Introduction: The Early Prehistory Resource (Late Upper Palaeolithic to Middle Bronze Age ~14,000 – 1,200BC)

North West England is important for late glacial and early Holocene studies nationally, as the region includes numerous sites retaining proxy evidence of changes in climate, relative sea level, and past vegetation. These studies provide the context for early recolonization of the country and people’s adaptations to rapidly changing environments. Although there are very few known deposits that might contain evidence of early human occupation in the Lower or Middle Palaeolithic periods, there have been a few developments concerning our understanding of the Late Upper Palaeolithic during the past ten years, and several significant discoveries relating to occupation, other activities and, possibly, belief systems during the Mesolithic period.

Although human activities during the Neolithic period are still relatively poorly known in the region, there have been some important new discoveries. Fieldwork highlights the need to have suitable methods of detection and investigation for these widespread but dispersed and ephemeral remains. There have been several significant discoveries of a range of different types of site and activities dating to the Bronze Age period, particularly regarding funerary and mortuary sites, but also providing some glimpses of settlement activity, farming practices and enigmatic burnt mounds.

Most of the known early prehistory sites are still located in rural areas and their discovery is often rather serendipitous. Investigations in rural areas tend to be undertaken by academic
and community research projects (as at Copt Howe and Long Meg Neolithic monuments) or prompted by infrastructure projects, such as the Carlisle Northern Development Route (CNDR) which found Bronze Age settlement sites and the A556 road upgrade which uncovered a multi-period Bronze Age funerary landscape. New developments in scientific analyses and, perhaps more fundamentally, in ways of thinking about early prehistory, provide several opportunities to synthesise or to re-investigate current and long-archived material evidence. There is also considerable potential for integrated studies of past and present environments, particularly at sites where flood alleviation, habitat creation, carbon sequestration and public health benefits are priorities (as at Lunt Meadows, Merseyside).

This chapter covers a long time period (over 12,000 years) and is divided into two parts: the late glacial/early postglacial period characterised by hunter-gatherer communities, and the Neolithic to Middle Bronze Age periods. Please note that this distinction is more apparent than real and the transition from late Mesolithic to early Neolithic cultural activities remains an important topic for further study.

**PALAEOLITHIC AND MESOLITHIC ~ 14,000 – 4000 BC**

**Environment**

The past ten years have seen a number of palaeoenvironmental surveys undertaken in the region. This work has contributed significantly to our understanding of prehistoric coastal, lowland and upland environments, and has been complemented and supported by some offshore work on now-drowned landscapes dating to the immediate and early post-glacial periods.

Offshore, the West Coast Palaeolandslapes project (Fitch and Gaffney, 2012) used existing 2-D and 3-D remote sensing data (obtained by commercial offshore development projects) to model the submerged landscapes in Liverpool Bay. They successfully mapped high ground and freshwater drainage systems that could have provided foci for late glacial and early Holocene human occupation and activities. They also noted that the failure of some companies to record full georeferencing metadata for their surveys meant that some data could not be re-used.

On land, the BRITICE-CHRONO five year NERC (Natural Environment Research Council)-funded project into the decay of the last ice sheet over Britain and Ireland has sampled extensively in north west England, mainly inland but also at coastal locations in Cumbria and Merseyside [http://www.britice-chrono.group.shef.ac.uk/](http://www.britice-chrono.group.shef.ac.uk/). Chiverrell et al (2013) used Bayesian modelling to investigate the chronology of how the last British-Irish ice sheet decayed or re-advanced over an 8000 year period, whilst Clark et al (2018) provide an up to date map of known glacial movements that is relevant to the geological origins of lithic raw
materials in glacial deposits (particularly useful for studies of prehistoric stone resource procurement). The map is free to download and is supported by a geodatabase and comprehensive bibliography.

Lang et al (2010) used the remains of chironomids (non-biting midges) and other proxy data from sediment cores to investigate changes in climate in North West England during the late glacial period. Ambient temperatures changed very rapidly (in both directions) during the last stages of the last glacial period, affecting the nature of the environment and its attractiveness to people living here during the Upper Palaeolithic period.

Smith et al’s (2012) study of sea level changes found that there was a rapid and major rise in relative sea level in northern Britain and Ireland, coinciding with the change from Early to late Mesolithic c 7000 – 6800 cal BC, which must have affected the nature and locations of places previously occupied or used for various activities.

In the intertidal zone and coastal strip, the second stage of the North West Rapid Coastal Zone Assessment (NWRCZA) examined eight coastal inter-tidal peat sites located between the Dee and the Solway (see Eadie et al 2012, Chapter 6). The sites at Cleveleys (L), Walney Island (C), Annas Mouth (C), Eskmeals (C), Drigg (C), St Bees (C) and Beckfoot (C) were sampled for radiocarbon dating and pollen assessment. The project has produced a significant body of new data indicating that the start of coastal peat formation took place much earlier than had previously been thought.

At Cleveleys, located just south of Fleetwood (L), a radiocarbon date from peat in a palaeochannel of c13110–12150 cal BC indicates the onset of peat growth during the late glacial Windermere Interstadial. The project has added considerably to our understanding of the complexity of post-glacial sea-levels. The data from Cleveleys, for example, demonstrated that the sea inundated the land there by 7040–6650 cal BC.

At all eight sampled sites peat growth continued through the Mesolithic, with some peat deposits spanning the Mesolithic/ Neolithic transition. The project has shown through successful dating and preliminary assessment of evidence how coastal peat deposits of the north-west coastline represent a significant resource for investigating late glacial and early post-glacial environments (Eadie et al 2012, Chapter 6).

The Annas Mouth, Bootle (C) survey work has added to the growing number of locations around the British coastline where surviving submerged remains of early postglacial forests are recognised, and contributes to the national database of intertidal and coastal peats (Historic England, n.d.).

North West England also retains proxy evidence for major early post-glacial climate change at upland sites inland. Vincent et al (2010) extended their earlier work on loessic sediments in the Yorkshire Dales to the limestone area of North West England. They found further evidence for major increases in slope instability and soil erosion relating to a brief, but
severe, downturn in climate at approximately 8,200 years ago at sites in Cumbria and north Lancashire, including Warton Crag (L) and Whitbarrow (C). They estimated that during this period (within the Early Mesolithic) there was a reduction in mean annual air temperature at these upland locations of ~2.6 – 4.6 degrees Celsius. They infer that this led to greater snow accumulation in winter, that the snowpack persisted for longer periods, and that there was an increase in frequency and magnitude of frost-related processes and meltwater flooding. They note that other sites (at lower altitudes) show a contemporaneous shift to wetter conditions.

At Sizergh Castle (C), a programme of community archaeological work directed by Oxford Archaeology North and commissioned by Levens Local History Group and the National Trust combined palaeoenvironmental investigation of a kettle hole with survey and excavation of an associated burnt mound. The deep, basal deposits of blue-grey silty clay and shelly marls in the kettle hole could not be dated by radiocarbon assay due to the lack of suitable organic material. The sparse pollen indicated an open environment with areas of open water, and pioneering species of grasses, herbs and trees. The plentiful microcharcoal may indicate cold, dry conditions prone to natural fires. Very similar evidence has been found at other Cumbrian sites and probably relates to the last cold event (the Loch Lomond Stadial) of the Late Glacial period. This fits with an Early Mesolithic radiocarbon date of 8290-8230 cal BC for the base of the overlying peat. The Early Mesolithic peat contains pollen dominated by shrubby deciduous woodland with some open water, but no indicators of disturbance (Druce and Rutherford 2014).

An important, long, pollen core from a windfarm site at Beck Burn on the Solway Moss has provided continual proxy evidence of changes in climate, vegetation and landuse from the early post-glacial to the post-medieval periods (Rutherford , 2018, and in prep). In the early period, the landscape contained typical post-glacial small bodies of open water, that gradually became infilled with peat as the sea level rose and the warm dry climate encouraged vegetation growth. This eventually led to peat deposits in the basins and closed, mixed, woodland on the higher drier land.

For the coastal lowlands of the SW Lancashire plain, the final volume of the North West Wetlands survey has been published (Middleton et al, 2013). Although the fieldwork for this project was completed in 1996, it still provides a useful baseline of environmental studies and archaeological discoveries.

A few inland lowland wetlands in Cheshire have received detailed analyses, some due to commercial developments and some as an extension to the Cheshire Hillforts Landscape Partnership Project funded by the Heritage Lottery Fund.

Studies of cores from Ince Marshes in the Mersey estuary (RSK Environment Ltd, 2016) are important for their detailed pollen & macrobotanical investigations of two strata of peat, whose formation was linked to changes in relative sea level. The first is early post-glacial:
peat formation started about 10,000 – 9,500 cal BC and continued throughout the Mesolithic period to about 7500 – 7300 cal BC. The deposits provide good evidence for warming climatic conditions. The combination of pollen and plant macrofossils from the same sampling points provides complementary details facilitating interpretations of climate and vegetation changes, and the macrobotanical items provided suitable radiocarbon samples.

A new type of scientific analysis was applied to sediments at Hatchmere (Boyle et al 2015) where the authors studied the impact of people on landuse through comparisons of phosphorus levels. The phosphorus evidence corresponds well with the botanical evidence from Hatchmere, with stable levels indicating little anthropogenic alteration of the landscape up to c 6000 years ago ie the end of the Late Mesolithic.

New investigations and synthetic work on past environments have also been undertaken in targeted upland areas in Cumbria, Lancashire and Greater Manchester. The two volumes of the Upland Peats survey (Huckerby et al 2010a & 2010b) are important for creating baseline data.

The analyses demonstrate that the onset of peat formation varied considerably through time, responding to local conditions as well as to large-scale climate changes. It also notes that some locations indicate modifications to local vegetation (from the Mesolithic onwards), that may relate to human activity, but where activity or occupation sites have not yet been discovered.

The project led to important conclusions regarding the management of upland peats, which are being targeted increasingly by windfarm developments and by projects and programmes designed to reduce flooding and to reduce carbon release through peat erosion.

It is clear that each site is likely to have undergone a unique sequence of events requiring individual investigation. Whilst data from nearby sites can contribute to wider, landscape-scale studies, they should not be used as substitute data.

An overview by Innes and Tomlinson (2008) of palaeoenvironmental work in Merseyside provided a comprehensive bibliography of specialist work undertaken in the region during the previous twenty-five years, focusing on Merseyside and Lancashire, but also taking some adjacent sites into consideration. They reviewed the late glacial and early post-glacial periods (times of rapidly changing relative sea levels), the development of various types of sediments, woodland history and the local impact of later prehistoric and Romano-British agriculture and other forms of landuse.

