

1. INTRODUCTION

1.1 Project Outline

This report documents Phase 2 of the Rapid Coastal Zone Assessment for the North West Coast of England (NWRCA). The area covered by the NWRCA project runs from the Anglo-Welsh border in the Dee Estuary to the Anglo-Scottish border in the Solway Firth and from lowest astronomical tide (LAT) to 1km in-land from mean high water springs (MHWS). This document follows Phase 1 of the Rapid Coastal Zone Assessment of the same area which commenced in August 2007 and was completed in September 2009. This was conducted by Archaeological Research Services Limited (ARS Ltd) and comprised aerial photographic transcription and analysis and a detailed desk-based assessment (Bacilieri 2009; Johnson 2011). It was updated in May 2011 in light of the publication of Shoreline Management Plan 2 (SMP2 for North West England and North Wales) in December 2010, with Phase 2 of the project commencing in March 2011.

During the course of the Phase 1 desk-based assessment and aerial photography transcription exercise 1163 new records were added to the English Heritage National Record of the Historic Environment (NRHE) and supplied to the regional Historic Environment Records (HER). An additional 203 existing records were enhanced. Phase 1 also identified thirty-nine archaeological sites and areas which are facing imminent threat from natural processes such as coastal erosion and rising sea levels (Johnson 2011, 211-223). Further damage could be caused to such sites by the construction of sea defences as a result of the recommendations from the SMP2 which aim to manage such threats. These sites under threat were identified as being in urgent need of rapid ground surveys to inform recommendations and prioritisation for their future management and conservation.

1.1.1 *The Archaeological Survey*

The Phase 1 list of thirty-nine sites and areas under threat formed the basis for Phase 2 of the project. Following further consultation with the relevant local authority archaeologists and other project partners, a further eleven sites and areas of interest were added, resulting in a list of fifty sites requiring rapid survey (see Table 1.1). Additional locations were added as threatened sites were identified and surveyed opportunistically, and as attention was drawn to further sites potentially under threat. The rapid field survey examined the fifty highlighted locations in greater detail, recording the visible archaeological remains and taking field notes. All of these locations are at risk from some form of ongoing erosion, whether immediately or in the longer term, and the specific site reports include assessments of the level of threat to historic assets at each survey location visited.

In Phase 2 of the project rapid field survey recorded 248 archaeological features at the fifty targeted locations, approximately 66% of which were new records or rediscovered features thought to no longer exist. All records collected during Phase 2 contained condition statements in the form of attached data tables. These contained data on the current condition, the type of site and its period, and this information can now be used to significantly enhance any existing records in the HER and NRHE. Newly identified archaeological features include military features, such as weapons pits and trenches at Grune Point in Skinburness, medieval saltworking sites on the Solway Coast, post-medieval fish traps around Morecambe Bay, and several wreck sites (Figure 1.1).



Figure 1.1 Wreck / gunnery target recorded on the foreshore at Drigg, Cumbria (scale = 1m).

The detailed location reports summarise the archaeological features recorded at each site and assess the threats that they face with reference to current SMP2 policy. This information is compiled in Chapters 2-5 of this report. These chapters cover each of the fifty sites surveyed, being subdivided into Cheshire, Merseyside, Lancashire, south Cumbria and north Cumbria.

1.1.2 Palaeoenvironmental Survey

Alongside the review of archaeological sites the Phase 1 desk-based assessment provided a review of known inter-tidal peat sites along the North West coast based on the English Heritage Inter-tidal and Coastal Peat Database. This considered their location in relation to the risk of erosion, their height above LAT and the amount of previous scientific work undertaken. This identified eight inter-tidal peat sites in the study area that have not been subject to systematic investigation by modern geoarchaeological techniques. It recommended a palaeoenvironmental survey and sampling programme and this was undertaken as part of Phase 2. The survey included these eight sites, together with a further two sites added following consultation with the English Heritage Regional Science Advisor and other project partners (Figure 1.2). This resulted in a list of ten inter-tidal peat or submerged forest locations requiring survey (see Table 1.2). The results of this are discussed further in Chapter 6 of this report and the English Heritage Inter-tidal and Coastal Peat Database will be updated with new information yielded by Phase 2 of the project.



Figure 1.2 Survey in progress at exposed inter-tidal peat bed at Cleveleys, Lancashire (scale = 2m).

1.1.3 Management Options

Chapter 7 of this report deals with the key management issues relating to each of the locations surveyed. This was done using an onsite assessment of threat by the project team, considering coastal erosion, potential for future flooding and land use. The assessment is inevitably a partly subjective process and it is intended only to propose an independent priority listing and possible strategies for further discussion in the future. The outcomes of this are not intended to provide definitive proposals for what should be done to manage these sites in the future. The assessment of threat to each site was used together with an assessment of significance, using criteria outlined in English Heritage's guidance for Scheduled Monuments (formerly Annexe 4 of PPG 16). This allowed each site to be given a score out of sixty and to be ranked accordingly. The results of these risk assessments were tabulated and the most threatened sites of the highest significance are discussed in greater detail in Chapter 7 of this report. This process enabled proposals for the management of the archaeological resource at each site to be put forward for discussion by the project team and these are also discussed in Chapter 7.

