

CASE STUDY 3G – NORTH CORNWALL & NORTH DEVON

Case study area: North Cornwall and North Devon, UK.

Main geomorphological types: Hard cliffs, rocky outcrops, sandy beaches.

Main coastal change processes: Coastal erosion, beach change, some cliff instability, low lying areas vulnerable to flooding.

Primary resources used: Archaeology.

Summary: The high cliffs, interspersed with small natural harbours and sandy beaches face the full force of the Atlantic Ocean. The cliffs consist of relatively hard geology but are vulnerable to landslides. Although few major archaeological studies have been undertaken in this area, there are extensive prehistoric landscapes surviving. Knowledge of the heritage resource clearly demonstrates changes in relation to erosion and changes in sedimentation.

Recommendations: Coastal managers should use archaeological and palaeoenvironmental resources to understand long term changes, in particular where humanly-made structures (such as Bude breakwater) have influenced the sediment regime. Extensive Bronze Age peats buried under the coast provide opportunities for detailed modelling of change.

Coastal managers face an ongoing battle to moderate impacts from the sea in the face of a changing climate and pressures from human use of the coastal zone. The challenges that lie ahead are forecast to increase while resources are being forced to go further.

This case study report is part of the Arch-Manche project, which quantifies the value of under-used coastal indicators that can be applied as tools to inform long term patterns of coastal change. In addition, it provides instruments to communicate past change effectively, model areas under threat and interpret progressive coastal trends.

The North Cornwall and North Devon coast is one of six UK case study areas for the Arch-Manche project. Work in this area has focused on the archaeological and palaeoenvironmental evidence. The ranking results are presented followed by an analysis of the results and the potential for demonstrating the scale and rate of sea level change. For further details about the project and the methodology see [Section 2](#).

Within the study area the archaeological and palaeoenvironmental resource has been researched, ranked and analysed. The extents of the detailed study area is shown in Figure 3G1 below.

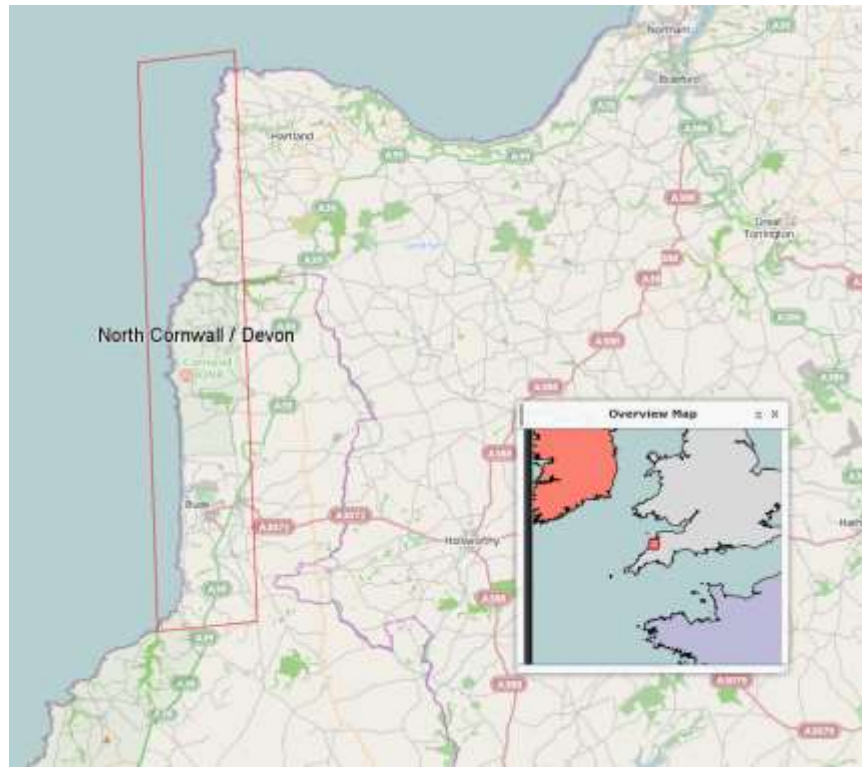


Figure 3G1. Map of the North Cornwall and North Devon case study area

3G.1 Introduction to the North Cornwall & North Devon Study Area

The archaeological study area of North Cornwall and North Devon includes the coast from Widemouth Bay in the south to Hartland Point in the north (see Figure 3G1). It incorporates the west facing coastline at the northern-most point of Cornwall and the most north-westerly coast of Devon, in the area around Hartland. The coastline consists of high cliff faces with small natural harbours opening onto sandy beaches (the largest being Summerleaze Beach at Bude) in the north and centre of the study area, while in the south the land is more low lying and runs down to a mile long beach at Widemouth Bay.

The study area was chosen due to the variable coastline, with hard cliffs in some areas and low-lying sandy beaches in others. Several submerged, intertidal prehistoric landscapes are also known from this region.

3G.1.1 Summary of the Geomorphology of the Area

The case study area has a distinct north-south orientation with a foreshore dominated by rocky ledges and outcrops of resistant sandstone exposed to the full force of Atlantic swells (Cornwall Council 2011, SMP). The area is renowned for its sheer cliffs, reefs and dramatic geology which is regularly battered by the Atlantic causing distinct wave-cut platforms as well as coastal waterfalls. The geology of this coastline is predominantly sandstones, shales, conglomerates, slates and limestones and is generally classed as a resistant coast, this is also partly due to the fact that the area was not glaciated under any Pleistocene glaciation (Buscombe & Scott, 2008:5).