Settlement and activity areas

Historically, the region has produced late Upper Palaeolithic lithic material, mainly from excavations in caves and rock shelters (Hodgson and Brennand 2006, 24-5). During the last
ten years, however, fieldwork across the region has produced no new discoveries of Upper Palaeolithic cultural evidence \textit{in situ}. The lack of such finds and the absence of open-air sites in particular is troubling, since the evidence from High Furlong in the Fylde (Hallam et al. 1973) demonstrates that we should anticipate finding late Upper Palaeolithic evidence from open air locations.

There is an established tradition of surface artefact collection, mainly focussed upon upland peat environments, and individuals or local archaeological societies undertake much of this work. In certain areas substantial lithic assemblages have been and continue to be amassed, but only a handful are analysed in detail or prepared for publication by analysts with the experience, knowledge and confidence to recognise occasional Upper Palaeolithic artefacts. Consequently, most of these upland, open environment assemblages are assigned to the Mesolithic or later periods. It is therefore a concern that for want of the necessary expertise we may be overlooking such evidence from lithic scatters.

Stephen Poole, who is experienced with lithic technology and typology, is currently undertaking research for an MPhil at the University of Manchester. His research involves re-examining some of the existing museum collections in and around the central and southern Pennines. He has already identified (Poole pers. comm.) at least two previously unrecognised examples from the Rochdale area of late Upper Palaeolithic flintwork including a classic Creswellian point (fig. ).

Similarly, re-examination of cave assemblages has produced new information from old archives. Many contain material evidence of past human activities from a range of different archaeological periods, and useful summaries were prepared for a joint Quaternary Research Association and British Cave Research Association field excursion to the region in 2012 (O’Regan et al, 2012, Smith & O’Regan, 2012).

Barton (2009) provides a summary of Upper Palaeolithic finds from caves around Morecambe Bay including Lindale Low (C), Bart’s Shelter (C) and Kirkhead (C) in his national overview, and some of these sites are thought to have produced further (unpublished) lithics of this period.

The recent increase in interest in the limestone caves that encircle the Lake District (particularly in the Arnside and Silverdale Area of Outstanding Natural Beauty (AONB) in north Lancashire/south Cumbria), has demonstrated that there is much new evidence to discover, both from new excavations and from re-interrogation of existing materials and archives. Historiographies of cave exploration mention some of the key sites and early investigators (see O’Regan et al 2008, Willkinson et al 2011).

An example of new information obtained from archived finds concerns the late glacial skeleton of an adult male elk found in association with two Late Upper Palaeolithic barbed bone points at Poulton le Fylde (L). Hallam (et al. 1973) identified several marks on the bones and concluded that the elk had been attacked on at least two separate occasions. The
original analyses demonstrated that the elk was deposited in a small open-water pool surrounded by a thicket of birch. Initial bulk sample radiocarbon dating of the detritus muds in which the elk’s body came to rest indicated an age of 11,665 ± 140 BP (St-3836) and this date has since been supported by an ultrafiltrated AMS radiocarbon measurement of 11,660 ± 60 BP (OxA-11151). These are in good accord with a date of 11,715 ± 50 BP (OxA-13075) on the elk itself, and calibrate to c 13.8 – 14 ka cal BP i.e. the earlier part of the Allerød/Windermere Interstadial (Jacobi et al. 2009).

For several decades, the skeleton was on display at the Harris Museum, Preston. Subsequent renovation and renewal of the museum’s archaeological galleries in 2013 allowed full access to the elk and harpoons for fresh analysis, and also provided an opportunity to take samples of a tooth, rib and antler for isotopic measurement of strontium (Sr), carbon (C), nitrogen (N) and oxygen (O). The isotopes indicate that the animal remained within a restricted home territory, browsing in an open birch environment. It died in winter and was about 3.5 to 4.5 years old.

Reanalysis of the remains by Pettitt et al (2017) concluded that most of the unhealed surface marks were caused by the tools of the excavators, not by flint-tipped projectiles. They thought that the animal had been shot in one or both hind feet by bone points and suggest that the points were hafted together (as a leister) and the wound inflicted as the animal fled or, perhaps more likely, as it dived or swam in the water. The lack of any indication of butchery suggests that this was an unsuccessful hunting event- the animal was injured and it died, but its body could not be accessed under the water.

Since the publication of the Resource Assessment in 2006 there have been a number of highly significant projects for our understanding of the Mesolithic period in the north-west region. One critical aspect of this emerging body of research has been that it includes locations from the uplands, river valleys, lowland wetlands and coastal environments. In so doing it is demonstrating the potential offered by the region for investigating and understanding the role and use of contrasting environmental and topographical locations within the landscape strategies of Mesolithic groups.

It also illustrates how fieldwork prompted by developers, government agencies, volunteer individuals or groups, and university researchers are all making contributions to our understanding of the period. Many of the key sites discussed here are the subject of a forthcoming publication of the 2013 CBANW conference held at the University of Salford on the Mesolithic of the North West Region (Myers and Preston forthcoming).

Multi-season community excavations in the Vicarage Garden, Mellor (GM), run by Mellor Archaeological Trust (MAT) supported by the former University of Manchester Archaeological Unit (UMAU), were primarily focussed on a large Iron Age enclosure. But lithics from several earlier periods were also recovered, indicating repeated use of this prominent hilltop location. A significant Mesolithic component includes a small, distinctive
Early Mesolithic assemblage. The excavations and finds analyses have been written-up for publication (Arrowsmith forthcoming).

Post-excavation work on material from Greasby (M) on the Wirral sandstone ridge, confirms an early Mesolithic date (mid-ninth millennium BC) for charred hazelnuts from three contexts. Although the disturbed stratigraphy of the site precludes complete confidence that the charred hazelnuts are associated with the Mesolithic lithics, these are diagnostically of Early Mesolithic type (Cowell in prep.).

In Cheshire, major excavations of an Iron Age settlement overlooking the confluence of the Pulford Brook and the River Dee at Poulton (Ch) have also recovered evidence for earlier phases of activity from residual contexts. The majority of these finds comprise flint and chert tools and debitage, totalling 275 items. Blades, cores, flakes with retouched edges, general debitage and various types of scraper have so far been identified. Although a significant proportion of the assemblage cannot be attributed to a specific period, there is a marked occurrence of diagnostically Early Mesolithic items, suggesting that this may have been the site of a temporary or seasonal camp. There are also tentative identifications of Late Mesolithic material (Cootes et al, 2016).

Perhaps the most spectacular contribution to Mesolithic research has come from the developer funded investigations undertaken by Oxford Archaeology North at Stainton West in association with the Carlisle Northern Development Route (CNDR) (Brown and Clark 2011 a, b, Brown et al in prep). At a point where the River Eden bisected the proposed road corridor with a large meander, the site for the northern landing of a new bridge was subject to open area excavation between October 2008 and December 2009. This followed an evaluation phase that had revealed a dense and extensive lithic scatter on the low lying (9m a.m.s.l.) floodplain spatially associated with two relict river channels.

The time pressures upon the development combined with the scale of the archaeological evidence and the logistics of excavating the site sediments gave rise to a truly industrial scale excavation applying procedures and technologies to recover the lithic assemblage that were both innovative in this country and efficient in time and recovery rates. A significant proportion of the lithic assemblage was incorporated into the boulder clays and alluvium of the floodplain covering the site. This material was excavated in systematic units, placed in tubs and transported to a processing area on-site where it was passed through a bank of powered water sieves. As soon as layers or features were identified these were excavated contextually.

In this manner a lithic assemblage of over 300,000 artefacts was recovered, making Stainton West one of the most prolific Mesolithic sites in Britain (and Europe). A dedicated team of lithic analysts was organised to process the assemblage. The overwhelming majority of lithics date to the Late Mesolithic or Neolithic periods. The excavation revealed the
assemblage was associated with and, in part, incorporated into a series of features including tree throws, hearths, pits and possible structures.

It appears that Stainton West site was visited and revisited by groups on multiple occasions and that the site remained a focus for a specific and limited range of tool-using activities. In this sense, within the movements of local Mesolithic groups the site may have represented a ‘persistent place’ (Barton et al. 1995) visited many times over many years.

Stainton West provides a good example of collaboration between an academic institution (the University of Central Lancashire (UCLAN)) and a commercial contractor (Oxford Archaeology North, OAN). Two PhD theses began in 2016, to study targeted aspects of the palaeoenvironmental deposits and lithics in further detail than was possible in the commercial project, and to consider these in a much wider geographical context.

Other sites and areas that appear to have received sequential visits were investigated along the route of the new Highways England link between the Port of Heysham and Junction 34 of the M6 motorway (Bradley & Howard-Davis 2018). Dispersed findspots of prehistoric lithics and burnt organic material show repeated visits within the valleys of the Howgill Brook and the Lower Lune valley.

Adjacent to a palaeochannel, a mid-5th millennium lithic scatter at Slynedales Culvert (aka SMR 3) (L) was investigated by OAN in the same manner as Stainton West, with gridded collection of material for bulk sieving in an open area strip, map and record (SMR) excavation. The site included some negative features and was buried beneath colluvium.

Analyses of the lithic technology indicated that stone tools were made and used at the site, whilst re-fitting studies showed that the three concentrations of lithics represented three different visits rather than contemporaneous activities. The lithic technology and one of the radiocarbon dates indicate a Late Mesolithic date, slightly post-dating an underlying linear group of features that may be natural (Bradley & Howard-Davis 2018, 30-32).

A community-based scheme at Brackenber Moor, Appleby-in-Westmoreland (C), has been involved in excavations at a Bronze Age ritual and burial site (Railton 2011, 2018). The Altogether Archaeology Project was sponsored by the Area of Natural Beauty Partnership and overseen by North Pennine Archaeology. During the investigation of an Early Bronze Age barrow a significant lithic assemblage dating to the Mesolithic and Early Neolithic was recovered. This earlier material had originally been deposited in the sandy soils, only to be later incorporated into the mound during its construction. This could have been deliberate or incidental reuse of earlier sites, but the location (close to the Iron Age enclosure known as The Druidical Judgement Seat) was clearly a persistent focus of people’s activities.

The co-occurrence of Mesolithic and Neolithic lithics has been noted at several sites in Britain. Although these could be conflated due to plough disturbance and residuality in some sites, it has led to some discussions that the lithic industries may not be entirely
sequential chronologically (or culturally), emphasising the need to consider exact stratigraphic provenances of finds.

In 2012, when the Wildlife Trust for Lancashire, Greater Manchester and Merseyside (LWT) supported by the Environment Agency were in the process of creating a wetland wildlife reserve and flood storage facility at Lunt Meadows near Sefton (M), important Mesolithic remains were discovered (as predicted by the North West Wetlands Survey: Cowell & Innes 1994). A team from the National Museums of Liverpool (NML), together with community volunteers, have been excavating the site directed by Ron Cowell.