1.2 Aim and Objectives

1.2.1 Project Aims

Phase 2 of the NWRCZA is primarily focused around rapid field survey which aims to substantiate and complement the results of the desk-based study undertaken as Phase 1 of this project. The overarching aims of this project are as follows:

- Provide further heritage information to inform Flood and Coastal Erosion Risk Management (FCERM) strategies and schemes and, in the longer term, SMP3,

thereby helping to ensure appropriate protection, or mitigation of damage, to heritage assets.

- Provide enhancement and additional information to the HERs and NRHE record of coastal heritage assets. This will enable an enhanced curatorial response to strategic coastal planning at both a national and regional level
- Provide an increased factual base for the curatorial response to individual applications in advance of developments or coastal protection schemes.
- Provide further information on the likely archaeological potential and vulnerability of the coast and priority sites.

1.2.2 Specific Objectives

1. Upgrade the Phase 1 report in the light of the completion of SMP2, undertaken by Halcrow on behalf of Defra.
2. Provide more detail on archaeological sites under threat within the study area so that it can be fed into Defra's Shoreline and Estuary Management programme, the NRHE and the various local authority HERs. This includes the production of management options and a priority list of at-risk sites which can be used to target future monitoring, recording and local community work.
3. Verify identifications made from aerial photographs during Phase 1 of the project by ground-truthing and rapid survey.
4. Locate and characterise sites and features undetected during Phase 1 of the project.
5. Determine the geomorphological/sedimentary context of the various sites and features targeted for survey.
6. Assess whether features are under active erosion, are at imminent risk or at longer-term risk, and relate to the SMP2 policy and the National Coastal Erosion Risk Mapping (NCERM) predictions of shoreline evolution for 20, 50 and 100 year intervals.
7. Selectively sample features with particular attention to the inter-tidal peats to ascertain their extent and, resources permitting, their date range.
8. Identify sites in urgent need of additional recording, dating or characterisation work to take place after the Phase 2 project.
9. Assess the practicalities and logistics of future fieldwork including any required mitigation measures and/or required additional recording, dating or characterisation work at specific sites to take place after Phase 2.
10. Contribute, where possible, to initiatives and priorities identified within the North-West Regional Research Framework (NWRRF, Brennand 2007).
11. Make data available to other coastal managers, other coastal surveys and researchers and community groups.
12. Increase the understanding of the archaeology of the North West Coast amongst the public and the research community by various means of project dissemination.

1.2.3 Project Integration

Local Authority HERs

The project has provided survey data in the form of a GIS that has been designed specifically to integrate with the particular systems in place at each of the local authority HERs. This has enhanced the various HERs within the study area, enabling a much improved and more informed response within the planning process.

SMP's and Conservation

The project has provided heritage information that has been made available to Defra's SMP and this will inform FCERM strategies in the future. It will help to ensure protection and management and/or mitigation of damage by natural processes.

The project has also informed other organisations, such as the Arnside and Silverdale AONB, the Solway Coast AONB and various landscape partnership schemes in the area such as The Sefton Coast Partnership, The Morecambe Bay Partnership and the Solway Firth Partnership. It will hopefully contribute to the aims set out in their respective Management Plans and provide guidance on priorities for future heritage projects within these areas.

Research Frameworks

This project has contributed to the regional research framework, most notably to the Coastal, Marine and Maritime Theme (Brennand 2007, 196). Initiative 2.7 calls for 'an assessment of the inter-tidal resource and identification of the areas most at risk from erosion' (*ibid*, 34) and this has been provided through both Phase 1 and Phase 2 of this project. New sites have been identified through the Phase 1 aerial photography transcription exercise, adding to our knowledge of the coastal resource and new heritage assets identified through Phase 2 include military features such as weapons pits and trenches at Grune Point, Skinburness, medieval saltworking sites on the Solway Coast and post-medieval fish traps around Morecambe Bay and the Cumbrian coast. The ground-truthing, survey and condition assessments of these sites, provided in Phase 2, have facilitated the assessment of the risk of erosion to this resource and those sites most at risk are identified and discussed in Chapter 7. This will inform future management and allow for renewed research initiatives to take this work forward.

The survey and sampling of inter-tidal peat and 'submerged forest' sites has also contributed to research initiative 2.4 which calls for the 'targeted sampling and investigation of the most important waterlogged sites' (Brennand 2007, 33). This contribution takes the form of both delimiting the mapped extents of exposed areas of inter-tidal and coastal peat beds as well as providing palynological analysis and radiocarbon dates for these previously under-investigated sites.

Future Research Possibilities

During Phase 2 of the project further research avenues have been explored. These have included contributing to the Solway Coast Landscape Partnership and the Morecambe Bay Landscape Partnership. As these projects gather momentum they will seek to frame projects around the priorities identified by the NWRCZA project and address the requirements of some of the threatened or actively eroding sites.