After the Last Glacial Maximum (LGM) the sea level around this coastline was at least 120m lower than today, the early Holocene witnessed a rapid increase in sea level which became more stable around 6,000 years ago. Submerged forests are found in several places along this coastline which provide evidence from a period of lower sea levels. The cliffs have suffered

many landslides as well as erosion but are still relatively hard and resilient, the beaches are also relatively stable with high sediment input from offshore resulting in low erosion rates (Buscombe & Scott, 2008:7).

3G.1.2 Summary of the Archaeology and History of the North Cornwall and North Devon Study Area

The geography and geology of Cornwall has meant that, relative to the rest of the UK, agriculture has been less intensive and many buildings and monuments have been built of stone. This means that it has an above average number of monuments and one of the largest Historic Environment Records (HERs) in the country.

The presence of significant sand dunes in the south of the study area means that there is potential for further archaeological material to be identified in the coastal area (Bell & Brown, 2009: 26). This section provides an overview of the currently known archaeology and history of the study area.

Early Prehistory (Palaeolithic and Mesolithic)

The coastline of the study area was once much further west than its present location. It is presumed that during the Pleistocene era, the coastline of Cornwall would have run almost continuously south west and so, Hartland Point would not have been definable as a point and Bude Bay would have been part of a river valley which exited at the coast some distance to the west. The ending of the last Ice Age led to rising sea levels around the coast; progressively the shape of the present coastline would have begun to materialise (Berridge & Roberts, 1986: 10). The remains of submerged prehistoric forests in the intertidal zone at Bude and Widemouth Bay (Bell & Brown, 2009: 26), as well as several other locations in the south west support this model. Although the only forests which have been definitely dated to the Mesolithic period so far are those at Westward Ho! (Berridge & Roberts, 1986: 11).

Webster 2007 outlines that “Overall, the Palaeolithic and Mesolithic archaeology of this [South West] region is generally rather poorly known, reflecting an absence of robust geochronological frameworks, the predominance of research into a handful of cave and open sites over the lithic scatter resource (whether located on the surface or deeply buried) and the absence of any major syntheses” (2007: 23).

For some time it had been presumed that there was no occupation of the Cornwall peninsula in the Palaeolithic period. A small number of individual finds of Lower and Middle Palaeolithic handaxes and flint tools, and some Upper Palaeolithic cave sites on the south coast suggest limited, sporadic activity in the area. Within the study area, the sole relevant find is a Palaeolithic axe head found in Bude. However, it is thought likely that many Palaeolithic sites on the coast have been lost on account of rising sea levels and erosion (Berridge & Roberts, 1986: 10). This suggestion is given further weight through research undertaken as part of the West Coast Palaeolandscapes Project (Fitch and Gaffney 2011), which extended to the North Devon coast. They outlined that “The west coast of Britain was identified as an area where information on existing palaeolandscapes would have a significant impact on our understanding of the Mesolithic and, potentially, the Palaeolithic in England and Wales” (*ibid.* 2011: ii). Modelling using marine survey data demonstrated that the previous landscape in the northern part of the study area has undergone significant change since the Palaeolithic.

The Mesolithic is often considered the first major period of human settlement in Cornwall and Devon, although this is largely based on a lack of Palaeolithic artefacts (Berridge & Roberts, 1986: 7). Several sites in Cornwall have been assigned a Mesolithic date on the basis of

microlith types. In addition, numerous axeheads, scrapers and other tools have been identified in locations all across Cornwall and Devon. Several Mesolithic findspots have been found along the coast at Bude. One in particular, at Crooklets, has yielded a number of microliths that suggest a Mesolithic working site, most likely from the Later Mesolithic. In the 1970s and 1980s these were exposed by the slumping cliff face and, although this rapid erosion means that the site may already be lost (Berridge & Roberts, 1986: 27), further possible evidence of Mesolithic activity in the study area can be found in the flint scatters off the coast at Hartland Point, at Bude Bay, Widemouth Bay, Bethams, and Summerleaze Point (although these may represent Neolithic activity) (Cornwall and Devon HERs).

To the north of the study area there is well documented prehistoric evidence surviving at Westward Ho! which includes in-situ Mesolithic remains (Balaam et al 1987). These examples are further evidence of potential survival in the intertidal and near shore zones in areas of tidal estuaries, but also exposed coastal bays.

Later Prehistory (Neolithic, Bronze Age and Iron Age)

Neolithic activity in the area of Cornwall and Devon is well evidenced by a number of tor enclosures, megaliths and long barrows. None of these monuments are found within the study area, nor is there any evidence of settlements, although it is possible that any such evidence could have been impacted by more recent agriculture. However, numerous find spots suggest a Neolithic presence in the study area; Neolithic leaf shaped arrowheads have been found near Helebridge and at Crooklets Beach, as well as the many flint scatters which have been given a Mesolithic date, but may indicate Neolithic activity (Cornwall HER). For the Neolithic and Early Bronze Age there is well persevered evidence of prehistoric landscapes on the uplands of Bodmin Moor (Webster 2007: 45), however the nearby coastal zone territories are less well understood.

Cornwall has many areas of 'Anciently Enclosed Land' (a characterisation identified in the Historic Landscape Characterisation). These areas were most likely first cleared and used for farming in the Bronze Age, although successive periods of history have removed most traces of this land use (Cornwall County Council, 2007). The earliest evidence of settlement in Cornwall and Devon dates from this period; early farms have been identified in the upland landscape, as have settlements believed to be associated with managing animal herds.