It has evidence of two substantial dwelling structures, one of which has been radiocarbon dated to 5800BC (Cowell forthcoming). Measuring 4 - 6m in diameter the walls of these circular buildings combine lines of posts with banks of sandy soil. The structural forms are not the typical Late Mesolithic types found at Howick, Mount Sandel and East Barns.

The cut features provide evidence for multiple phases of occupation suggesting repeated visits and use for settlement. There are indications that this particular area of settlement extends beyond the current excavations. Different types of raw materials were deposited in different parts of the site, possibly enhancing the suggestion that the site was periodically re-occupied. Inundation by rising sea levels in the late sixth millennium BC probably saw its final abandonment.

During the groundworks for the new wildlife ponds, Mesolithic lithics were noted at two other sites located on slight sandy elevations several hundred metres away from the main site, indicating that the whole area had been a repeated focus for hunter-gatherer activities at a time of rapidly rising sea levels. Palaeoenvironmental analyses by a team from Exeter University's Geography Department indicated various periods of peat formation.

One of the sampling sites produced charcoal, cereal-type pollen and other indicators of small-scale landscape alteration that date to the late Mesolithic period (Cowell in prep). This site (and probably several others in lowland wetlands of NW England) has good potential for further investigations of possible evidence of cereal cultivation by Mesolithic people. This is a topic that has been unresolved for several years, but can now benefit from refined laboratory techniques, a better understanding of radiocarbon dating and Bayesian statistical modelling, and new breakthroughs in the identification of some cereal pollen types from those of other large grasses (eg Albert & Innes in press).

The archaeologists from NML are collaborating with the Lancashire Wildlife Trust, who manage the site. They are developing the visitor experience and educational facilities to highlight and integrate the past and present environments.

Not far from the Lunt Meadows site is the remarkable foreshore site at Formby. The recognition of animal and human footprints preserved in the silts and muds has provided a rare opportunity to look at direct evidence for spatial behaviour of people and animals in
the prehistoric past, including the Late Mesolithic. Building upon the earlier work of Gordon Roberts (Roberts et al., 1996) the Formby and Sefton foreshore has, over the past ten years, seen a lot of work undertaken for the Sefton Coastal Landscape Partnership & the National Trust by Alison Burns of the University of Manchester (Burns 2019). The process of surveying and recording the wide range of prehistoric animal and human footprints being exposed and eroded has continued.

Analysis has demonstrated how coastal saltmarsh environments served as route ways, hunting and foraging environments. It has graphically reminded us how habitually terrestrial prey species, such as red and roe deer, were drawn to this environment, simultaneously providing hunting opportunities for human groups. It emphasises how many coastal environments may have been exploited for their terrestrial rather than exclusively coastal resources and highlights normally hidden details of people/animal interactions. The evidence provides important information on social groupings, footwear, physiology, gender, age and health. This work has also provided a vehicle for valuable public outreach (Burns 2014).

In Greater Manchester, Tameside Archaeological Society (TAS) have undertaken significant fieldwork at three sites located at varying altitudes, ranging from a lower level valley site at c 200 m.a.s.l. at Grange Farm, Mottram, (GM) (TAS in prep.) to two moorland sites above Swineshaw Reservoir at c. 350 m.a.s.l. at Boar Flat (GM) and at c. 450 m.a.s.l. at Irontongue Hill (GM) (Cowen 2009; Leeming and Cookson 2009; Milne 2009 a, b; Wright 2007, 2012). These Pennine fringe sites have yielded a range of Late Mesolithic lithic material and cut features. At Irontongue Hill there is evidence for the re-cutting and re-use of hearth pits.

The site at Grange Farm (GM) is located on a ridge formed by free draining glacial outwash sands within a valley forming one of the main routes from the lowlands in the west up into the Pennines. As such the location could be considered as intermediate between upland and lowland environments. The site is close to fresh water springs and benefits from excellent visibility of the surrounding landscape. It was visited in the Mesolithic and Neolithic periods, and the proximity of the features and lithic distributions of the two periods suggests that specific attributes of the location persisted, and continued to attract people, even if the earlier anthropogenic features were no longer visible. An amorphous hollow feature contained a fill that held Late Mesolithic lithics stratified securely with charred hazelnut shells that yielded two radiocarbon dates spanning 6620-6470 cal BC (TAS in prep).

Adjacent to the nearby site of Shaw Cairn (GM), Mellor Archaeological Trust (MAT) together with a small team from the University of Sheffield also found evidence for a Late Mesolithic scatter possibly associated with a series of stake holes (Noble, 2010; Noble et al, forthcoming)

Late Mesolithic lithics were found during excavations at Junction 6 of the M62 in Merseyside, associated with a pit containing burnt hazelnuts and burnt oak wood, both radiocarbon
dated to the 5th millennium BC (Cowell in prep.). Situated on a low sandy terrace next to a stream, the site also produced Late Neolithic occupation material.

Commercially, there has been little to report in Greater Manchester. The exception has been work undertaken in advance of a flood defence scheme at Castle Irwell, Salford (GM), initially by the University of Manchester Archaeological Unit (UMAU) and then by Salford Archaeology. The site consisted of a low-lying (c.20 m.a.s.l.) peninsula of sandy soils projecting into an extensive area of wetland through which runs Salteye Brook. Evaluation trenching revealed a multi-period site including a very small Late Mesolithic lithic component consisting of flakes and blades with little or no cortex, a core and a single microlith.

Similar finds have been made previously on lowland wetlands within a 10 mile radius, including possible temporary camps on Radcliffe E’es (GM) and at Nook Farm on Chat’s Moss (GM); and an excavation in Barton (GM) in 2012 produced a Mesolithic flint blade (Reader and Roberts, 2016; Salford Archaeology, 2018, 10-11).

The new evidence supports the previously reported impression (Cowell 1991, 1996; Cowell and Innes 1994; Cowell and Philpott 2000) that Late Mesolithic sites of lowland Lancashire, Greater Manchester, Cheshire and north Merseyside tend to cluster on patches of better drained ground adjacent to wetlands and/or stream courses. These sites consist predominantly of small, low-density lithic scatters with few recognisable retouched forms and little in the way of structural evidence. The flaking evidence suggests little or no primary flaking. Prepared cores and/or flakes and blades were carried to the sites and used, with some eventually being discarded.

The evidence is in marked contrast to the multi-phase structural and substantial finds evidence from Lunt Meadows. This may reflect a significant contrast between Late Mesolithic archaeology of the inland coastal plain and certain coastal and/or estuarine locations which have previously been noted as producing significant artefact concentrations (Cowell 1996) and activities repeated over long time periods (as at Stainton West).

Ritual, Religion and Ceremony

It can be difficult to recognise depositional actions that had significance beyond the mundane. Occasionally, however, such deposits are sufficiently different as to allow them to be distinguished archaeologically (i.e. Palmer 1970). Claims for ritually structured deposition on Mesolithic sites are rare but can give rise to expansive interpretative discussions (Chatterton 2003: Conneller 2004).

Excavations at Lunt Meadows have found what appears to be special depositional treatment of pieces of crystalline rock containing mica crystals that reflect light (possibly a now-
decomposed form of granite). One piece appears to have been deliberately placed on a stone plinth flanked by two struck blue flints at the centre of a sandstone cobbled setting. The cobbles had been sequentially laid in a spiral at the base of the central plinth. In this instance the material stands out visually from the general assemblage of finds, both for the unusual geological nature of the central, sparkly, stone and the blue flints, and for the unique spiral spatial setting. Elsewhere on the site, other pieces of the same type of crystalline rock appear to have been deliberately placed sealing a number of pits. One piece was found associated with one of the two white blades from the site, directly beneath a fallen burnt tree trunk dated to c. 5900BC (Cowell in prep).

This may be a rare example of discernible, meaningful structured deposition from a Mesolithic context, although the actual meaning remains unknown.

Trade, exchange & production

Evidence from Mesolithic assemblages for the procurement of raw materials from distant sources has long provoked speculation about technology and trade (Palmer 1970; Rankine 1951). Across the region, there is widespread evidence for lithic materials being deposited that may be considered exotic to their depositional context. Distinguishing between the various potential mechanisms by which specific materials may have been acquired demands suitable approaches to lithic analysis. Inter-assemblage comparisons of site reduction evidence can provide a powerful tool in understanding if materials were accessed through the mobility of groups, or whether inter-group exchange or barter mechanisms were involved.

The application of these approaches (see Myers 2015) requires that raw materials can be traced to a source location or area and this entails extensive sampling of potential source deposits. In this respect the use of laser ablation plasma mass spectrometry techniques (Evans et al., 2007) promises to be a valuable approach for source characterisation, and this is being applied to exotic material from the Stainton West assemblage (see below).

The new mid-ninth millennium BC dates from Greasby (M) are reassuringly close and coherent, and are in accord with our current understanding of dating for Early Mesolithic assemblages of ‘Deepcar type’. If accepted, the dates would help with anchoring the chronology of these assemblages in Merseyside and the south Lancashire plain.

It would also confirm that in the ninth millennium BC Mesolithic groups in this area were obtaining lithic material for their assemblages from the limestone of north Wales. It begs the question, during the ninth millennium BC, how did groups in these areas maintain their raw material supplies? In answering this question it may be possible to undertake an interesting comparison with contemporary activity east of the Pennines (Myers 2015).

In the Early Mesolithic period, the contemporaneous coast lay well to the west of the current North Wirral and Lancashire coastlines. By approximately 9,000 BC, the sea level had
risen to 37 m below modern OD. By about 7,500BC it had risen significantly, but was still 18 m below current sea level, providing a large area of land linking Wales and north-west England during the Early Mesolithic period (Bell 2007).

The Early Mesolithic assemblage from Mellor (GM), typologically of ‘Deepcar type’ (sensu Radley and Mellars 1964), represents an interesting western outlier of this distinctive group of assemblages dependent upon the use of Wolds flint. Although Wolds flint has its primary sources in the Cretaceous chalk of Lincolnshire and East Yorkshire, Mesolithic groups probably obtained their material from secondary deposits of glacial till in the Trent valley. These assemblages are principally concentrated east of the Pennine watershed (Myers 2015) and the Vicarage Garden assemblage appears to be a western outlier. West of the Pennines, Early Mesolithic assemblages that are typologically similar (but which lack obliquely truncated microliths with opposing retouch at their tips) do occur, but they draw upon a different suite of raw materials.

There is also a substantial Late Mesolithic assemblage at Mellor, manufactured from varieties of translucent and semi-translucent flint that includes two microliths and a number of end scrapers on short flakes.