Phase 2 of the NWRCZA project identified several locations where further work is required to fully understand the nature of the archaeology, or to preserve eroding remains through record. For example, the potential site of the medieval port of

Skinburness could yield further information on the nature of medieval activity in the area and the abandonment of the port and failed borough. However, further work would need to be undertaken to analyse and record the earthwork remains and conduct archival research in order to fully understand the location and realise the full potential of the site. Also, the Roman fort at Ravenglass in south Cumbria is partially understood archaeologically, however it is under imminent threat from erosion and has visibly eroding archaeological deposits and artefacts. Here further work is required to record these rapidly eroding remains before they are lost. In some cases both scenarios were encountered, where a poorly understood site was found to be actively eroding, such as the Copper Smelting works at Jenny Brown's Point where the foundations of buildings potentially associated with the industrial site are being exposed and subsequently eroded by tidal channels within Warton Sands. Further work at this site could focus on recording the eroding remains and conducting archival research to more fully understand the nature of this site and its significance as part of the industrial heritage of the area.

All of the proposals for further work that have been identified by Phase 2 of this project are discussed further in Chapter 7. Proposals for further work have been based on the significance of each site along with the immediate level of threat faced by the surviving archaeology. Using this evaluation process for each of the top sites of significance identified in Chapter 7, options for further work and management of these sites have been proposed. These are only proposals intended to promote discussion on the future management of these key sites and are not a definitive guide for what must be done.

Project Outputs

Phase 2 of the NWRCZA project has produced the following outputs as a direct result of the field survey work:

- Project Report (this document)
- A separate Executive Summary document summarising cumulative results of Phase 1 and Phase 2 of the project
- The project GIS database containing all survey records plus additional records for peat sample locations and all data from Phase I of the project
- Digital photographic archive comprising 1614 .jpeg images
- Approximately 164 new HER records based on the Phase 2 survey,
- Web pages on Archaeological Research Services Ltd website detailing the aims and scope of the project and key findings.
- Workshop at the Morecambe Bay Landscape Partnership Scheme's Annual Conference. A guided fieldtrip as part of ArtGene's Design Café around Barrow-in-Furness
- Project leaflet summarising results for distribution to the public and local authorities
- A specialist report on the palynological analysis of inter-tidal and coastal peat samples (incorporated into Chapter 6 of this report)
- Specialist reports on artefacts recovered from the eroding cliff edge at Ravenglass Roman Fort (incorporated into Chapter 5 of this report)
- A further specialist report on radiocarbon dates from inter-tidal and coastal peat samples will also be produced and incorporated into Chapter 6 of this project report when available.

1.3. Scope of the Survey

1.3.1 Geographical Scope

The aim of the aerial survey mapping element of the project was to produce accurate mapping from aerial photographs and a record of all archaeological features from all periods that could be identified within the study area as part of an in-depth desk-based assessment. The Phase 2 field survey, based on the locations identified during Phase 1 for further recording, aimed to ground-truth and expand upon the archaeological features mapped by the aerial photography and enhance these surveys with rapid metric survey data and digital photographs. The aerial photography transcription data was employed in the field during the course of the survey. It was used to help interpret newly identified archaeological features and to re-evaluate interpretations of those that had been previously recorded, for example the aerial photography transcription mapped a post-medieval fish trap on Pilling Marsh, but this was found to be a simple fence line during the Phase 2 ground truthing.

The project area extends across the following local authorities (from south to north): Cheshire West and Chester Borough Council, Liverpool City Council and Wirral Metropolitan Borough Council, Sefton Metropolitan Borough Council, Lancashire County Council, Lake District National Park Authority and Cumbria County Council. The thirty-nine sites identified for further work subsequent to Phase 1 did not include any sites in Cheshire. However, following consultation with HER officers at Cheshire West and Chester Council, three sites were added to the list as requiring a condition assessment based on rapid survey. The NWRCZA Phase 2 therefore undertook site visits and recording in each of these local authority areas.

The field survey focused on sites identified within the strip of land mapped in Phase 1, from the lowest astronomical tide (LAT) to a width of 1km in-land from the high tide level (MHWS) (Figure 1.3). The project area extends over an area of 1601km² but only c. 673km² extends over exposed land; the remainder falls within the inter-tidal zone. The field survey was carried out to Level 2 standard (Ainsworth *et al.* 2007) and covered a length of nearly 700km of coastline, although this figure does not account for the coverage of foreshore, cliff top dunes and estuarine hinterland that was covered during the field investigation.

1.3.2 Geology

The solid geology of the study area is reviewed in detail in Chapter 3 of the Phase 1 report (Johnson 2011) and so does not need to be repeated here, but can be broadly summarised as follows. The underlying geology varies along the coast but can be divided into two broad units, separated by Morecambe Bay. Rocky headlands such as Heysham Head, Humphery Head and St Bees Head exist north of the southern shore of Morecambe Bay consisting mainly of Permo-Triassic deposits such as Permian Red Manchester Marls and Collyhurst Sandstone and St Bees sandstone (Tooley 1985). Morecambe Bay is the largest expanse of mudflats and sands in the United Kingdom and is largely composed of Carboniferous Limestone. To the south upper Carboniferous Millstone Grit is interspersed with the Permo-Triassic outcrops.

The superficial geology of the study area is dominated by Late Glacial Maximum (LGM) Till and diamicton. North of St Bees the glacial till forms raised beaches due to post-LGM isostatic uplift, which at Workington and Whitehaven forms low cliffs. In the inter-tidal zones and estuaries mudflats and sands overly the superficial geology, with

numerous late Holocene sand dunes and shingle barrier deposits along much of the rest of the region's coastline.

