments at spring low tides under favourable weather conditions. The Dover Bronze Age boat was discovered during construction works. Additional sewn-plank boats are known from the Welsh side of the Severn estuary, and for the Middle and Late Bronze Age.

Sewn-plank boats were paddled, with two paddles found at North Ferriby. These craft are likely to have been used for seafaring journeys, although it has to be said that discussion of their suitability for such journeys is ongoing, focussing on such aspects as the rocker or the curve of the keel, and the degree to which these craft were watertight. Sewn-plank boats were large boats, up to 18 m in length and with room for a crew of 20 or more, and with a greater freeboard than logboats; overall they are likely to have been capable of successful seafaring journeys. The location of the finds of sewn-plank boats, exclusively on the coast or in estuarine situations, supports the argument that this type of craft was used for coastal journeys and sea crossings (Van de Noort 2006).

5.2 Research Questions

The research base for Neolithic and Early Bronze Age craft is limited and any increase in the number of craft available will offer important expansion of knowledge. The Ferriby and Kilnsea sewn-plank boats were discovered as part of research projects, but more recently,

craft of this period have been found as part of developer-led activities. Research questions that emerge from this are:

- *SQ1: Can we predict areas of high potential for the presence of Neolithic and Early Bronze Age craft?*
- *SQ2: What are the most effective research methods to discover Neolithic and Early Bronze Age craft?*
- *SQ3: What are the most effective research methods to record and contextualize Neolithic and Bronze Age craft?*

The debate on the Neolithic boats that enabled contacts to be established between England and continental Europe and Ireland is ongoing. Importantly, the craft that introduced (aspects of) Neolithic practices, tools, monuments, domesticates and possibly people to the British Isles, long after farming had become established on the continental side of the North Sea and Channel, remain unknown to us. Debates on the nature of the introduction of Neolithic customs, and reasons for the 'standstill' on the Continent, are hampered by a lack of knowledge of the maritime activity in this period. Three alternative explanations have been put forward to date. First, it has been suggested by several commentators that boats made from hide or skin-covered frames were the most important craft during the Neolithic, and possibly before and after this period as well. However, none such craft have been discovered, nor is it likely that such craft survive anywhere in coastal England, as the acidic burial environment required for the long-term preservation of hide and skin does not exist along England's coastline. Second, not all logboats have been dated through radiocarbon assay, and it is possible that the tradition of logboat construction has a longer heritage than implied by the currently available dates. Third, the oldest sewn-plank boat, Ferriby-3, includes several technological solutions, such as the protection of the yew withies from damage when landing the craft on a beach, which suggest that sewn-plank boats had evolved over a considerable period of time. Research questions that emerge from this are:

- *SQ4: What were the craft of the Neolithic period, where were these made and what roles did these play in the introduction of Neolithic practices to the British Isles?*
- *SQ5: What is the origin of logboats in England; did logboat design diffuse from the Continent or Ireland, or did logboats evolve in more than one location?*

- *SQ6: Were hide or skin-covered frame boats the predecessors of the sewn-plank boats?*

Consensus amongst maritime archaeologists is that logboats were used on England's inland waters from c. 2000 cal BC onwards. However, is this because of modern perceptions and could these craft, in fact, have played a role in coastal transport, and possibly seafaring as well?

- *SQ7: Could logboats have played a role in coastal transport?*
- *SQ8: What was the seafaring capability of logboats?*

Looking at the sewn-plank boats as a type of craft beyond the Early Bronze Age, it is noted that increasingly wider boats are constructed, that is linking more 'keel-planks' together. Thus, Ferriby-1 and -2 (c. 1850 cal BC) have a single keel-plank; Dover (c. 1500 cal BC) has two keel-planks, and the Brigg 'raft' sewn-plank boat (c. 850 cal BC) has possibly five keel- or bottom-planks.

- *SQ9: What were the reasons for building wider (and larger) sewn-plank boats during the Bronze Age? Is this a reflection of changing functions, evolving boat building skills or reflecting a scarcity of very large oak trees?*

The Bronze Age logboats and sewn-plank boats used paddling for propulsion, and the discovery of two paddles at North Ferriby appear to confirm this. Because of the absence of mast-steps, logboats and sewn-plank boats are presumed not to have carried sail. However, it has been shown, experimentally, that sewn-plank boats could have been sailed (Gifford and Gifford 2004) and, ethnographically, that logboats can be sailed when fitted with outriggers. The emerging research question here is:

- *SQ10: How is the use of wind and sail shown in the archaeology of Neolithic and Early Bronze Age ships in the absence of mast-steps?*

Only exceptionally have craft been found with evidence of their cargos, but where this has been the case, such as the Bronze Age logboat of Shardlow in the River Trent with its sandstone blocks (Pryor 2004), this provides valuable insights in the function of early craft.