The Late Mesolithic assemblage at Stainton West (C) appears truly remarkable. The tool assemblage is notable for the limited range of retouched forms. There are relatively few scrapers, whilst forms such as denticulates, burins or notched flakes/ blades appear to be largely absent. Microlithic forms dominate the retouched tool assemblage, with over 5600 having been identified. These include classic Late Mesolithic varieties of rod and backed types, and scalene triangles (Brown et al in prep).

The raw materials employed in the lithic assemblage at Stainton West reflect the site’s riverine position between the coastal plain and the uplands of the Lake District Fells and the North Pennines. The majority of materials come from deposits along the Cumbrian coast embracing a wide variety of materials. The assemblage, however, also includes cherts and volcanic materials derived from the uplands.

A most significant review of raw material use in Late Mesolithic and Early Neolithic assemblages in Cumbria (C) has demonstrated how the balance of raw materials employed in site assemblages generally mirrors the topographical position of each site. Coastal assemblages are dominated by coastal raw materials. Moving inland along drainages sees the proportion of materials from upland sources increase until, in upland sites, they dominate (Dickson and Cherry forthcoming).

At Stainton West, however, the assemblage also includes materials acquired from sources at a significant distance including the southern uplands of Scotland and even from as far afield as the Isle of Arran. Analysis of patterns of raw material procurement, use and discard can provide highly informative data relevant to the discussion of Mesolithic mobility, territorial behaviour and social interaction (Middleton et al 2013, 177; Myers 2015). It is anticipated
that the analysis of the assemblage will shed light upon the role of Stainton West in patterns of local Late Mesolithic settlement and mobility. It is noteworthy that flakes derived from polished Group VI tuff implements were recovered from Late Mesolithic contexts (Brown et al in prep).

At SMR 3 (Slynedales Culvert) (L) on the Heysham-M6 link route, the main source of raw material was pebble flint, augmented by chert, with minor quantities of tuff and grey flint (probably from East Yorkshire). Occasional other materials were used including unidentified sources, possibly a quartzitic sandstone. Two refitting fragments of red ochre/haematite were also found but are not definitively utilised (Dickson 2018a).

A flake from a ground and polished Group VI (Great Langdale area) tuff axe was found within a cluster of Late Mesolithic flaked lithics, including elements from all stages of a Late Mesolithic reduction strategy and several microliths (Dickson 2018b).

At Lunt Meadows (M), a lithic assemblage of c 5000 pieces has been recovered. Sources of workable flint are not found locally to the site. It appears that at least some of the material, such as varieties of grey chert, may have come from distant sources, possibly the Ribble Valley plus some from Wales (Cowell in prep).

Excavations at one of the Seven Lows barrows, Delamere (Ch), produced a range of lithic debitage and tools including microliths, flakes and blades, most of them of Late Mesolithic form. These were manufactured from pebbles and cobbles of chert and flint, probably from Irish Sea Till or gravels derived from it. Several pieces showed signs of mild heat treatment (discoloured to a pale pink), thought to have aided working of the poor quality raw material (Brooks, forthcoming).

At Grange Farm (GM), the lithic assemblage encompasses a wide variety of raw materials and retouched tools include battered back and scalene microliths with a variety of other forms. There are also a large number of pebbles and cobbles. Some may represent the gathering of raw materials for potential subsequent reduction. Some, however, show signs of wear and use as tools used for a range of activities including rubbing/ grinding through to hammering (Thameside Archaeology Society (TAS) in prep).

**NEOLITHIC AND EARLY- to MID-BRONZE AGE ~ 4000-1200 BC**

**Environment**

By the start of the Neolithic period, the major post-glacial rise in global sea levels, and the fluctuations in relative sea levels cause by eustatic uplift, had both slowed down. Britain had been cut off from Continental Europe by the inundation of the Channel, which constrained the arrival of new types of plants, insects and animals. But there were still some areas on
the north-west coast and in its river estuaries where local adjustments continued to occur. This was particularly true of the complex drainage area around Morecambe Bay, where relative sea level was still rising at a rate of about 0.50 metres per 500 years between c 4100 – 3900 cal BC ie during the Late Mesolithic to early Neolithic transition period (Lloyd et al 2012).

The end of the Early Neolithic period, the Late Bronze Age and Early Iron Age, as well as the Late Medieval period, are all associated with relatively rapid changes towards more unstable weather conditions in Britain and Europe, with colder winters and wetter summers (Bevan et al 2017). These climatic changes are thought to have affected the viability of agriculture and landuse, particularly in upland or poorly drained areas. In turn, this may have led, indirectly, to changes in settlement patterns and activity foci.

Whilst large-scale and regional changes in climate remain of direct interest to studies of populations, settlement patterns and economic regimes, most site-specific palaeoenvironmental studies focus on the effects of people in their local landscapes, and on disentangling these from ecological developments.

Grosvenor’s (2014) PhD thesis investigated upland and lowland sites in Cumbria (C) and focused on evidence for changes in climate, vegetation and landuse during the Mesolithic-Neolithic transition. Climatic changes and effects were relatively minor. Whilst there was evidence for more intensive clearance during the Neolithic than during the Mesolithic, there was evidence for a delay of about 200 years in the upland landscapes when compared to the lowlands.

Importantly, the scale of impact on vegetation in the upland landscape was far more extensive than the archaeological evidence had suggested. Furthermore, the upland landscape appeared to recover relatively quickly after clearance events, whilst in the lowland environment, the newly open vegetation remained far more dominant.

Appley’s (2013) PhD thesis investigated the prehistoric environment of the Furness peninsula (C), providing important environmental background to prehistoric activity and changes in relative sea levels. The Furness peninsula and Walney Island (C ) were repeatedly visited or settled in the Late Mesolithic and Early Neolithic periods, and some of the activities included trade in stone axes and the use of Lake District volcanic tuff as a raw material.

Appley obtained evidence for two marine transgressions during the Late Mesolithic period in the valley of the Sarah Beck, close to Holbeck Park Avenue (C), providing a landscape characterised by intertidal mudflats, saltmarsh and tidal creeks. As sea levels dropped in the later Neolithic, carrs and peatlands formed, and two burnt mounds sitting directly on the marine sediments (adjacent to a palaeochannel that cut through them) demonstrate that the sea had largely retreated from the valley by the Early Bronze Age. His work illustrates
the key links between archaeological sites in their contemporaneous landscape settings and studies of changes in relative sea levels.

At Drigg (C), the current coastline is eroding away another burnt mound associated with a (previously inland) palaeochannel. Woody peat (possibly indicating a submerged forest like that found in the current intertidal area) lies immediately beneath a burnt mound. Radiocarbon dating shows that the peat started to form in the Late Neolithic period 3810-3650 cal BC (Quartermaine and Cook 2010).

At Ince Marshes (Ch), the upper peat deposit in this estuarine location began to form during the Early Neolithic period (radiocarbon dated to about 4900 – 4600 cal BC) and shows a change from wooded conditions to wetter, more open habitats including phragmites (reeds), sphagnum moss and heathland (RSK 2016).

The presence of peaks of charcoal- mostly in the upper peat but also in the lower (Mesolithic) peat - suggest human activity as the burnt wood includes sap-rich species such as willow/poplar which do not catch fire easily.

Grosvenor et al’s (2017) study of pollen data from Urswick Tarn (C) in the lowland Furness peninsula and Blea Tarn (C) in the upland central massif integrated a range of pollen data from southern Cumbria to consider the dating and causes of the Elm Decline- often used as a marker of increased human impact and the start of Neolithic activities, although its causes are complex and controversial. Both sites show that the pre-disturbance landscape consisted largely of mixed woodland including hazel, birch, oak and alder, with a period of vegetation stability between about 7100 and 6800 cal BP (Late Mesolithic ~ 5000 cal BC).

Like some other sites, both show two phases of elm decline and vegetation disturbance, although each site has slightly different dates for each phase. The dates are quite early for the elm decline in the British Isles, and the authors find little evidence for a major role for climate change. Instead, they conclude that human clearance of trees (possibly targeting trees weakened by disease) was the main driver of the vegetation changes, and they emphasise the significant impact of human activities on the landscapes of southern Cumbria.

Current investigations of environmental samples from Lunt Meadows (M) by a team from Exeter University have found cereal-type pollen in deposits dated to the Late Mesolithic (5th millennium BC) (Jones et al n.d). New work by Albert & Innes (in press) has clarified identification criteria to help distinguish between pollen grains of a domestic cereal (barley, *Hordeum*) and those of sweet grasses (*Glyceria*). This work is based on their studies of cereal-type pollen found in an area with several concentrations of Late Mesolithic rod microliths at Dog Hill, Calderdale (NY), just to the ENE of Rochdale (GM) in the southern Pennines.

At Stainton West, near Carlisle (C), pollen data suggest that agriculture was introduced in the Early Neolithic period between 3800 cal BC and 3700 cal BC, but this does not appear to
coincide with any major shift in cultural affinity of the people using the site (Brown *et al* in prep).

At Arclid South quarry (Ch), pollen evidence from peat deposits in a lowland mire indicates that from the Middle to Late Neolithic periods the local vegetation was woodland dominated by oak and hazel with alder/birch carr. These are the four most frequently occurring taxa in the charcoal assemblages from the nearby burnt mound located at the edge of the mire basin; suggesting that little had changed by the Middle Bronze Age when the burnt mound was in use (Jones *et al* 2017).

The palaeocological sequence from Hatchmere (Ch) covers the period from the end of the Mesolithic (~6000 cal BP) up to around AD 1800. Woodland taxa - particularly oak, alder and hazel - are dominant through the Neolithic until the Late Bronze Age, again emphasising a long history of woodland habitats. But at Hatchmere there is also some evidence of woodland clearance & cereal pollen from the Early Bronze Age onwards (Chiverrell *et al* 2016).

The increases in phosphorus levels indicative of increased human or animal activity occur in steps that coincide with the Neolithic, Bronze Age, and Medieval periods, and occur again in the first half of the 20th century, consistent with anthropogenic causes or influences (Boyle *et al* 2015). This is an important new methodology for tracing the impact of people on their environments.

The palaeoecological sequence from the nearby Peckforton Mere (Ch) covers the period from the end of the Mesolithic (~6000 cal BP) to the beginning of the Medieval Period (around AD 1066) (Chiverrell *et al* 2016). The Peckforton diagram shows a more consistently wooded landscape than that from Hatchmere, with arboreal species, particularly alder, dominant throughout the record. In common with the Hatchmere record, the Peckforton results show two phases of clearance (each followed by some woodland regeneration), occurring first in the Early Bronze Age (~4000-3600 cal BP) and then again in the Iron Age (~2600-2000 cal BP).