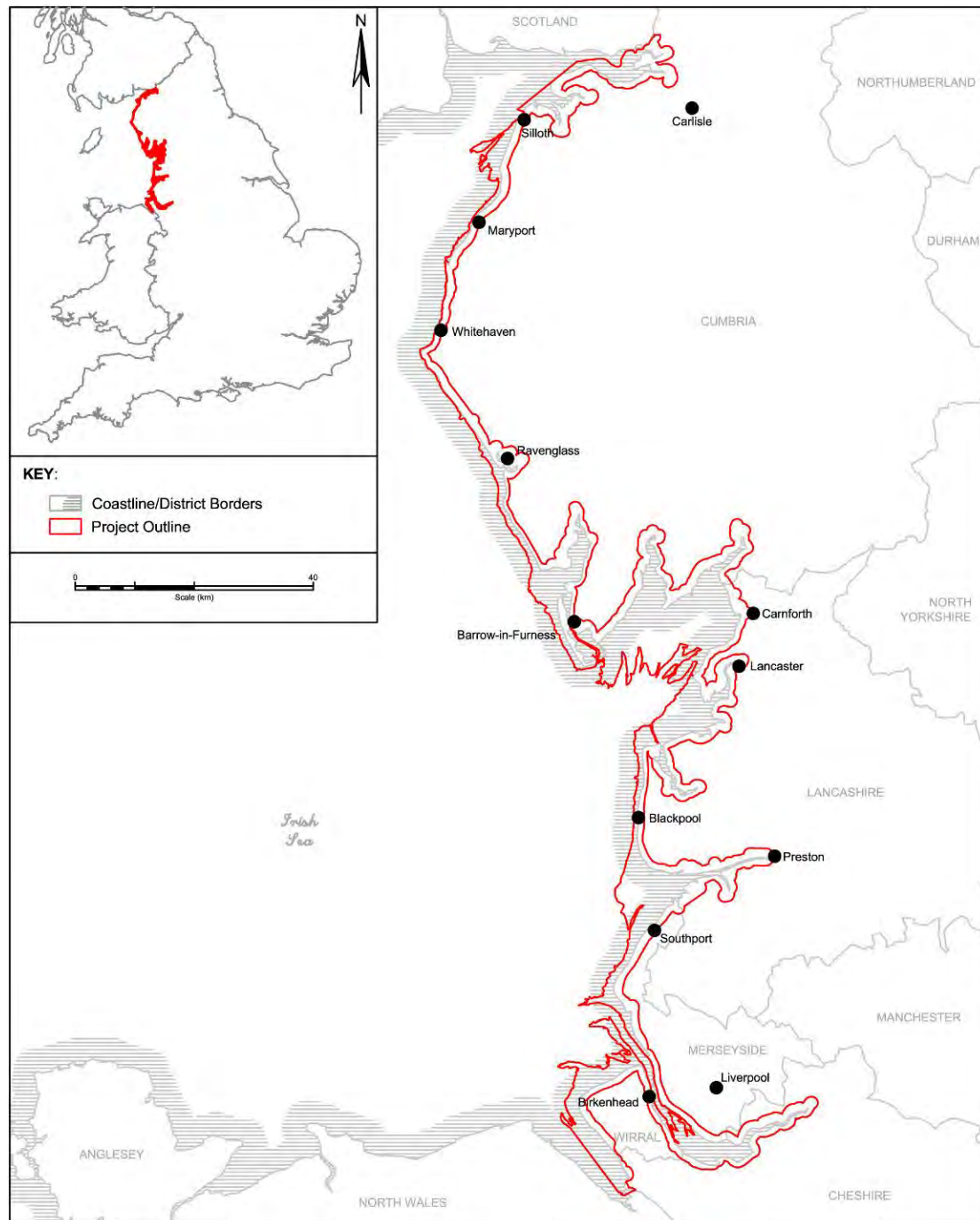


Figure 1.3 Location of the North West Rapid Coastal Zone Assessment Study Area.

1.3.3 Archaeological Scope

Earthwork archaeology

All extant earthworks identified as archaeological in origin on aerial photographs were mapped as part of the Phase 1 project. Available RCHME/EH ground survey plans were used to assist and enhance this mapping. The data from Phase 1 was used on the GPS

display in the field to identify previously known earthwork remains, some of which were then re-interpreted (Figure 1.4). The field survey recorded all earthwork remains encountered using mapping grade GPS in basic plan form utilising lines and polygons where appropriate in accordance with Level 2 survey (Ainsworth *et al.* 2007). If earthwork sites had already been recorded as part of a recent detailed Level 3 survey, for example Cockersand Abbey (Burn *et al.* 2009), then they were recorded as a point with an attached condition statement, rather than in detail, to avoid repetition of survey work.



Figure 1.4 Handheld GPS survey in progress on the earthwork remains at Skinburness, Cumbria (scale = 2m).

Levelled archaeology

All crop marks, soil marks and parch marks identified as archaeological in origin were mapped during the Phase 1 project and two cropmark sites in particular, Swarthy Hill hillfort and Knockcross Roman Temporary Camp, were identified for field survey on the ground as part of Phase 2. The Phase 1 data was used to precisely locate the position of these sites on the ground to determine the extent and level of survival of any archaeological features. In addition to cropmark sites, the lithic scatters at Hilbre Island, Heysham Head, Walney Island and Eskmeals were also targeted for further investigation. The same methodology was undertaken using known positional information on the GPS with field reconnaissance to attempt to relocate the extent of these sites.