- *SQ11: What was the cargo of Neolithic and Early Bronze Age craft?*
- *SQ12: What are the most effective research methods to find evidence of cargo in boat finds?*

Archaeologically, we know very little about the navigational skills and devices used for seafaring in the Neolithic and the Early Bronze Age. The discovery of the *Himmelscheibe* from Nebra in Germany (Meller 2002) has been hailed by some as evidence for the ability to read the stars for navigational purposes, and the possibility that sea crossings could have been made at night. Research questions emerging in this area:

- *SQ13: What is the evidence from the Neolithic and Early Bronze Age material culture and monuments from the British Isles for the ability to read the stars and interpret the trajectories of sun and moon, and what are the implications for seafaring in this period?*

The use of boat-shaped log coffins in Bronze Age funerary behaviour is not without its controversy as, for example, shown in the discussion on details of the boat-shaped log-coffin from Loose Howe. Research question emerging here are:

- *SQ14: Why were log-coffins shaped in the form of boats?*
- *SQ15: How accurate and relevant are the presumed maritime architectural detail on log-coffins for maritime archaeology?*
- *SQ16: What is the symbolic significance of burials in boat-shaped log-coffins?*

6. Maritime Networks (RVdN)

6.1 Characterization of research

Despite the long-standing acceptance that elements of the British Neolithic, most notably the domesticated animals and cereals (Case 1969), and concepts of the early monuments (and possibly the earliest farmers themselves), came from the Continent, most studies of Neolithic long-distance trade and exchange in Britain over the last decades have given little attention to maritime networks. Instead, research into long-distance exchange in the Neolithic has been focused on stone and flint tools with geologically determinable provenances. The distribution of these stone tools at the point of deposition has emphasized the operation of overland networks for much of the Neolithic, with a near-absence of imports from across the seas surrounding Britain (e.g. Clough and Cummins 1979; Bradley and Edmonds 1993; Edmonds 1995).

A handful of polished stone axes of Neolithic date have been found in the North Sea by trawling fishermen. These include two early Neolithic polished axes from the Brown Bank. Both are typologically part of the Michelsberg culture and dated to *circa* 4300--3700 cal BC (Maarleveld 1984). From the Dogger Bank come two small polished axes, both of volcanic tuff and are currently held in Craven Museum in Skipton (Van de Noort forthcoming). These finds have previously been understood as lost cargo from ships that travelled across the North Sea (Louwe Kooijmans 1985), but it has recently been suggested that these axes may have been deposited on the islands or possibly tidal islands (Gaffney *et al.* 2009). Both alternative

suggestions have far-reaching implications for the nature of maritime networks that existed in the early Neolithic.

More recent research has served to strengthen this perception of a period of frequent contact between Britain and continental Europe, at the onset of the Neolithic period around 4000 cal BC and the following centuries. Examples of this include the resemblance between the first megalithic monuments on Britain's Atlantic coast with the monuments of northern and western France and Ireland (Sheridan 2003); the placing of the origin of the British Carinated Bowls in Brittany (Herne 1986) and the links between the earliest pottery in Britain with ceramic traditions in northern France, Belgium and the southern Netherlands (Louwe Kooijmans 1976); the introduction of modern cattle into Britain (Edwards *et al.* 2007); and the similarities in 'long barrow' and causewayed enclosure-type monuments in Britain and continental Europe (Bradley 1998). With the notable exception of jade axes, few artefactual evidence for maritime networks that involved Britain exist for the first half of the fourth millennium (Petrequin *et al.* 2002; 2006). Importantly, towards the end of the fourth millennium BC and through the first half of the third millennium BC, archaeological evidence for maritime networks connecting Britain with continental Europe is practically absent (Bradley 2007: 88). This is the case for long-distance traded materials and the sharing of new concepts and monuments.

This situation changes again some time around 2500 BC. The operation of maritime networks linking Britain across the North Sea, the Channel and the Irish Sea are shown in the long-distance exchange of exotic objects and artefacts, in particular Beaker pottery found frequently in single graves beneath barrows alongside jewellery, or other adornments of gold, amber, faience, jet, and tin; also copper and bronze weapons and tools, and flint daggers, arrowheads, and wrist guards (e.g. Butler, 1963; Clark 1970; 1976; Lanting and Van

der Waals 1972; O'Conner, 1980; Harrison 1980; Bradley 1984; Clarke, Cowie, and Foxon 1985; Needham 2005). This evidence has formed the basis for extensive discussions amongst terrestrial archaeologists about the significance of exotic or 'prestige goods' in the emergence of social differentiation in the later Neolithic and Early Bronze Age (e.g. Rowlands 1980; Shennan 1982, 1988; Bradley 1984; Barrett 1994; Harding 2000; Needham 2000; 2009; Van der Linden 2004), and the maritime networks of the late Neolithic and Early Bronze Age were undoubtedly networks that connected elite groups across Europe.