A number of prehistoric field systems within the study area may date to the Bronze Age, although this is uncertain. Bronze Age burial mounds, traditionally found on areas of high ground, can be found extensively in the southern part of the study area, and there are many further inland in Cornwall and Devon. A number of these barrows are situated on the cliff tops around Bude and on a high ridge south of the town. Many of these survive as extant mounds, although a number are presumed and identifiable only as cropmarks. However, curiously none are recorded north of Morwenstow and so there are none on the high cliff tops around Hartland Point (Cornwall and Devon HERs).

The Iron Age is well evidenced in Cornwall and Devon by large numbers of hillforts, cliff castles and settlement sites. Within Cornwall, earth and stone ramparts of late prehistoric enclosed settlements (known in Cornwall as 'rounds') appear to have been subsequently used as field banks and survive in modern day field systems (Cornwall County Council, 2007). Within the study area, a number of fields on average 3km inland suggest that they were formerly rounds, either through existing or previously recorded evidence, or because their historical names incorporate 'round' (HER). The National Mapping Programme has identified extensive field systems, broadly dated to the Iron Age/Roman period (although this is based on morphology as

opposed to absolute dating) suggesting an active area, possibly under the governance of Hartland hillfort or Embury Beacon hillfort. This hillfort, just north of the Cornwall/Devon border, was found to enclose several structures during a rescue excavation in the 1970s, before it succumbed to coastal erosion (Devon HER).

Roman Period

Perhaps because of the narrow peninsula or the terrain around Dartmoor and Exmoor, it has traditionally been believed that the Romans never extended much influence into Cornwall, although it is unlikely that the area was independent of their control. Roman documents suggest that Devon and Cornwall was as an area known as Dumnonia, and the land of the Cornovii and Dumonii tribes. There may have been active trade between the Romans and the tribes, particularly for tin (Cornwall Heritage Trust). However, recent discoveries of possible Roman forts suggests the Roman presence may have been more active than previously thought.

Accordingly, although several Romano-British features date to this period, there is little in the way of Roman archaeology in the study area. The most significant find was a coin hoard discovered in 1893, which contained Sesterii of Julius Ceaser, Augustus and Hadrian, Minimi of Constantine the Great and an Antoninianus of Carinus (Cornwall HER). A possible signal station at Oldwalls may also indicate a Roman presence at some point during the period, although this cropmark is hard to interpret. A number of finds, including hearths exposed by erosion at Duckpool, boundary banks and domestic refuse suggest that local tribes were still present in the area after the Iron Age (Cornwall HER).

Medieval Period (AD 500 – 1485)

Cornwall and Devon remained largely independent of the Saxon influx in the wake of the Roman departure from Britain. A separate 'Kingdom of Cornwall' evolved from Dumnonia, and the area seems to have some power in Brittany. However, by the 9th century, regular battles took place with the realm of Wessex, including a decisive battle in 825AD that might have been 25 miles south west of the study area. After losing this battle, the power of the Cornwall kingdom waned and by the 10th century, Devon had been incorporated into Saxon Wessex and Cornwall, its boundary now broadly similar to the present day county division, was a minor power (Cornwall Heritage Trust).

Although the Viking incursions of the period had little effect on the region, the arrival of the Normans in 1066 brought many Bretons to Cornwall. Although there was an acceptance of a separate region of Cornwall, the county was incorporated into the Norman kingdom (Cornwall Heritage Trust).

The area around Hartland was part of the larger Saxon Royal Holding in the west of Britain and passed through numerous generations until the Norman Conquest, at which point it was given to King William. The Manor of Hartland was subsequently gifted to the De Dinham family in the 12 century. The greater manor consisted of four smaller manorial areas that make up almost the entire Devon element of the study area. South Hole, Meddon and Stoke run along the coast, whilst Milford is further inland (Hobbs, 2009:9). As a result a number of medieval field systems can be found in the study area, many of which run right up to the present day coast. Other evidence of agriculture and subsistence includes an extensive area of rabbit mounds, including one extensive site known as 'The Warren' or 'Cliff Warren', established as a breeding area near Hartland Quay (Devon HER).

A number of medieval settlements, now abandoned fall within the study area. Many of these are farmsteads, but some, according to documentary evidence, appear to have been whole villages.

Several other monuments including wells, corn mills, farmhouses, manor houses and homes attest to the population settling here (Cornwall and Devon HERs).

Post-Medieval Period (1485 – 1901)

As industrialisation began to take place around the country, more significant changes began to occur in the study area. In the late 16th century, a quay was built at the natural harbour in the cliffs west of Stoke. Hartland Quay served to protect the harbour from the sea, but was itself washed away in 1887. The customs house and warehouses survive today and have been converted into a hotel and museum (Devon HER). Further to the south at Bude a small harbour was thriving by the 18th Century, with strong links with Ireland, Bristol and Wales. Warehouses, houses and business' then grew around the port, particularly after the mid 18th Century.

As maritime trade flourished, coastal traffic increased and so too did the number of accidents. Of the 78 wrecks listed off the Devon coast in the study area, approximately 60 date from the Post Medieval period (Devon HER).

In an effort to improve the infertile farmlands inland, landowners regularly used sand from the shore of the study area on their fields. Transporting such quantities was difficult and a canal was constructed from Bude to serve surrounding agricultural land. Completed in 1823, the canal ran from Bude, where a lock gate gave access to ocean going vessels to a wharf and basin. The canal ran inland as far as Launceston, and various wharfs along its route allowed cargo to be loaded and discharged. An extremely unusual feature of the canal was the use of incline planes rather than locks, which allowed the cargo 'tub boats' on the canal to be towed up and down the hills and inclines inland (Bude Canal and Harbour Society).

The canal was never profitable and developing technology eventually rendered it obsolete. In 1898 a railway line from Holsworthy to Bude was opened. A significant impact of the railway was the impact on tourist traffic, and Bude began to flourish as a coastal tourist destination (Cornwall HER).