Post-medieval and modern field boundaries

Extant field boundaries that are depicted on first edition Ordnance Survey or later edition maps, but have now gone out of use, were generally not surveyed by Phase 2. This was unless they formed a key component of another significant archaeological feature that was identified as under threat from erosion. An example of this can be seen at Burgh-by Sands marsh where a plough headland appears to mark the edge of the

medieval extent of the marsh, potentially allowing for a clearer interpretation of the chronology of salt-working sites in this area.

Medieval and post-medieval ridge and furrow

Ridge and furrow was mapped using the GPS where it was either newly recognised, identified as being under threat, or presented an exceptional example of preservation. Newly recognised ridge and furrow fields were recorded as polygons with the GPS using a simple graphical depiction, delineating the extent of area and direction of the furrows.

Industrial features and extraction

Large and small-scale quarries were mapped with the GPS and recorded as polygons where possible, whether or not they were depicted on any Ordnance Survey map or within the Phase 1 data. Mining and associated features, such as tramways, were mapped and recorded as with other features. Large complexes were also mapped generally as an extent of area or as detailed lines points and polygons of a representative section of the remains, as there was no scope within this project for undertaking further detailed survey. The undersea coal mine at Saltom Bay, Cumbria was recorded as a point as a Level 3 survey of the site was completed by Oxford Archaeology North in 2000.

Post-Medieval and 20th Century military features

Former post-medieval and World War military sites and installations were mapped. Extensive military complexes and sites were outlined as an extent of area with descriptive data attached. Anti-landing obstacles and tank traps were recorded as lines and polygons to show their alignment. Surviving installations such as pill boxes and coastal gun/searchlight batteries were also mapped. Since many sites of this period and function were by nature shortlived and transitory, emphasis was placed on the identification and general extent of activity when appropriate, rather than the accurate depiction of single features, such as local trackways. In some cases, however, this was necessary to interpret the nature of the surviving remains. Where such remains were fragmentary or insubstantial, a single point was used to record their position.

Buildings

The foundations of buildings visible as earthworks, or ruined stonework, were surveyed using the GPS, regardless of whether they were depicted on first edition Ordnance Survey or later edition maps. Standing roofed, or unroofed, buildings or structures, such as the buildings at Barrowmouth Alabaster and Gypsum Mine were also recorded if they had a particular association in the context of industrial or military remains (Figure 1.5). Medieval castles and ecclesiastical sites previously recorded and extensively surveyed and mapped by the Ordnance Survey were generally already mapped by Phase 1 as an extent of area, e.g. Piel Castle and Cockersand Abbey, and so were not recorded in detail by Phase 2, save for providing an updated condition assessment.

Geomorphological features and natural deposits

Geomorphological features when encountered in association with known archaeological deposits were recorded. For example the eroding dune cliff seen at Beckfoot, was recorded in basic plan form as it is known to contain surviving buried archaeological deposits. Also, any visible peat layers were recorded as part of the palaeoenvironmental sampling element of Phase 2. For example the extent of visible peat at Cleveleys was recorded in plan form using the GPS, and silts and muds containing prehistoric human and animal footprints at Formby Point were also recorded.

Where significant organic deposits such as these were identified in association with archaeological remains, an environmental sampling programme was undertaken. This was the case most notably at Drigg where suspected burnt mounds are found in association with a distinctive band of peat and organic material. These were recorded and sampled as part of the palaeoenvironmental element of the project, whilst the suspected burnt mounds were recorded in the archaeological assessment.



Figure 1.5 Structural remains at Barrowmouth Alabaster and Gypsum Mine, Cumbria (scale = 0.5m graduations).

Maritime Features

The opportunistic recording of ship wrecks was an important element of this project since few wreck sites have been accurately recorded along the North West Coast. They were recorded in plan form where possible. Fish traps visible in the inter-tidal zones were recorded if visible on the foreshore. The locations of inter-tidal features were fixed more accurately than Phase 1 data would allow utilising the GPS equipment.

1.4 Methodology and Recording Practice

1.4.1 Survey Methodology for field survey of threatened sites (Objectives 2-6, 8-12)

Summary of Targeted Sites

The Phase 2 project was focused on fifty sites identified as being under threat by the Phase 1 desk-based assessment and through consultation with local authority archaeologists and other project partners. The table below lists these sites with the SMP2 policy for their locality, their assessed level of special interest, and their initially assessed level of risk.