Studies of material at Beckburn windfarm (C) add considerably to our knowledge and understanding of vegetational change, and the impact of people on the environment of Solway Moss during the Bronze Age. The data show that, during the Early Bronze Age there was little disturbance of a generally wooded environment, but during the Middle Bronze Age there is evidence for greater anthropogenic impacts, including limited tree clearance, slight increases in open-ground indicators (grasses, ribwort plantain) and the incidence of cereal-type pollen. This renewed clearance may correlate with the movement of arable farmers across Solway Moss, but during the Late Bronze Age to Iron Age there is evidence for forest regeneration, accompanied by a slight reduction in grass pollen (Rutherford 2018 & in prep).
Deer Dyke Moss, Cumbria, is one of a complex of lowland raised mires on the eastern fringe of the Leven estuary. Pollen evidence shows extensive forest cover on both the drier hills surrounding the site and in the Leven estuary wetlands, from the base of the core (c. 1200BC) until c. 700BC, with a minor peak in agricultural indicators from c. 970BC onwards. Although this dates to the Late Bronze Age, the implication is that this environment had remained wooded for most of the early-mid Holocene (Coombes et al 2009).

Quartermaine & Leech (2012, 6-10) provide a useful overview of vegetation and climate change in the Lake District during the Holocene.

The Upland Peats Study for North-West England looked at four landscape areas: the South West Fells of Cumbria (C), the Langdale Fells in the central Lake District National Park (C), the Forest of Bowland (L), and Anglezarke Moor (L) on the uplands bordering Greater Manchester (Huckerby et al 2010).

The results revealed a varied and complex picture across each of the four areas, exemplified by the following examples from Cumbria. The onset of peat formation appears to have been associated with clearance evidence around the South West Fells and Langdale Fells. At Barnscar and The Knott some clearance cairns may be Neolithic. Around Cockley Moss and Hesk Fell, however, peat formation commenced later in the Bronze Age. At Mart Crag Moor axe factory sites, Great Langdale, pollen analysis indicates that at the time of the axe production Martcrag Moor was an open grass and heather dominated landscape with some hazel and alder scrub. It suggests that the land was in use as pasture (Huckerby et al 2010).

In the southern Pennines, quite close to Anglezarke Moor at Hyndburn windfarm (L), an unusually long and complete peat core was recovered from the blanket mire on Oswaldtwistle Moor. More than three metres of peat contained abundant and well preserved pollen dating from the Early Neolithic through to the late Medieval/post-Medieval period (Raynor and Rutherford 2013).

Pollen from the earliest peat indicates woodland dominated by alder, with birch and oak. Elm pollen is scarce, suggesting either that an elm decline had already happened, or that elm trees were not suited to the altitude of 245-370 m.a.s.l. The top of the basal pollen zone is dated to 3970-3790 cal BC, during the earlier part of the Early Neolithic. During the Late Neolithic at 2910-2690 BC, there is a sudden rise in percentages of grass pollen and charcoal, although trees are still dominant in the pollen record and this is a short-lived event. Lithics of Neolithic types were recovered from archaeological investigations at the windfarm site, indicating human activities in the area during this period.

In the subsequent period, dating to the Early Bronze Age c 2040-1880 cal BC, the vegetation shifts from predominantly woodland towards a mixture of woodland and moorland pollen. The main feature is the rise of pollen of *Calluna* (heather) and the spread of *Sphagnum* moss spores on the uplands (Raynor and Rutherford 2013).
The chief factor controlling vegetation change on Oswaldtwistle Moor (L) from the Early Neolithic to the Middle Bronze Age seems to have been one of increasing waterlogging and podsolisation from the Bronze Age onwards, as a result of environmental disturbance or deterioration (caused by people or climate or both) favouring the spread of heather and moss on the moor. Evidence for deliberate burning activities by people: for example, to clear areas for animal grazing, enhanced the spread of heather moorland but this did not occur until the Middle to Late Bronze Age dated 1270-1040 cal BC. Cereal pollen does not appear until the Early Medieval period c. cal AD 890-1040 (Raynor and Rutherford 2013).

Settlement and Land-use

In the Mersey basin, Cowell (2010) investigated sites on a low ridge of Bunter Sandstone ahead of quarrying at Southworth Hall Farm, near Winwick (Ch). Adjacent to a Romano-British enclosure on the top of the ridge was an area containing several small pits. Radiocarbon dating of burnt hazelnut shells from fills of two pits produced dates ranging from 4680 – 3340 cal BC and these are compatible with the (scarce) lithics of Late Mesolithic and Early Neolithic date. There are also some Late Neolithic/Early Bronze Age lithics, and some potentially later prehistoric materials. Although all of the activities appear to have been relatively low key or short-lived, it is clear that the same ridge was repeatedly visited throughout prehistory.

Cowell (2010, pp 35-46) provided a comprehensive overview of Early Prehistory in the Mersey Basin and adjacent Pennine uplands and Fylde peninsula. He considered the Southworth Hall Farm site to be typical of the inland sites of the Mersey basin, where the Mesolithic and Neolithic activities were dispersed and small scale, and people used very similar lithic technology with little environmental impact in both periods. He drew a comparison between these sites and the larger, coastal, sites where woodland clearance tended to be more long-lasting or greater in spatial extent. He also noted that, by the Bronze Age, sub-regional differences were developing.

Besides the Late Mesolithic component, Stainton West (C) has also produced an intriguing Neolithic assemblage, much of which was associated with the relict river channels. A large number of Neolithic arrowheads of leaf and chisel forms was retrieved from within the palaeochannel and from adjacent ground. This might indicate that bow and arrow hunting was undertaken along the edge of the palaeochannel (Brown and Clark 2009a and b, Brown et al in prep).

It has also been suggested that the palaeochannel preserves the remains of a beaver lodge and it is not inconceivable that Neolithic groups hunted beaver for their pelts and meat. The assemblage of preserved wood also provided a tree trunk with the claw marks from an
animal, possibly a bear, and possible remains of a fish weir were identified in one of the channels.

The wet deposits in the Stainton West palaeochannels provided various examples of woodworking including two rare tridents (see below). Pieces of coppice stool possibly retain evidence of wooden bowl manufacture. Other debris is associated with tree felling, showing how parallel grooves were cut into the trunk. This is the first clear evidence for such a method in this country. In an English Heritage review of excavated sites in northern England producing samples of preserved wood or charcoal, Huntley (2010) has shown how few Mesolithic or Neolithic examples have been found in north-west England.

Besides the preserved wood, the organic deposits at Stainton West have produced an insect assemblage that is currently being analysed. The reported scarcity of such analyses from Mesolithic, Neolithic or Bronze Age sites west of the Pennines is testimony to the exceptional character and significance of Stainton West to prehistoric archaeology in the north-west region (Kenward 2009).

A fieldwalking project in south Furness undertaken by Dave Coward surveyed a range of topographies (coastal, inland valleys and localised upland areas) and found many lithic scatters of Late Mesolithic and Early Neolithic forms. The scatters were focussed on low ridges between about 10 – 30 m AOD, with much larger accumulations of material close to some beck confluences (Evans 2008).

An Early Neolithic occupation site has been investigated at Holbeck Park Avenue, Barrow in Furness (C) (Evans et al 2018). A tree throw hollow contained a significant assemblage of Early Neolithic pottery, lithics (including a rod microlith), and a cereal grain radiocarbon dated to 3960-3710 cal BC. Two further radiocarbon dates from this hollow and a fourth from a second, similar, hollow (devoid of artefacts), are all statistically consistent, probably indicating a single phase of activity. The dates are also consistent with the suggested date range for the pottery.

Two pollen cores from an adjacent valley indicate a varied environment during the Late Mesolithic and Early Neolithic period, containing mixed deciduous woodland, wetland peats, alder carr and an open woodland fringe along the coast. Brief clearance episodes are associated with pasture indicators. This is similar to other sites discussed by Grosvenor (2014) and Appley (2013) in their PhD theses: clearances are very small scale, and any cereal agriculture is either too small or located too far away to register in the sediment cores locations.

Work in advance of an extension to Stainton Quarry (C) on the nearby limestone uplands has also produced a significant assemblage of Early Neolithic pottery, with two broken polished stone axes and c 70 charred cereal grains from a tree throw, a pit and a limestone gryke. The material is dated to between c 3800 and 3600 cal BC (Robinson & Town, forthcoming).
Bayesian statistical modelling of the dates for the tree throw deposits at Holbeck Park and Stainton Quarry was undertaken by Griffiths (2011) as part of her PhD research into the dates of the Mesolithic – Neolithic transition in northern England and the Midlands. The modelling places some aspects of Early Neolithic material culture in the region in the 39th or first half of the 40th century cal BC, and sets the Holbeck Park assemblage amongst the earliest demonstrably Neolithic sites on the British mainland.

Griffiths (2014) has also demonstrated that rod (or at least parallel-sided) microliths remained in use in parts of northern England into the 39th and 38th centuries cal BC, supporting earlier arguments that aspects of a microlithic technology persisted in various regions of northern England into the Neolithic period.

Whilst the Stainton Quarry site, which appears to have incorporated a spring of fresh water, was first occupied at a similar time to Holbeck Park, it was also visited on numerous subsequent occasions. At these slightly later dates, perhaps a few generations after the first occupation, there is evidence of a mixed economy.

Pollen evidence indicates woodland with pastoral uses; charcoal shows that woodland trees and shrubs and heather were all used as fuel and/or thrown onto fires; charred cereal grains show the use of various domestic cereals including barley, emmer and wheat; and organic residues in the ceramics indicate the presence of dairy fats and plants or beeswax. These different lines of evidence all provide complementary information that helps to build up a picture of how Neolithic people exploited and lived within their environments, as well as how they subsisted (Robinson & Town, forthcoming).

At Lathom (M), excavations of a primarily Iron Age site has produced a segment of ditch with a very homogenous fill of burnt wood, ash, burnt sand, pottery and struck lithics. The pottery and lithics are probably Early Neolithic in date, c. 3900-3600BC (Cowell in prep).

In Merseyside, a community-led test pitting project (Ducker et al 2014) provided useful background information about prehistoric activities on the Wirral peninsula (M). These helped to inform the desk-based assessment (dba) and Written Scheme of Investigation (WSI) for mitigation of a commercial development at Mark Rake, Bromborough (M), where evidence of repeated use of the site (which lies on the flank of a sandstone ridge overlooking a small stream) dates to the Neolithic, Bronze Age, Early Medieval, Medieval and post-Medieval periods. The site is adjacent to the church in the centre of the modern village, emphasising again the long time periods (>5,000 years) of persistent places in the landscape (Adams forthcoming).