Modern (20th Century)

The most significant development in this area during the modern period was the establishment of military defences during the Second World War. In the southern part of the study area, particularly around Bude where the beach represented a potential enemy landing site, numerous pillboxes and anti-tank obstacles were constructed in the early years of the war. Summerleaze Beach in particular was closely defended with pillboxes and concrete blocks. Around 60 of these are still extant (although they have been moved from their original positions) and many feature period graffiti (Council for British Archaeology, 2006).

In 1940, RAF Cleave was established four miles north of Bude. Although a grass airstrip, the site had numerous hard structures including perimeter tracks, barracks, offices and other buildings, dispersal pans, AA positions and numerous pillboxes and bunkers. Many of these remain extant and the main airfield itself was redeveloped in the 1960s to become a radar station that has since evolved into Government Communications Headquarters (GCHQ) Bude (Council for British Archaeology, 2006).

The site of GCHQ Bude may have been chosen because of its proximity to Widemouth Bay. The bay is the landing point for several submarine cables that originate in other countries and GCHQ Bude was used to monitor communications along the cables. The first Transatlantic Telecommunications Cable was laid between the USA and UK in 1963, from Widemouth to New

Jersey and to date eight such cables have been landed at Widemouth where they are connected to the nearby repeater station (Bamford, 2008:pp. 215–217).

3G.1.3 Current Environmental Impacts, Threats and Coastal Management

Approach

This section considers the current environmental impacts and threats along the North Cornwall and North Devon coastline and reviews the current coastal management issues and approaches. Particularly relevant to this element of the report is the North Cornwall Shoreline Management Plan (SMP), Unit 7B-3 Widemouth Bay to Hartland Point.

Review of Key Contributors to Coastal Change

The coastline is dominated by cliffs and rocky headlands, with some low-lying beaches and coastal sand dunes. The cliffs along the southern parts of the study areas are generally fronted by sand, this decreases further north where there are more narrow shingle beaches. Many of the cliff sections have witnessed landslides, where large amounts of the material break down onto the beaches. However, it is not thought that the cliffs here will retreat significantly so littoral material resulting from cliff erosion will be minimal despite previous landslides (Cornwall Council 2011, SMP). The dominant westerly wave direction and the orientation of this coast means that little material moves along the shore, sediment movement is predominantly offshore-onshore.

As well as natural erosion the few low-lying areas of the coast around Widemouth, Crooklets and Summerleaze where there is good access to the shoreline, are impacted by tourism and developments, and many other parts of the coast are being affected by agricultural pressures. The coast here is internationally significant for its ecology, geology and archaeology and this is reflected by the various designations including SSSI, AONB, GCR and Heritage Coast.

The severe storms over the winter of 2013-2014 saw huge waves hitting the coastline. South of the study area witnessed dramatic changes with the iconic natural rock formation at Porthcothan Bay destroyed by waves, and huge amounts of sand lost from beaches at Newquay which exposed a shipwreck. Sand from the beaches within the study area was stripped by the waves during the storms, however, the natural on-shore off-shore sediment regime in the area means that much of this will slowly be pushed back to the beaches over time.

Summary of Current Coastal Management Approach

Four areas within the case study currently contain coastal defence structures, these are Widemouth, Crooklets Beach, Bude and Hartland Quay. The coastline has witnessed a long history of cliff erosion, the current shoreline management plan proposes that this natural regime of erosion and retreat should be allowed to continue, 'this is a coastline where non-intervention is vital' (Cornwall Council 2011, SMP), this is in order to maintain the diversity and richness of the coastal habitats. Currently these habitats exist in a narrow margin between the coastline and farmlands, in these areas the National Trust Management Plans are encouraging schemes for habitat recreation, alongside Natural England who are also introducing new grazing regimes to help restore the habitats.

Further south around Bude previous holiday developments have had a negative effect on the coastal landscape, recent work has been carried out to restore and re-vegetate the dunes at Bude. Other areas along this coast have also been affected by the pressures of tourism and agriculture, beaches at Widemouth, Crooklets and Summerleaze are popular tourist attractions as they are some of the few low-lying points in an area dominated by cliffs.

Widemouth includes important habitats and geology, where the entire Namurian succession of the Crackington Formation is exposed (Cornwall Council 2011, SMP) and areas are part of the Boscastle to Widemouth SSSI, the Heritage Coast and Cornwall AONB. The SMP also recognises the palaeo-environmental potential of Widemouth due to the submerged Neolithic forest remains. The coastal management strategy for Widemouth is to hold the existing line of defence, but in areas where there is no existing defence a strategy of do nothing will be implemented (Cornwall Council 2011, SMP).

From Widemouth to Bude the coast has a history of landslides and rockfalls, and again contains important habitats and geology reflected through its SSSI status. Roads along this coast and buildings such as the Coastguard lookout are at risk from coastal erosion. Archaeological monuments, mainly tumuli are located along the cliff top but are not thought to be at risk as they are quite set back (Cornwall Council 2011, SMP). The strategy here is to do nothing. In Bude itself where existing coastal defence structures are in place, this will be maintained, the undeveloped areas will be left which may result in the need to relocate the coastal footpath (Cornwall Council 2011, SMP).

From Crooklets to Hartland Point some buildings are at risk from coastal erosion, including the lighthouse and quay at Hartland along with archaeological sites at Duckpool. Again the area includes SSSIs, is an AONB and Heritage Coast. The SMP proposes that the assets are not at risk in the short to medium term, although the possibility of landslips should not be discounted, the preferred strategy here is to do nothing, although existing structures at Hartland Quay will be maintained.