County	Site name	SMP 2 policy at this site	Significance	Risk
CH	Neston Old Quay	NAI	Medium	High
CH	Bombing Decoy-Burton Marsh	NAI	Medium	High
CH	Wireless Telegraphy Station/Control Building-Burton Marsh	NAI	Medium	Medium
ME	Hilbre Island lithic sites and midden	HTL	High	High
ME	St Hildeburgh's Chapel, Hilbre Island	HTL	High	High
ME	Dungeon Lane Saltworks	NAI	High	High
ME	Formby Point Mesolithic and Neolithic footprints	MR	High	High
LA	Target Ribble Estuary for shoreline walkover	HTL with NAI at Warton and MR at Hesketh	Medium	Medium
LA	Target Pilling shoreline for evidence of saltworking	HTL	Medium	Medium
LA	Sambo's Grave, Sunderland Point	MR	Medium	Medium
LA	Cockersand Abbey (rapid field visit only)	HTL then MR	High	High
LA	Heysham Head early medieval graves and chapel and Mesolithic lithic scatters	NAI and HTL	High	Medium
LA	Warton – area between railway line and Crag Foot for walkover	NAI	Medium	High
LA	Jenny Browns Point, Silverdale. Copper smelting site to also include WWII target to south to Walduck's Bank to west. Look at coastal stretch from Arnside Moss to Jenny Browns Point	NAI	Medium	High
LA	Post-Medieval fish weirs	Inter-tidal	Medium	High
CU	Aldingham Motte-and-Bailey	NAI	High	High
CU	Aldingham Medieval Fish traps	Inter-tidal	Medium	High
CU	Greenodd, Ulverston and Baycliff quays	NAI	Medium	Unknown
CU	Piel Castle	NAI	High	High
CU	WWI and WWII Hilpsford battery, Walney	NAI	Medium	High
CU	WWI Practice trenches, Walney	NAI	Medium	Medium
CU	WWI and WWII Battery H3, Walney	NAI	Medium	High
CU	Trough Head lithic scatter	NAI	Medium	High
CU	Cow Leys Lane lithic scatter	NAI	Medium	High
CU	North End Midden Mesolithic flint scatters	NAI	Medium	High
CU	North End Haws Neolithic flint scatter	NAI	Medium	Medium
CU	Sandscale Haws medieval bloomery	NAI	Medium	High
CU	Roanhead Neolithic structure	NAI	Medium	Medium
CU	Millom – known to be salt mounds but not currently mapped	NAI	Medium	High
LDNPA	Eskmeals Neolithic flint scatter	NAI	Medium	High
LDNPA	Bronze Age lithic scatter at Eskmeals	NAI	Medium	High
LDNPA	St John's Church, River Esk	NAI	Medium/High	High
LDNPA	Ravenglass Roman Fort (Only rapid site visit necessary and incorporation of existing survey data – assess west side of fort against existing plan for evidence of erosion). Consult also aerial survey.	NAI	High	High

LDNPA	Burnt Mound, Drigg	NAI	Low	High
LDNPA	Drigg Roman bloomeries	NAI	Medium	High
CU	Post-Medieval saltworks, River Irt	NAI	Medium	High
CU	St Bee's medieval fish traps	Inter-tidal	Medium	High
CU	Fish traps at Mawbray		Medium	High
CU	Saltom Bay colliery	HTL to NAI in 50 years	High	High
CU	Barrowmouth alabaster and gypsum mine (<i>Saltom?</i>)	NAI	High	High
CU	Swarthy Hill hillfort	MR	High	High
CU	Roman milefortlet 20B (<i>Swarthy Hill</i>)	MR	High	High
CU	Roman milefortlet 15 (<i>Beckfoot</i>)	MR	High	High
CU	Beckfoot Roman cemetery	MR	High	High
CU	Roman Roads at Bowness, Beckfoot and Maryport	MR	Medium	Medium/High
CU	Salt sites on Solway Coast and Crosscanonby	MR	Medium	Medium/High
CU	Medieval Port, Skinburness	NAI	Medium	High
CU	Roman temporary camp at Knockcross (<i>Bowness</i>)	MR	Medium	High
CU	Rockcliffe Castle	MR	Medium/High	Medium
-	Opportunistic recording of any shipwreck sites – particularly off Sefton and south Lancs coast. Areas could include: Glasson, Lune Estuary, Wyre Estuary		Medium	Medium

Table 1.1 List of archaeological sites or areas targeted as part of the Phase 2 survey

Survey Methodology

The methodology for the archaeological survey outlined below follows the method developed for the corresponding phase of the North East Coastal Zone Assessment (NERCZA) which was successfully completed by ARS Ltd. in 2010 (Burn 2010).

The survey of archaeological remains involved surface identification of surviving features followed by rapid detailed recording. This included the digital photography of the remains, together with the production of field notes on the nature and extent of survival, dimensions, interpretation, setting and additional environmental information. This information was also recorded digitally directly onto the GPS equipment as attached data for each record in a format that could be transposed directly into the appropriate local authority's HER. This allowed direct download of field data into the project GIS without an extensive data entry exercise.

Where possible each survey site was also subjected to a walkover survey extending for at least a 1km radius from the site. This helped to add context to the records of the targeted sites and also allowed for the identification of new sites or associated features that would otherwise have escaped notice. Each site was broken down into manageable sections with the foreshore, cliff tops, dunes and estuarine locations all investigated. For example the survey would initially progress along the foreshore and then back along the cliff top or through the dunes to cover as much of the threatened area as possible.