The Neolithic features and finds at Mark Rake include postholes and shallow pits, two of which produced radiocarbon dates on charcoal of 3943-3712 cal BC and 3360-3103 cal BC. The long time gap and small, ephemeral features, suggest that the site was revisited within the Early Neolithic period.
Artefacts include Grimston Ware pottery (including at least two, possibly three, carinated bowls), a leaf-shaped arrowhead, a possible saddle quern, a rubbing stone, and concentrations of fire-cracked stones and sandstone pebbles. No charred plant remains were recovered (despite sampling) apart from charcoal, predominantly from oak plus some shorter lived trees typical of mixed deciduous woodland (Adams forthcoming).

In Liverpool (M), on the site of Dale Hall, a small pit of similar dimensions (~0.40m diameter) to those at Mark Rake produced no artefacts, but charcoal from its single fill returned a Late Neolithic radiocarbon date of 2248-2137 cal BC. Adams et al (forthcoming) highlight the difficulty of detecting such sites through conventional non-intrusive methods such as fieldwalking or geophysical surveys, and recommend that early prehistoric sites should be assessed by strip map and recording of open areas. The same approach was used successfully on the Heysham-M6 link (L) (Bradley and Howard-Davis, 2018) and on aggregate quarries on the Abbeytown Ridge (C) (Jackson and Churchill 2017).

On the Heysham-M6 link, at the same site (SMR 3) (L) that produced the three concentrations of Mesolithic lithic scatters noted earlier, several groups of features appear to indicate the presence of a Neolithic building plus other activities. The putative building consists of an area defined by four postholes and surrounded by shallow features all of which contained burnt material, although the central area did not contain a hearth (Bradley and Howard-Davies, 2018).

Modelling of a suite of radiocarbon dates suggests that the most concentrated phase of activity took place during the Early Neolithic between the second half of the thirty-seventh and the first quarter of the thirty-fourth century cal BC (probably towards the latter part of that range). The structure itself may have been in use for about 35 years (at 68.2% probability) and almost certainly for less than 141 years.

No unburnt animal bone survived, but there were some tiny calcined fragments of animal bone, and some heat-affected vesicular material (a residue of burnt organic matter), and some hazel charcoal.

Several other shallow features (pits or postholes) contained burnt material including charcoal and heated stones, although these had been deposited in the pits, not burnt in situ. Carbonised fragments of grass culms and of rhizome or tuber fragments may have been from burnt turf. These plant resources can also be used for food as sources of starch.

Similar Early Neolithic activity was recorded only 600 metres away at site SMR2 (L). This had two large, shallow, irregularly-shaped pits, one of which had a concentration of stones in the centre that may have formed an arrangement defining a single post setting. Its basal fills appeared to be natural and it may have originated as a tree-throw hollow. Subsequent fills contained Neolithic material including abundant oak charcoal and a charred hazelnut with a radiocarbon date of 3500 – 3340cal BC (Bradley and Howard-Davis, 2018).
This is very similar to the dates from pit and posthole fills at SMR 3, suggesting that this general geographical location, on a slope overlooking a stream, was a favoured area for repeated activities in the Early Neolithic as well as during the Mesolithic period.

At SMR 3, the radiocarbon dates on charcoal, burnt hazelnut shell and rhizomes etc indicate activities spanning the Early and Mid-Late Neolithic periods and also run on into the Early Bronze Age (eg charred onion couch tubers dated to 2140-1960 cal BC). The features continue to be small, shallow and enigmatic throughout the Mesolithic, Neolithic and Bronze Age periods.

Pottery finds were scarce at SMR 3, but include sherds of Early Neolithic Carinated Bowls and impressed pottery (possibly Middle Neolithic Ebbsfleet ware), and one from a vessel in the Early Bronze Age Collard Urn tradition.

At Grange Farm (GM), Neolithic lithics including a leaf-shaped arrowhead were found close to a hearth yielding radiocarbon dates on willow/poplar charcoal of 3500-3090 cal BC. The hearth was located extremely close to the feature that produced Late Mesolithic lithics deposited three thousand years earlier. A rectangular anomaly recorded by a geophysical survey of the area probably indicates yet another (later) period of activity at the site (Tameside Archaeology Society in prep).

Multi-period occupation and activities and land-use were recovered from a site located on a low hill overlooking a beck at Durrannah near Carlisle (C). A southern site was excavated in 1997 - 1998, and the adjacent area to the north was excavated in 2011. Both are reported by Jackson (2016). Many of the features were small, irregularly shaped, and contained no datable materials, but they were probably associated with others on site, some of which could be dated. Only one feature could be dated explicitly to the Middle Neolithic period: a roughly circular cut feature containing a large amount of burnt material radiocarbon dated to 3350-3030 cal BC.

There were several features dated to the Late Neolithic- a cluster of 20 pits in the northern area, five of which produced late Neolithic radiocarbon dates eg 2460 – 2210 cal BC and 2480 – 2290 cal BC. Two of the dated pits contained Grooved Ware pottery and a third contained Grooved Ware and a clay ball (see Ceremony section).

In the southern area, where the cut features were more dispersed, 12 of them produced material of Late Neolithic date. The radiocarbon dates are similar to those for the northern cluster eg 2470 – 2230 cal BC & 2560 – 2300 cal BC, but the pottery associated with these features is Peterborough Ware rather than Grooved Ware, indicating clear spatial distinctions between the two activity areas.

Environmental samples produced hazelnuts from almost every sample, and the charcoal indicates exploitation of a range of woodland species, particularly hazel, plus some oak and
other deciduous woodland species. No charred cereal grains were recovered from the Neolithic samples (O’Meara and Bishop 2016).

A large pit at the southern end of the site contained sherds from three vessels of indeterminate type, but with similarities to Early Bronze Age Collared Urns from Cumbria. Later features at the site include a small pit with a Late Bronze Age radiocarbon date, two undated but probably Iron Age palisaded enclosures and a Romano-British field system (Jackson 2016).

Following on from a desk based assessment and archaeological evaluation at the Montcliffe Quarry extension site, Bolton (GM), National Museums Liverpool Archaeology Field Unit undertook a targeted excavation of a geophysical anomaly prior to quarry ground works commencing. This turned out to be a small depression between gritstone boulders containing charcoal and burnt stones, associated with a scatter of 103 flints. The burnt stones are gritstone and siltstone, but no other siltstone pebbles or cobbles were found on the site. The flint lithics are mainly debitage from later stages of working pebbles from local boulder clay, and stylistically are likely to date to the Late Neolithic/Early Bronze Age periods, centred on the third millennium BC. There is also a range of tool types (including arrowheads), in various stages of manufacture or reworking, suggesting that several different activities took place at the site (Adams & Cowell, 2015).

Intensive quarrying for aggregates from the well-drained and easy-to-plough sands and gravels of the Abbeytown Ridge of western Cumbria (C), led to a series of archaeological investigations published by Jackson and Churchill (2017). These revealed that people had focused on this area in the Neolithic and Bronze Age.

At New Cowper Quarry (C), Neolithic settlement features included an enclosure surrounding two groups of postholes that probably comprised four-post structures. A third four-post structure lay outside the enclosure, with pottery of possible Early Neolithic date in one of its post pits. Fragments of an Early Neolithic bowl were recovered from the top deposit in a natural hollow, and a separate cluster of pits contained a range of materials including burnt stone and hazelnut shells and charcoal, a flint bladelet, and fragments from five Early Neolithic vessels (Churchill et al 2017).

A nearby pit with a different profile contained similar material to the pit cluster, but also had an upper fill that was tightly packed with unburnt stones and was surrounded by 10 stakeholes. It may have been a different form of structure (Churchill et al 2017).

Settlement activities continued, with another enclosure, a fourth four-post structure, and various pits dating to the Late Neolithic/Early Bronze Age. The fill of one of the pits contained Grooved Ware, a Neolithic blade fragment, and sherds from four All Over Cord decorated beakers. Sherds from two of these same vessels were additionally found in fills in other pits, distributed within a distance of 80 metres. Churchill et al (2017, 62) suggests that people may have made conscious decisions to use the pottery to link these features.
The structure contained a large quantity of an Early Bronze Age Beaker vessel and the remains of a possible hearth containing charcoal that gave a radiocarbon date of 2400-2140 cal BC. As well as the settlement evidence, a pair of parallel ditches interpreted as a sheep race was aligned along one edge of the enclosure.

Beaker pottery was also recovered during fieldwork at Lower Brockholes sand quarry, where the M6 crosses the River Ribble east of Preston (L) (Town 2014). The pottery came from two pits found close together, possibly associated with a curvilinear feature thought to possibly be an eaves-drip gully of a building or the footings of a windbreak. The pits also produced bone fragments and charred hazelnut shells and a wheat grain. Radiocarbon dating of the pits and the gully appear however to be somewhat too late for the Beaker pottery fragments. Nonetheless, the site suggests some measure of domestic activity.

Giffords undertook fieldwork at Oversley Farm, near Wilmslow, (Ch) ahead of the Manchester Airport expansion in the late 1990s. Some of the findings were reported and discussed previously (Hodgson and Brennand 2006, 33). The full publication is now available (Garner 2007), confirming a range of evidence for prehistoric activity from the Neolithic onwards, including two Neolithic rectangular structures, hearths, pottery, barley and struck lithics.

At Irby, on the Wirral peninsula (M), another multiperiod site was investigated by the Field Archaeology Unit of Liverpool Museum in association with undergraduate and Continuing Education students from the University of Liverpool. There was a great deal of community involvement, with many residents allowing the excavation of trenches within their gardens between 1987 to 1996 (Philpott & Adams 2010).

The site lies on a relatively flat area of land just below the crest of a sandstone ridge, on a geological junction. It is underlain by well-drained, easily cultivable brown earth, and is in close vicinity to a range of other types of topography and soils. Redeposited lithics (mainly Mesolithic with some Neolithic) indicate that people undertook various activities here, but the main settlement evidence comes from the Middle Bronze Age, the Iron Age and the Early Medieval periods.

The structural evidence for post-built Middle Bronze Age houses is slightly ambiguous: there was either one large (15 metre diameter) roundhouse with a double row of posts, or two sequential and overlapping houses that were slightly smaller but still unusually large (14 metre diameter). There is a southwest facing entrance flanked by post holes containing pottery and clay artefacts. An unusual feature for Middle Bronze Age structures in north-west England is the use of a continuous foundation trench for the part of the wall opposite the entrance. Whether one or two buildings, the posts are not set equidistantly around the circumference(s), nor are they arranged symmetrically around an axis aligned from the entrance. Four radiocarbon dates from short-lived plant remains from the fills of the foundation gullies and postholes are all within 1520-1010 cal BC. There is also fragmentary
evidence of an adjacent structure. Finds from the main structure(s) include decorated and plain locally made pottery, two spherical clay weights, potential oven clay, naked barley and emmer wheat (Philpott and Adams 2010). Bones only survived as unidentifiable comminuted calcined fragments.