The recent discovery of the 'Amesbury Archer', dated to 2500-2300 BC, shows the existence of a group of people who had travelled widely, and for whom seafaring was part of their itinerary. Alongside the five Bell Beakers ,the Archer's grave goods included artefacts from other parts of Europe, such as the copper that was used to made the knives which came from Atlantic Europe, northern Spain or western France (Fitzpatrick 2009: 183). It also included a 'cushion stone' used in metalworking, and the implication is that the Archer was an early metalworker. It is the importance of metal, initially gold and copper and later of tin and bronze (Northover 1999), and their geographically restricted availability, that has been explained as the principal reason for the emergence of the trade networks in the third millennium BC (e.g. Parre 2000). Britain and Ireland are relatively late entrants into these exchange networks. The earliest evidence for metal working is of a high quality, suggesting that the techniques used were not developed locally, and this is also true for the earliest copper mining (O'Brein 2004 for Ross Island in Ireland). The maritime networks of the Early Bronze Age play also an active role in the transport of finished bronze artefacts, and a long history of research exists for this, commencing with Butler's (1963) *Bronze Age Connections across the North Sea* . These elite networks were not stable throughout the period 2500-1500 BC, and detailed studies have shown both supra-regional (eg, the entry of the Scandinavian elite into the European network after 1700 cal BC; Kristiansen 2004) as well as regional

changes (eg, the shifting regional production and exchange of bronzes in the British Isles; Northover 1982). That the maritime networks evolved during the Early Bronze Age is undoubted, and in a recent paper summarising the dynamics of Britain and Ireland's maritime network, Stuart Needham (2009: 32) offers a high-resolution summary of intensity of contacts and direction of geographical linkage.

Towards the end of the Early Bronze Age, by *circa* 1500 BC, the long-distance network appears to be replaced by a high-intensity, but shorter-range exchange of metal artefacts. Chris Pare (2000), in a review of the evidence of the circulation of bronze, concludes that during the Early Bronze Age, metal was a scarce commodity in Britain, relative to later Periods, and that the trade in bronze, copper and tin was of a high-level and long-distance nature. However, by the beginning of the Middle Bronze Age, these metals had become more generally available and had become a commodity that was exchanged in larger amounts between neighbouring groups. This clearly included exchange between Britain, and its near-neighbours across the seas in Ireland, Armorica and the Lower Rhine regions.

6.2 Research questions

Evidence from archaeological science, including DNA analyses, has provided important contributions to the debate on the origin of a range of domesticated animals and plants. Research questions emerging from this include:

- *MN1: What is the potential for extending DNA techniques to other domesticates?*
- *MN2: What is the potential for extending DNA techniques to people?*

Much evidence on early maritime networks comes from similarities in Early Neolithic: monuments found in Britain and Ireland and continental Europe. Research questions emerging from this include:

- *MN3: Are similarities in monument limited to their construction, or does this extend to their long-term use?*
- *MN4: How much connectedness is required to retain similarity in monument use and development?*

The polished axes from the Brown and Dogger Banks in the North Sea could potentially change our understanding of the maritime networks significantly. Research questions emerging from this include:

- *MN5: What other material of possible Neolithic (and Early Bronze Age) date is landed by trawlermen, but may have been overlooked?*
- *MN6: Is there other material held in collections from the North Sea that is not well known?*
- *MN7: What artefacts from the North Sea have yet to be dated?*
- *MN8: The survival of islands would have greatly benefitted early seafarers, but when did the last islands in the North Sea disappear?*

After c. 3500 BC, Britain and Ireland appear to have lost connections with continental Europe. Is this largely a matter of absence of evidence or a genuine situation? Research questions emerging from this include

- *MN9: Why did the connectedness disappear in the second half of the fourth millennium BC?*

The application of electron probe microanalysis coupled with lead isotope analysis of bronze alloys has offered to date the most important insights into the distances travelled by raw material, scrap metal and finished products in the second millennium BC (Northover 1982; Rohl and Needham 1998). These studies have identified Irish copper-arsenic alloys as the first metals in Britain, alongside a gradually increasing importation of metal from the Continent.. Research questions emerging from this include:

- *MN10: What is the full potential of applying electron probe microanalysis coupled with lead isotope analysis to bronze-tin alloy bronzes?*
- *MN11: What are the opportunities to determine the provenance other types of material through scientific analysis?*

7. Maritime identities, Maritime space; concluding thoughts (FS)

The issue of determining maritime identities within the Neolithic and Early Bronze Age is clearly problematic. As discussed above, evidence for settlement and subsistence is variable, and appears to indicate a range of strategies. However, in line with Van-de-Noort (2006), what we can do is begin to think more clearly as to what the evidence we do have for maritime activity may tell us about society. At this point, the degree of maritimity becomes an issue which needs to emerge on a case by case basis, rather than taking a presumed base-line level for all coastal and island locations in both periods. This should not be read as a call for blinkered, small scale regional accounts alone. Rather, it is meant to highlight the need for a continued commitment to both long term, detailed regional studies, *and* large scale synthesis. The sea and maritime activity encourages us to engage with issues of connectivity which are all too easy to avoid within terrestrial contexts. Here, on the coastal fringe we are forced to confront an entity which is often viewed as a barrier, but the evidence continues to indicate was medium through which people, ideas and material flowed freely at different points in time.

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