Overall the current coastal management strategy for this study area is to do nothing, the SMP stresses the importance of natural erosion in maintaining the rich and diverse habitats as well as allowing new geological exposures to be opened up and coastal geomorphological features to evolve (Cornwall Council 2011, SMP).

3G.2 Archaeological and Palaeoenvironmental Ranking

This section outlines the results of the archaeological and palaeoenvironmental ranking from the North Cornwall and North Devon study area, followed by a discussion of the results. The ranking methodology applied is detailed in [Section 2](#).

3G.2.1 Results of the Archaeological and Palaeoenvironmental Ranking

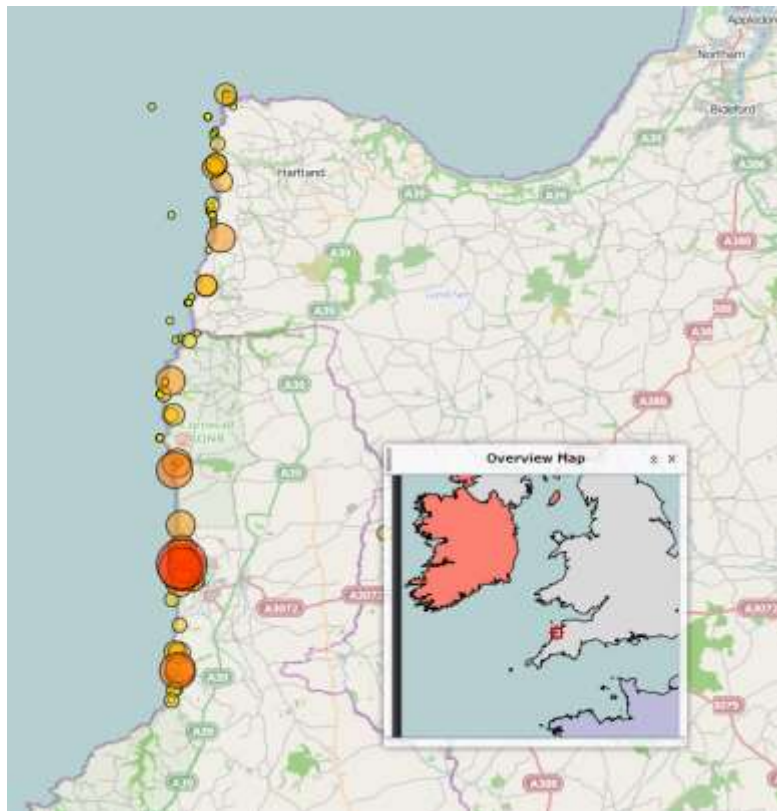


Figure 3G2 Map showing the distribution of all sites assessed within the North Cornwall and North Devon study area.

Within the North Cornwall and North Devon study area data was obtained from the local Historic Environment Records (HERs), the National Record of the Historic Environment (NRHE), the United Kingdom Hydrographic Office (UKHO) and the English Heritage Peat Database. It should be noted that the data obtained from the HERs was often limited, and where sites scored highly further research was then required in order to understand the full nature and extent of the site. Each data set went through a process of cleaning, in order to prevent the duplication of sites, this process is detailed further in the Methodology [Section 2](#). A total of 240 sites and records were assessed.

The highest ranking sites are listed in the table below (Table 3G1), the total score has been normalised to give each site a score out of 100.

| ID | Site Name | Site Type | Period | Score – Sea Level | Score – Environmental | Score – Temporal Continuity | Total Score | Coastal Context | Broad Environment type |
|----|--------------------------------------|-----------------------|-------------|-------------------|-----------------------|-----------------------------|-------------|-----------------|------------------------|
| 27 | Crooklets Beach – Prehistoric Forest | Submerged Landsurface | Prehistoric | High | High | High | 100 | Marine | Marine |
| 36 | Crooklets Beach – Peat Deposits | Submerged Landsurface | Prehistoric | High | Medium | High | 88 | Marine | Marine |
| 37 | Duckpool – Submerged forest | Submerged Landsurface | Prehistoric | High | Medium | Medium | 77 | Marine | Marine |
| 12 | Widemouth Bay – prehistoric forest | Submerged Landsurface | Prehistoric | High | Medium | Medium | 77 | Marine | Marine |
| 39 | Maer Lake – Submarine Forest | Submerged Landsurface | Prehistoric | High | Medium | Medium | 77 | Marine | Marine |
| 24 | Northcott Mouth – Bronze Age Barrow | Monument | Bronze Age | Medium | Medium | Medium | 66 | Above HW | Coastal |

| | | | | | | | | | |
|-----|--|--------------------|---------------|--------|--------|--------|----|----------|---------|
| 26 | Duckpool Beach – Industrial Remains | Monument | Roman | Medium | Medium | Medium | 66 | Above HW | Coastal |
| 11 | Widemouth Bay – Romano British Site | Buried Landsurface | Roman | Medium | Medium | Medium | 66 | Above HW | Coastal |
| 28 | Vicarage Cliff – Medieval holy well | Monument | Post Medieval | Medium | Medium | Medium | 66 | Above HW | Coastal |
| 30 | Crooklets – Mesolithic flints | Buried Landsurface | Mesolithic | Medium | Medium | Medium | 66 | Unknown | Coastal |
| 65 | Mansley Cliff – Mesolithic flint working | Buried Landsurface | Mesolithic | Medium | Medium | Medium | 66 | Above HW | Coastal |
| 703 | Maer Lake – Core Sample | Other | Unknown | Medium | High | Low | 66 | Unknown | Unknown |
| 704 | Widemouth Sands – Core Sample | Other | Unknown | Medium | High | Low | 66 | Unknown | Unknown |
| 14 | Bude - Barrow | Monument | Bronze Age | Medium | Medium | Medium | 66 | Above HW | Coastal |
| 19 | Earthquake - Barrow | Monument | Bronze Age | Medium | Medium | Medium | 66 | Above HW | Coastal |