All of the twenty-six processed sediment samples of definite or probable Middle Bronze Age date produced charred plant remains, sometimes in dense concentrations (up to 234 items per litre). Although the concentrations varied, the plant remains were ubiquitously dominated by grains of naked barley and grains and glumes of emmer wheat. Few other taxa were present. Spelt wheat was represented occasionally by glume bases (but not by grains) and there were a few seeds of apples or pears and some hazelnuts. Weed seeds were very few. Four of the eight sampled postholes contained abundant remains of charred cereals. Their similar compositions, including not only naked barley and emmer wheat cereal grains and emmer glumes, but also some whole spikelets of emmer, may indicate the use of the main structure or an adjacent one as a grain store (Huntley 2010).

Puddington Lane, Burton (Ch) is another multi-period site on the Wirral peninsula, only nine miles (15 km) south of Irby. Prehistoric flint and chert lithics were found, including some of Mesolithic type, as well as a Middle Bronze Age hearth, and Iron Age, Romano-British, pre-Conquest and high Medieval features and materials, indicating the long-term attractiveness of the location for habitation and land-use (Gregory and Adams et al forthcoming).

The Middle Bronze Age hearth is remarkable for its extremely high concentration of charred plant materials, dominated by grains of naked barley, plus a few hulled barley grains and oat grains. One of the barley grains yielded a radiocarbon date of 1400-1220 cal BC. A 20 litre subsample of the deposit produced more than 6300 grains- a density of 315 grains per litre of deposit. Some weed seeds and cereal chaff were also recovered from the subsample, but the relatively low numbers of both suggest that the crop had been cleaned before it became burnt. The chaff was mainly from barley, but there were also a few glumes of emmer wheat (Druce forthcoming).

The hearth sample also produced abundant charcoal fragments, but it was poorly preserved due to being heated either to high temperature or repeatedly. A few pieces could be identified and indicate the use of a range of common tree species (Druce forthcoming).

In addition, the sample contained very rare ceramic building material (CMB) which might indicate the remains of a structure. Two small pits located adjacent to the hearth were probably postholes but no structure was identified (Gregory and Adams et al forthcoming).

The only known Middle Bronze Age roundhouse in Greater Manchester was excavated at Cutacre (GM) open cast coal mine by Oxford Archaeology North in 2006. This was a single roundhouse radiocarbon dated to c 1480-1260 BC. The house lay on gravel close to a palaeo-channel in an area dominated by boulder clay. Lying close by were two sequential four-post structures with analysis of charred plant remains suggesting a function as malting
floors. This was also radiocarbon dated to the Middle Bronze Age and a small assemblage of Middle Bronze Age pottery was recovered (Gregory 2016).

The Carlisle Northern Development Route (C) investigations found evidence for a settled landscape in the Bronze Age, with a small hilltop settlement comprising three roundhouses. Hearth samples yielded radiocarbon dates from both the Early Bronze Age and the Middle Bronze Age, and environmental analysis revealed the presence of cereal grains, chaff, and spelt wheat (Brown and Clark, 2011). The final excavation report will include important information about structures, artefacts, and people’s relationships with their environment (Brown et al in prep).

Other settlement sites potentially dating to the Neolithic to Middle Bronze Age periods include Cocklakes (C) and a group of five sites in north Cumbria (C). The archives for these sites were assessed in the Carlisle archives project as having high potential for further work (Zant 2010).

In the uplands of Cumbria and the Lake District National Park a large number of surveys have identified features relating to the establishment of early field boundaries, field clearance and possibly other activities such as burial. Many of these have been undertaken by volunteer groups, under the auspices of the Lake District National Park Authority. Others have been commissioned by English Heritage/Historic England or the National Park Authority, and some have been undertaken by in-house English Heritage/Historic England survey teams.

In the absence of direct dating evidence, period assignment is generally through formal comparisons with dated sites.

The results of archaeological surveys undertaken between 1981 and 1989 have been brought together in a very useful but slightly out of date comprehensive review by Quartermaine and Leech (2012). In total, the surveys covered 78 square kilometres of uplands, and recorded over 10,300 monuments. Since the topographical surveys targeted upstanding monuments, the volume does not cover the numerous Mesolithic and Neolithic lithic scatters found by field walking.

The majority of the identified remains are thought to date to the Bronze Age, and primarily consist of cairnfields. The authors suggest a typological development, starting with localised sub-circular clusters of cairns, perhaps implying the exploitation of small woodland clearances for agriculture, during a period of expansion upslope as the climate ameliorated. The cairns then began to be rationalised into lines, reflecting the beginnings of complex field systems, some of which incorporated substantial lyncheted boundaries, indicating the cultivation of marginal lands.

The greatest concentrations of cairnfields are found on the marginal uplands adjacent to the Cumbrian coastal plain, in western Cumbria. Other cairnfields and field systems were also
found in the southern, central and eastern parts of the National Park, but not usually in such densities.

In the western Lake District the National Mapping Programme has revealed rich pockets of known and potential Neolithic and Bronze Age sites at Ennerdale Fell (C), Caw Fell (C) and Lank Rigg (C) where some 15 cairns were identified during field survey (Deegan 2016). The Dunmail Raise (C) and Greenburn Valley (C) surveys have identified a total of 90 sites of which about 70 are previously unreported, including a discrete area of cairns and an extensive cairnfield (Style 2015).

The Rydal Head and Beck Survey (C), undertaken in connection with MSc Research, has recognised a large number of prehistoric and later features, including cairns, clearance cairns, platforms, enclosures, standing stones, ruined buildings, quarries, revetments, hut circles and cup marks (Style 2010, LDNPA S5324). These features include a possible Bronze Age circular enclosure and two ring cairns (Style 2012).

On land around Carrock Beck (C), survey has revealed a number of possible enclosures and prehistoric round cairns. At Woodland Fell, Kirby Ireleth (C), field survey has identified possible prehistoric cairns, clearance cairns and stone alignments (LDNPA S5398).

The Upland Peats Study for North-West England has also identified new sites in low numbers for all four of its study areas. Three previously unknown cairnfields were identified in the South West Fells area (C), one of which displayed compact linear cairn groupings in association with a possible round-house, likely to date to the Late Bronze Age. The other two cairnfields are likely to be Bronze Age primary clearance features (Huckerby et al 2010a, 2010b).

Excavation at Shap Blue Quarry (LDNPA S5125), near a known Bronze Age settlement, identified some potential Bronze Age banks in two trenches (Weston 2010).

Prior to the geographical extensions of the Lake District and Yorkshire Dales National Parks, Historic England undertook a mapping programme of the ‘new intake’ areas based on aerial photographs and lidar data. In the east of the project area – particularly in the Lune Valley and the Pennine fringe (C) – there were areas of extensive coaxial field systems and settlements, probably Iron Age or Roman in date but with potential Bronze Age origins.

None were specifically dated, but occasional areas such as High Park (C) showed stratigraphic sequences. At High Park, two sets of intersecting field systems (as well as a settlement feature) were targeted for sediment coring. They were assessed for Optically Stimulated Luminescence (OSL) dating but none of the samples proved suitable (Oakey et al 2015).

Areas in north-west England outside of Hadrian’s Wall, the Lake District National Park and Cumbria have received very little survey. Mapping programmes based on aerial photographs
and lidar data have been undertaken recently in pilot areas of Lancashire (Goodchild & Hardwick 2017) and Cheshire (Hardwick 2017, Goodchild in prep), but struggle to identify early prehistoric sites remotely. Upland areas, in particular, such as the Pennines and Forest of Bowland, should repay detailed topographic and walk-over field surveys.

**Ritual, Religion and Ceremony**

Some examples of possible deliberate placing of Neolithic to Mid-Bronze Age artefacts have been excavated archaeologically in the past ten years.

At Mark Rake, Bromborough, Wirral (M) one of the pits contained 22 undecorated body sherds of one, possibly two, carinated bowls of Grimston Ware. The sherds were relatively large and unabraded, with fresh breaks, and had been stacked on top of each other, giving the impression that they had been broken and immediately placed in a pile within the small, shallow pit. The single fill contained no other artefacts and radiocarbon dating of alder charcoal from the fill gave an Early Neolithic date of 3943-3712 cal BC (Adams forthcoming).

At Durranhill, Carlisle (C), a pit at the edge of a pit cluster contained over 60 sherds of Late Neolithic Grooved Ware, a clay ball made from the same fabric, a flint blade of Early Neolithic type, fragments of charred crab apple and a large quantity of charred hazelnut shells (representing at least 150 nuts), one of which gave a radiocarbon date of 2460-2210 cal BC.

In another cluster of features at Durranhill (C), nearly 200 metres away, a large pit had ten rectangular blocks of unburnt clay deliberately placed towards the base of the feature, sealed inbetween two heavily burnt deposits. Upper fills of the pit contained sherds of Late Neolithic Peterborough Ware.

At the Late Neolithic/Early Bronze Age site investigated at the Montcliffe quarry extension (GM), a triangular flint point was found pressed into the clay underneath a gritstone cobble and may have been deliberately buried (Adams & Cowell, 2015).

At New Cowper Farm (C), Churchill et al (2017, 62) suggested that sherds from two All Over Cord Beaker vessels had been deliberately distributed into three widely separated pits in order to form a conceptual link between them.

In the Middle Bronze Age site at Irby (M), ten decorated rim and body sherds were found in a stone-packed posthole associated with the main structure, and a further sherd probably from the same vessel was found in a gully part of the same structure. The sherds in the stone-packed posthole were all fresh and unabraded, and appeared to have been broken immediately before being placed in the feature (Philpott and Adams, 2010, p14).
Three Neolithic sites in Cumbria have produced evidence of (probably deliberate) placement or deposition of items into watery contexts: a carinated bowl at Fitz Park, Cockermouth; two wooden tridents at Stainton West, and a stone axe at Mossgarth.

Excavation of a palaeochannel at Fitz Park, Cockermouth, Cumbria, produced 53 fragments from a single Early Neolithic carinated bowl, together with pieces of charcoal (mainly oak) and a single grain of emmer wheat dated by radiocarbon assay to 3707–3638 Cal BC (Williams & Holgate 2015). The excavators noted that the pottery did not display any evidence of rolling or abrasion, but had crisp edges, some of which could be refitted. They suggested that this might indicate that it had been deposited directly into standing water and this is supported by the sediment analysis of the basal fills of the palaeochannel. This fine-grained, lacustrinal mud was probably deposited in open water after the channel had partially silted up and restricted water flow.

At Stainton West (Brown et al in prep) the fills of the palaeochannels have produced a great deal of preserved wood including two large ‘tridents’, each being around six feet in length, made from solid oak. Only four comparable examples have previously been found, all of which were discovered in the nineteenth century: two from Ehenside Tarn in western Cumbria, and two from a peat bog in County Armagh. Dating to between 3900 and 3400 years BC they are clearly Neolithic in age, but there remains considerable uncertainty as to their function or significance. FIGURE?