The survey recording procedure adopted involved the use of a handheld Differential Global Positioning System (DGPS) and digital photographic equipment. The handheld DGPS unit, a Magellan MobileMapper CX with post-processing hardware kit, offers real-time sub-metre accuracy and sub-0.3m post-processed accuracy using MobileMapper Office, running on Microsoft Windows CE. NET 5.0. The equipment provides both vector and raster map support through Digiterra 5 software, including datasets in ESRI .shp file format as well as MapInfo and Autodesk file format support. Relevant information, such as Ordnance survey mapping, NWRCZA Phase 1 data, NRHE, HER and NCERM data, from the project GIS was loaded onto the GPS unit to inform the fieldwork allowing this data to be used in the field. This aided the interpretation and assessment of threat at each site as part of the survey process. During Phase 2 of the NWRCZA, the GPS was found to consistently offer accuracy within 0.4m without post-processing, and allowed for the GPS to be used in handheld mode only (Burn 2010, 33). This method was followed for Phase 2 of the NWRCZA, increasing productivity and allowing further lengths of coastline to be covered by the project.

Data collected in the field was logged directly onto the GPS unit in a data entry form format compliant with the various local authority HERs in the study area, most of which follow the HBSMR format. The project also made use of the English Heritage Scheduled Monuments at Risk recording fields for assessing condition, risk and amenity value (Fearn and Humble 2003). The data collected is MIDAS Heritage standard compliant and uses the INSCRIPTION wordlists and is based on the compliance tables presented in section 4 of MIDAS Heritage - a data standard for the historic environment (English Heritage 2007).

The data has been downloaded from the GPS unit and integrated into the project GIS. This now includes data from NWRCZA Phase 1, NWRCZA Phase 2 survey data, HERs, NRHE, Ordnance survey 1st edition coastline, and NCERM data with the SMP2 preferred policy and predicted levels of coastal retreat 20, 50 and 100 year periods.

Collection/Excavation Strategy

The aim of Phase 2 of the project was not to excavate features or collect artefacts. However, during the survey several artefacts were identified which would otherwise have been lost to erosion. These were collected and their precise location recorded. A full 12 figure grid reference was recorded for each with the GPS as detailed above. Following completion of the project, the project archive was deposited with the appropriate museums. Nineteenth to twentieth century structural remains, such as bricks and concrete, were not collected, but small and significant objects were. Specialist assessment reports on Roman pottery and ceramic building materials recovered from Ravensglass Roman Fort have been included in Chapter 5 on this report.

1.4.2 Survey methodology for field survey of peat shelves and 'submerged forests', or other organic deposits (Objectives 2, 7-11)

Summary of Targeted Sites

The Phase 2 palaeoenvironmental investigation focused on ten peat or 'submerged forest' sites that were identified through the Phase 1 desk-based assessment and through consultation with project partners. These were assessed as requiring survey and possible sampling. The table below lists these sites together with their Coastal Peat Database ID number and brief description where appropriate.

Coastal Peat Database ID	Grid reference	Location	Description in database
-	-	Wallasey, Merseyside	Sue Stallibrass pers comm.
Not entered	SD 305 744	Bardsea, Cumbria	Foreshore peat deposit
225	SD 414 620	Heysham, Lancashire	Peat deposit - though not visible at surface
252	SD 430 645	Morecambe, Lancashire	Peat horizon - though not visible at surface
496	SD 321 483	Fleetwood, Lancashire	Submerged forest - though not visible at surface
-	SD 3102 4331	Cleveleys, Lancashire	Peter Iles pers. comm.
-	SD 07944 90922	Bootle / Eskmeals, Cumbria	Submerged Forest - Andy Howard pers comm.
611	NY 244 613	Glasson, Cumbria	Submerged forest
646	NY 08521 49769	Beckfoot, Cumbria	Forest soil, peat and organic fragments
-	SD 18456 69476	Walney Island, Cumbria	Sue Stallibrass pers comm.

Table 1.2 List of peat and ‘submerged forest’ sites targeted as part of the Phase 2 Survey.

Phase 1 identified that deposits such as these are particularly vulnerable to alterations in the wave regime that can be brought about by the construction of sea defences. In order to assess the threat to such deposits, their full extent was established where possible and an assessment was made of their archaeological and palaeoenvironmental potential.

Survey Methodology

The methodology for palaeoenvironmental survey follows the method developed for the corresponding phase of the North East Coastal Zone Assessment (NERCZA) which was successfully completed by ARS Ltd in 2010 (Burn 2010).

Using the same GPS unit and methodology as the archaeological survey, the palaeoenvironmental survey recorded the extent of the deposits, their condition of preservation, their potential to contain palaeoenvironmental resources and their assessed risk of erosion. The stratigraphy of the inter-tidal peat was established using a hand-operated gouge auger which facilitated the rapid identification of the depth and character of sedimentary sequences.

Sampling and analysis of sediments was then undertaken using a hand-operated gouge auger, where basal, middle and upper levels of identified peat deposits were sampled for palynological analysis. The positions of the auger points were accurately recorded by GPS. The survey has provided details of the depth of various peat deposits and this will provide a reference against which future measurements can be taken to confirm the rate at which the deposits are eroding. The peat samples have been examined by Emma Hopla of Birmingham University who has assessed their potential for hosting environmental residues such as the survival of pollen *etc.* This is presented in Chapter 6.

Separate bulk samples were also taken from small test pits and cleaned sections for radiocarbon dating. Again the positions of the sample locations were accurately recorded by GPS. The bulk samples were analysed by Paul Flintoft of ARS Ltd. to extract plant macrofossils viable for radiocarbon dating. These have been submitted to English Heritage for dating and the results of this assessment will be incorporated into Chapter 6 of this report when available.