Table 3G1: Highest ranking archaeological and heritage sites within the North Cornwall and North Devon study area

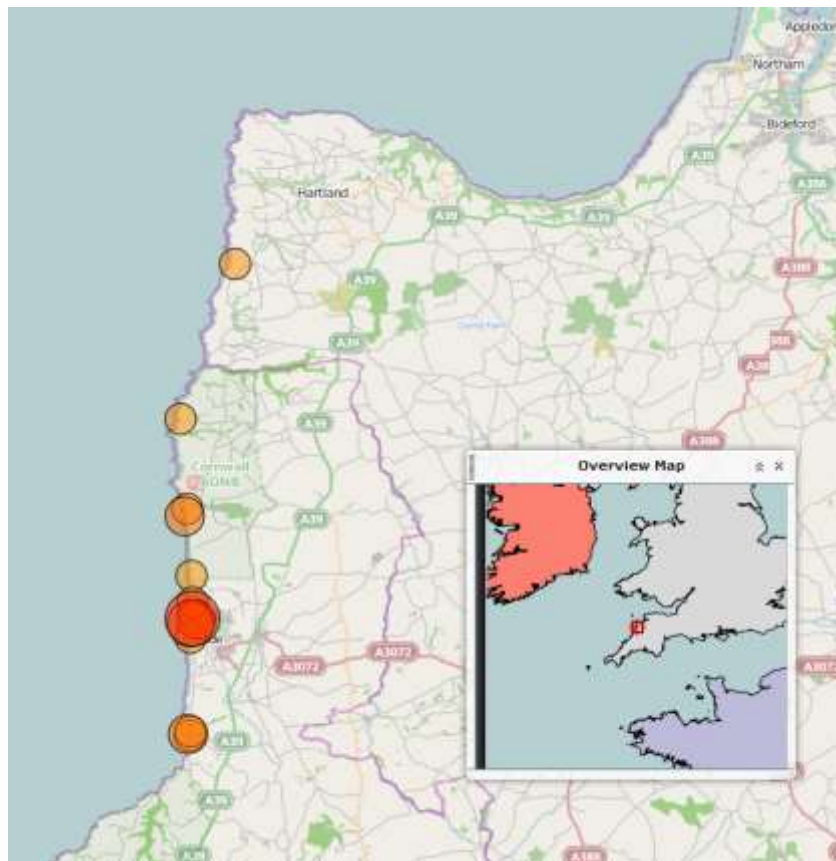


Figure 3G3 Map showing distribution of highest ranking archaeological and palaeoenvironmental sites within the North Cornwall and North Devon study area.

The following tables provide the breakdown of numbers of sites ranking ‘high’, ‘medium’ and ‘low’ for each category within this study area.

Ranks for sea level change

| | | | |
|--|------|--------|-----|
| | High | Medium | Low |
|--|------|--------|-----|

| | | | |
|-----------------|---|----|-----|
| Number of sites | 5 | 38 | 197 |
|-----------------|---|----|-----|

Ranks for environmental change

| | | | |
|-----------------|------|--------|-----|
| | High | Medium | Low |
| Number of sites | 3 | 20 | 217 |

Ranks for temporal continuity

| | | | |
|-----------------|------|--------|-----|
| | High | Medium | Low |
| Number of sites | 2 | 26 | 212 |

Table 3G1. Results of the three archaeological and palaeoenvironmental ranking categories

3G.2.2 Discussion of the Ranking Results

High ranking sites (Table 3G1) from the study area range from the Mesolithic to Modern periods. The sites with the highest ranks were submerged prehistoric forests, particularly around Bude, Crooklets Beach and Widemouth Bay. At Crooklets Beach core samples taken in 2002 provide detailed information on the Holocene environmental sequence, the site also contains evidence of Mesolithic and Neolithic occupation. Two sites containing large amounts of worked Mesolithic flints have also been found eroding from the cliffs at Crooklets and Mansley Cliff. These sites can provide detailed information on sea level and environmental change, and Holocene cores like those taken from Crooklets can also provide a detailed running chronology.

Other high ranking sites include Bronze Age barrows, particularly around the cliff tops at Bude including some which have partially eroded. A Romano-British site has also been exposed by erosion and includes several hearths. Medieval and Post-Medieval sites also ranked highly, these include wells, the quay and pier at Hartland which is still partially visible although much was destroyed in the late 19th century, and wreck sites. More modern sites include the canal, breakwater and pier at Bude, and even WWII defence structures, although many of these are not included in the list of highest scoring sites they still ranked medium for sea level change, one site at Northcott Mouth has partially collapsed due to erosion by the sea.

3G.3. Analysis

The North Cornwall and North Devon study area contains a wealth of archaeological and palaeoenvironmental evidence which can improve our understanding of past sea level and environmental change. Evidence from Crooklets Beach was ranked the highest, the site contains a submerged forest, peat deposits containing timber fragments, and a Mesolithic flint working site nearby. The forest was first recorded on a map in 1848, it is also shown on the 1880 Ordnance Survey map just below mean high water (see Figure 3G4). Environmental analysis of further material recovered during cable works in 2000 revealed that the environment of Crooklets Beach was predominantly woodland with swamp and freshwater pools dating to at least 3750-2200 BC (Kirkham & Herring, 2006:172). The submerged forest was mainly oak and alder with some ash and willow and has been radiocarbon dated to between 3750-3500 BC, open water pools also existed as evidenced by finds of aquatic plants and the Crooklets stream is said to have flowed through swampy environment, then woodland on the lower slopes of the bay and then out to sea (Kirkham & Herring, 2006:172). Although no evidence of human activity was found in this area a flint knapping site from the late Mesolithic was recorded inland from the beach, flints were first discovered eroding from the cliff in 1972. This data can help to reconstruct the prehistoric landscape, and to understand the change in sea level since this period.