1.4.3 Sample Walkover Survey of sites (Objectives 3, 4, 6, 8-11)

Phase 2 of the project was designed to be flexible to take into account difficulties of access to features, such as the inter-tidal peat deposits and fish weirs. Alternative survey work was pinpointed in advance in order to avoid wasted survey days due to inaccessibility of proposed targets for survey. The survey flexibility also allowed extra sites to be added to the program as they were identified or were brought to the attention of the project team. For example, the presence of animal footprints in newly exposed estuarine sediments at Hesketh Out Marsh in Lancashire prompted a site visit and discussion with the amateur archaeologist, Alan Porter, who reported them.

When time was available the opportunity was taken to identify and record wreck sites along the coast, which was identified as a priority during the project design and consultation meetings. The walkover involved the investigation of a large number of Second World War military features which represented over 70% of all features recorded in the aerial photographic survey undertaken as part of Phase 1 of this project. Priority was given to the defence areas on Walney Island and Drigg and a representative sample of other features identified during Phase 1 were surveyed within the environs of each targeted survey location.

1.4.4 Production of data from the surveys in a form compatible with HER and NRHE database systems (Objectives 2, 11)

The data produced was incorporated into the existing project GIS. Output is in ESRI .shp files which were then incorporated into each of the project partners' HERs. The data will also be provided to the SMP consultants (Halcrow Group Ltd) and Defra and allocated to the relevant Policy Unit for SMP2 for North West England and North Wales. The NRHE has been consulted and data will be provided to them in ESRI shape files in a form that will be both MIDAS and INSCRIPTION compliant.

1.4.5 Reporting (Objectives 2, 10-12)

This report forms the main textual project output, together with the standalone Executive Summary document. It has also been provided on CD to project partners and is available in the internet from both the ARS Ltd and English Heritage web sites. The report has been distributed to English Heritage, the project partners, Natural England, the National Trust and Halcrow Group, as well as to some consultants and developers upon request. The report has also been submitted to the OASIS system where it can be consulted on-line by the public and the project data has been archived with the ADS and incorporated within the various local authority HERs.

This report includes a preliminary assessment of the regional (and, where appropriate, national) significance of sites recorded (Chapters 2-6), and their vulnerability to erosion. These chapters discuss the results of the targeted archaeological survey of these sites. Each survey location is discussed in terms of its landscape setting, topography, previous research, known history and land use. The visible remains are discussed by period and the impact and nature of erosion is considered in relation to these heritage assets. This allows for the quantification and assessment of specific threats which are discussed at the end of each survey location and further in Chapter 7. Each survey site has been given a unique field survey record number specific to the NWRCZA and these are quoted throughout the document. These chapters indicate areas meriting further survey, assessment, recording and monitoring (Chapter 7) and identifies sites, structures or buildings potentially meriting protective legislation. The report also includes an assessment of the potential of environmental samples taken and artefacts collected, and

their potential for further analysis (Chapters 5 and 6). The report attempts to broadly classify the archaeological potential of the coast, consider the implications of the survey in terms of the relevant Shoreline Management Plans or strategy documents, and includes an executive summary suitable for circulation to non-archaeological coastal managers and planners.

In addition to this report a standalone Executive Summary has been produced and provided to the SMP consultants, Natural England and the project's partners. This has tabulated all records from Phase 2 (this output has already been completed for Phase 1), sub-divided in terms of SMP2 policy units, and includes appraisals of significance and vulnerability including much of the assessment included within Chapter 7 of this report. This provides a more detailed document for easy use and rapid reference by non-specialist coastal managers.

1.4.5 Outreach (Objectives 10-12)

The project has made important contributions to the successful Heritage Lottery Fund applications made by the Morecambe Bay Landscape Partnership and by the Solway Coast Landscape Partnership. Project staff have contributed to workshops and consultations carried out by the landscape partnerships and have been proactive in meeting local individuals and groups who are active on the North West coast. ARS Ltd have also supported ArtGene in a Heritage Lottery Fund 'Your Heritage' application for survey and excavation work on the World War archaeology of North Walney.

Publication of 10,000 A4 fold-out leaflets summarising the results and raising awareness of the project. This contribution of the project is at the draft stage at the time of writing. It is proposed that the latter will be distributed at county Archaeology Days, and circulated with county archaeological magazines and learned society newsletters. They will be made available at Tourist Information Centres and County Halls along the North West coast, as well as at English Heritage offices. A direct mail shot will be sent to relevant consultancies. This will raise awareness of the project and the availability of enhanced HER /NRHE records and improved understanding of coastal heritage assets and their risk from erosion.

1.6 Copyright

All outputs will be the copyright of Archaeological Research Services Ltd and licence to use the data will be extended to English Heritage and the project partners.

The project partners will have unrestricted use of all aspects of the data produced by the project for the purposes of research, education and non-commercial publication.

1.7 Project Archive

On completion of the project all files created during the project will be copied to DVD and passed to the ADS who will apply for a separate archiving grant. A project summary will be uploaded to the OASIS system. The GIS will be placed on the computer system of the various HERs together with backup copies on disk.

The results of this project will be archived with English Heritage's National Record of the Historic Environment (NRHE) and the respective SMR/HER as appropriate.

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