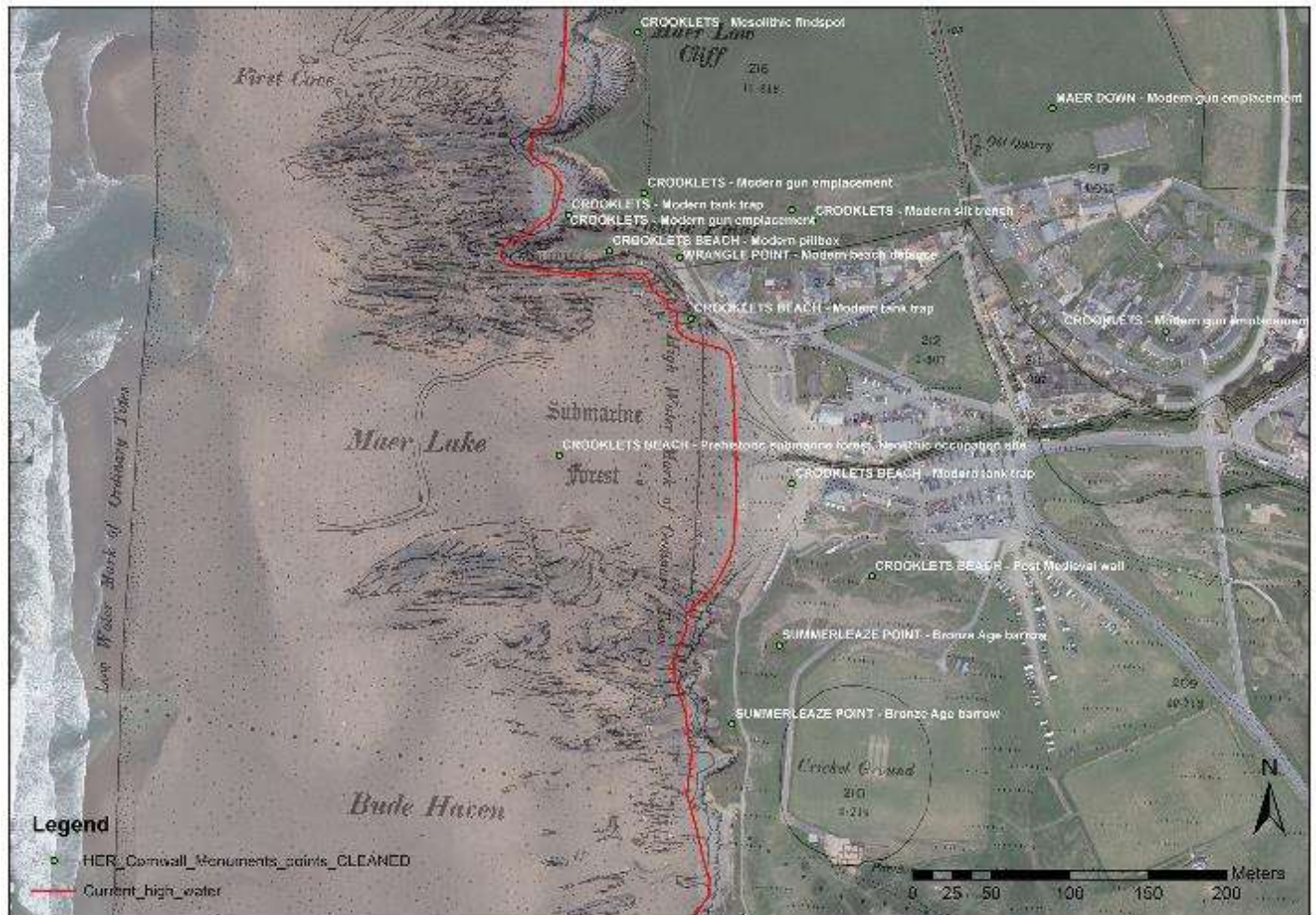


Figure 3G4. Map showing the location of the submerged forest at Crooklets Beach from the 1880 Ordnance Survey Map overlain on 2013 Aerial Photography (CCO). The red line shows the current high water mark, which in the centre of Crooklets Beach is 24m further inland than then HW mark on the 1880 map. The green dots show site data obtained from the Cornwall HER.

3G.4. Conclusions and Recommendations

For the Arch-Manche project the focus of the North Cornwall and North Devon study area has been on the archaeological and palaeoenvironmental evidence. However, results from other case study areas has shown that valuable information can also be gained from the use of historic maps, charts, photos and historic artworks. Although this report has demonstrated the value of archaeology in improving our understanding of coastal change, particularly through the evidence of submerged prehistoric forests, maps, charts, photos and paintings could help to refine our reconstruction of the coastline from the last few hundred years. A brief review of the 1880 Ordnance Survey Map, overlain on 2013 Aerial Photography (courtesy of the CCO), has helped us to see change in the last 123 years (see Figure 3G5), such maps also include information on the high water mark which can be compared with today.

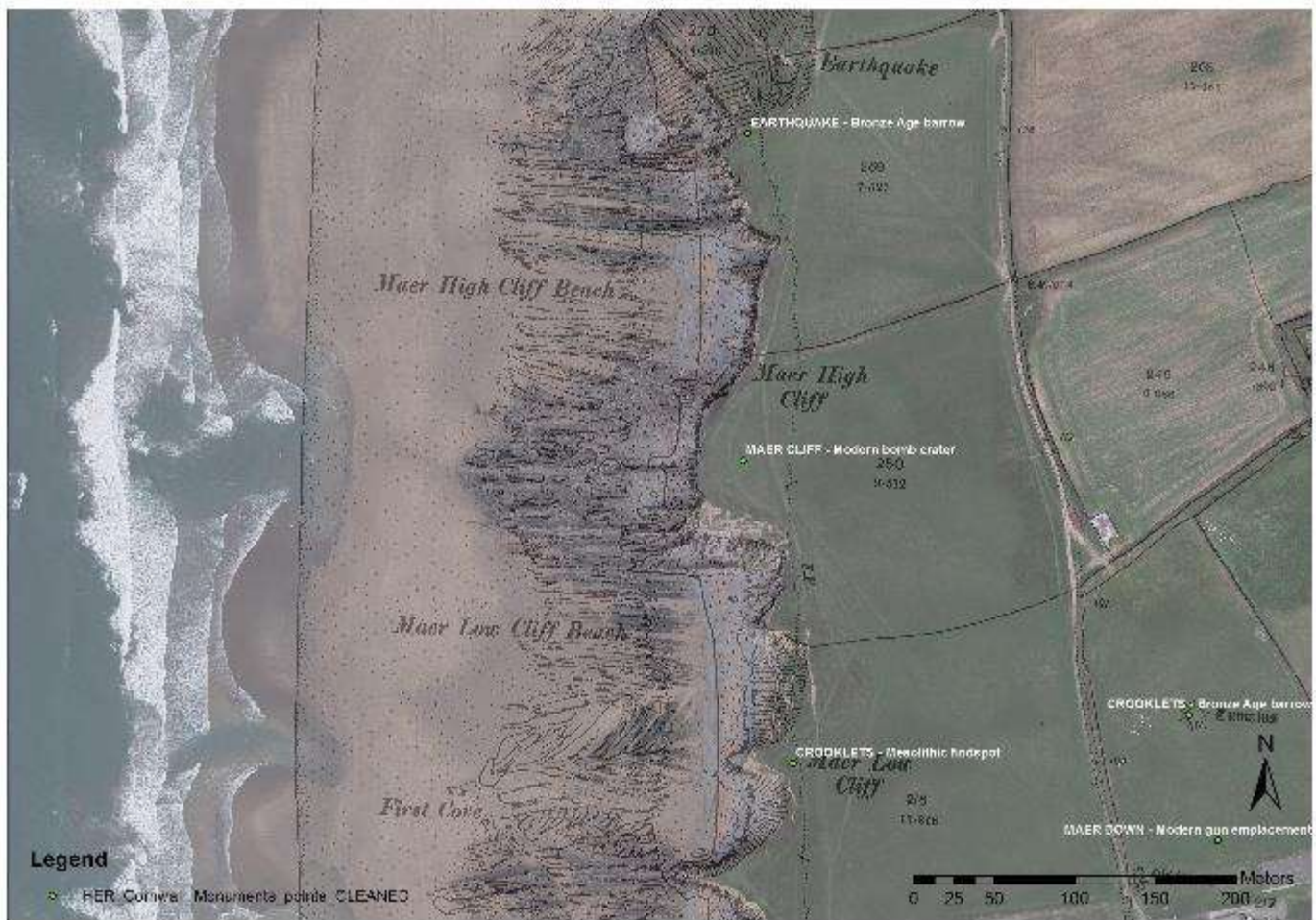


Figure 3G5. Map showing the 1880 Ordnance Survey overlain on 2013 Aerial Photography (CCO) around Maer Cliff. The cliff shows very little change over this 123 year period.

There is no shortage of available works of art from within this case study area. The 'wild' nature of the coastline here, and development of Bude as a tourist destination drew a number of established artists to the area. Just one example is shown in Figure 3G6 which shows a view of Nanny Moore's Bridge in Bude which is a grade II listed structure, painted by Joseph Stannard who was a prominent member of the Norwich School of artists. The history of the bridge can be traced through historic photographs up until the situation in the present day.

The geology of the North Cornwall and North Devon coastline is relatively resistant, dominated by hard cliffs and rocky outcrops. However, the area has witnessed a number of landslides and continual natural erosion, with the current shoreline management plan favouring a policy of no intervention along the majority of the coast. These processes have revealed archaeological material which has the potential to inform coastal managers on the rate and scale of past coastal change to help with planning for the future. However, much of this material may be lost before it is fully recorded. Evidence all along the coast can tell us about the environment and coastline both over the long and short term, with material from the Mesolithic and Neolithic up to WWII.



Figure 3G6: Painting by Joseph Stannard c. 1830 showing Nanny Moore's Bridge in Bude (Reproduced with permission of Newport Museum and Art Gallery)

Further work is required in order to reconstruct the prehistoric landscape, combining the environmental data obtained from sites like Crooklets Beach, with information on relative sea level rise it would be possible to demonstrate how this landscape looked in the Mesolithic and Neolithic periods. Combining this with data from later periods including Bronze Age, Iron Age, Medieval and more modern sites would allow us to understand how this coastline has changed over thousands of years, as well as the rate and pace of change. The incorporation of artistic images, maps, charts and historic photographs from the last two to three hundred years would increase the resolution of understanding of change during this period.

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