At Mossgarth, Portinscale (C), palaeoenvironmental analysis of deposits associated with the previous discovery of a series of Neolithic axes suggests that they may have been deliberately deposited in a waterside location (LDNPA S5341). The evidence indicates shallow open water on the edge of a wooded island surrounded by wetland habitats. The beetle remains provide a detailed picture of the local woodland environment. A number of dead-wood species are documented including a post-Elm decline example of Scolytus scolytus, the elm bark beetle. Such evidence is rare for north west England.

The study illustrates how environmental archaeology can contribute not only a description of the environmental setting for human activities, but can also directly add information relevant to the interpretation of putative prehistoric ritual behaviour.

Excavations at Poulton (Ch) are best known for the structural Iron Age evidence, but the artefacts span the Mesolithic to the medieval periods. The site, well ploughed, has yielded a series of earlier Prehistoric finds that have been disturbed from their original depositional contexts. Although the majority of these are Late Mesolithic, lithics have also been identified that are typologically characteristic of the Neolithic and Bronze Age. Amongst these are a bifacial polished stone axe and a fragment of a stone plaque, both dating to the Neolithic. The plaque, in particular, is an unusual type of find and its use is unknown, as are the original contexts of deposition for it and the axe (Cootes et al 2016).
At Broadgate Meadow Park (C), a series of clear cup and ring marks are present on an outcrop of rock next to the war memorial (LDNPA S1776). Similarly, at Allan Bank, Grasmere (C), a panel of rock art comprising cup-marks has been identified (LDNPA S5272, Oxford Archaeology North 2012).

The Portable Antiquities Scheme (PAS) database includes two portable examples of rock art (LANCUM 6660E5 & LANCUM 65AF78). These two stones of similar sizes with rounded edges (possibly river or glacial cobbles) have similar styles of cup marks. They were examined at Penrith (C) although their findspots are not recorded.

Bradley & Watson (in prep) are continuing their investigations at the rock art site at Copt Howe, Langdale (C) and have discovered further examples of symbols carved into the two large boulders. Bradley & Watson note that the style of the carvings is very reminiscent of those found in Ireland, particularly in the Boyne Valley.

Their findings emphasise the Irish Sea links of North West England and the importance of megalithic tombs during the Neolithic period. Nash (2013) also considered the Atlantic coast connections demonstrated in the art work of megalithic monuments in North West England, although he emphasised comparisons with examples in Wales.

In Merseyside, the physical condition of the Calderstones (M) megalithic tomb was deteriorating due to its previous relocated enclosure in a damp and humid structure. It has recently been removed and has received conservation work. The opportunity was taken to study the stones more closely and to record the rock art on their surfaces using photogrammetry (Nash and Stanford 2010). Additional archive research was undertaken by Faulkner (2010) and Roberts (2010), who looked at pictorial, photographic, cartographic and documentary references to the stones and their history.

In March 2019 the stones were reinstalled in a new location within Calderstones Park associated with the Mansion House project led by the Reader charity, with contributions from the Heritage Lottery Fund (HLF). It will be open to the public and the booklet describing the site has recently been reprinted (Cowell 2008).

The site provides a rare example of a megalithic tomb close to major modern settlements where people can visit easily. It is a helpful reminder that areas that have been densely developed with industry and settlement in the past few hundred years were, in early prehistory, very different and rural landscapes. Nash (2010) reviewed the grooved and cup-marked menhir of Robin Hood’s Stone, Allerton (M) which was originally part of the Calderstones, but had been moved to a separate location nearby in 1928.

Only two or three kilometres SW of the Calderstones, investigations at the former Dale Hall (M) noted a mound with exposed un-worked sandstone slabs. It is tentatively identified as a previously unknown tumulus or passage grave (Adams et al forthcoming).
The Neolithic stone circle of Long Meg And Her Daughters, Penrith (C), has been studied with regard to long term options for the site’s management, both to protect the site from damage or erosion (a farm access road runs through the circle) and to improve visitor facilities. Historic England commissioned an options appraisal, and various community and commercial organisations have worked to enhance our understanding of the monument.

A new geophysical resistivity survey, high resolution digital topographical survey and Digital Terrain Model (DTM) based on Environment Agency lidar data complement earlier topographical and infra-red aerial photography surveys. Small-scale, targeted excavation trenches by Altogether Archaeology established the substantial nature of the enclosure ditch that abuts and clearly predates the better known stone circle (Oracle Heritage Services 2017).

It is clear that the Long Meg monument and its wider landscape setting deserve far more investigation, in order to understand its detailed nature and its relationships with nearby monuments (which include a possible cursus).

A hengiform feature adjacent to the Carlisle Northern Development Route (CNDR) (C) received a brief investigation following hedge removal. The dating evidence for the ditch was inconclusive: the basal fill contained a sample of short-lived charcoal that has been radiocarbon dated to the Early Mesolithic (Brown et al in prep). The site is one of two circular features that may be Neolithic ceremonial sites.

A mapping project, based on aerial photography and lidar data, of areas targeted for mineral extraction in Cumbria identified a possible Neolithic pit avenue at Catty Crook Lane, Roosecote (C), on the Furness peninsula (Deegan 2013, Quatermaine 2015). This is an area where Neolithic and other early prehistoric sites have been found in advance of development.

Topographical survey and field walking located a ritual landscape on Askam Fell (C), where an alignment of sepulchral monuments and a stone avenue extends across a natural col between two valleys (Quartermaine & Leech 2012).

On the West Cumbrian Plain, a mapping project found a cluster of unusual enclosures revealed as crop marks in aerial photographs. Each of these large curvilinear enclosures, up to 65 metres in diameter, has a distinctive internal circuit of evenly, but widely, spaced pits. Three are closely grouped south of Bootle (C) and a fourth is nearby at Gutterby (C). A fifth has been discovered just outside the mapping project boundary at Millom (C). It is not known whether the pits held timber posts or if they were dug to receive items or burials, but they appear to be an unusual regional type (Deegan 2016).

In Lancashire, concern regarding the vegetation growth in and around the Bleasdale timber circle (L) led to some non-intrusive conservation work and a review of the results of W.J. Varley’s 1930s excavation. The site is unusual in that it is a henge with a timber circle and a
central burial mound containing cremations in Collared Urns, but also has an outer palisade enclosing everything else. The relative and absolute dating of the outer palisade, the inner henge and timber circle, and the central mound are still unknown (Varley 2010).

An enclosure possibly dating to the Neolithic period has been identified at Birkett Knott, Mallerstang (C), where a potential interrupted bank encloses the peak of the high ground. It utilises the natural limestone in parts of the circuit and the south-facing entrance appears to be defined by natural sinkholes. While undated, the site has the potential to be Neolithic in date as it is similar to known enclosures at Hallin Fell, Green Howe and Carrock Fell, representing a variant of causewayed enclosures more typical of southern Britain. It may be associated with a previously-unrecorded large circular cairn located approximately 500 metres to the south (Hamilton-Gibney 2011).

The University of Central Lancashire (UCLAN) has a research project investigating the use of natural landscape features in the limestone area of the Forest of Bowland [https://www.uclan.ac.uk/research/explore/projects/sheltering_memory.php](https://www.uclan.ac.uk/research/explore/projects/sheltering_memory.php).

This includes the re-investigation of the Fairy Holes Caves, Whitewell (L) and the material recovered by excavations by Musson in 1946. The re-excavation clarified the Early Bronze Age evidence and their depositional environments: cremated remains of two individuals (one adult, one juvenile) were probably originally placed in a single collared urn surrounded by a dry stone wall enclosure, possibly a cist. A sherd from an earlier period: either Late Neolithic Grooved Ware or, just possibly, Beaker, was also found in the main cave. Earlier activities in the area are further indicated by Mesolithic and Neolithic period lithics found up-slope from the cave entrances. Unburnt animal bones have been recovered from all three caves but have not yet been reported upon, and the sediments were sampled for pollen assessment (Peterson 2013b).

Private excavations in the un-designated Heaning Wood Bone Cave (C) on the Furness peninsula have recently extracted unburnt bones. Subsequent examination identified a mixture of human and animal bones, possibly of similar dates to those recovered by cavers in the 1950s, some of which are curated in the Barrow Dock Museum. The earlier excavations also recovered Collared Urn pottery, a knife made from Langdale volcanic stone and a bone pin (Chamberlain, nd).

Smith (2012) obtained four radiocarbon dates from the museum material, which indicated Early Neolithic dates for butchered pig and cattle bones and Early Bronze Age dates for the human remains. The entrance to the shaft or fissure appears to have been blocked after the deposition of the human remains.

The new material includes well-preserved bones of microfauna (bat and mouse-sized vertebrates) and remains of insects. These may provide useful data regarding landscape conditions around the site whilst it was open. Additional worked flakes of Langdale Tuff and
flint have also been excavated. UCLAN is currently undertaking scientific assessment and taphonomic analysis of the newly extracted material (Randolph-Quinney pers comm).

Throughout the north-west region, shallow rural sites seldom retain unburnt bone of any species, due to the typically acidic and shallow soils which are leached by high rates of rainfall. Exceptions can sometimes be found in limestone areas although, even on limestone, overlying soils can derive from more recent geological deposits, which need not be conducive to bone preservation.

In Levens Park (C) a large, multi-period, ring cairn was investigated between 1968 and 1973 in advance of a link road that was never constructed (Turnbull and Walsh 1996; see Hodgson & Brennand 2006). Levens Local History Group recently relocated the site archive and are currently working on more detailed post-exavication analysis. The Carboniferous limestone is overlain by well-drained alluvium and clay, and unburnt archaeological bones were recovered but are not very well preserved.

The central, crouched inhumation was the body of a woman of about 18 – 35 years of age and she was buried with at least two Beaker pots and two flint knives. Two satellite burials were of a mature adult female of over 46 years of age, and another adult, possibly also a female. A fourth (and latest) crouched inhumation was the body of a man of 36-45 years. His remains were better preserved, partly due to the fact that they had been protected by a massive boulder. All of the individuals were buried in a crouched position in an east-west alignment. All four showed pathological indications of various ailments or stresses, and the femurs of the mature woman and the man share a non-metric trait that may indicate some genetic affinity (Petersone-Gordina & Holst 2018).

Perhaps significantly, although the Cumbrian minerals mapping survey (Deegan 2013) recorded many new sites, most of the areas mapped did not identify new monuments of Neolithic or Bronze Age date. This is despite one of the areas being the Abbeytown Ridge (C) where excavations in advance of previous quarry sites demonstrated that the ridge was well used in the early prehistoric period (Jackson and Churchill 2017). Most of the minerals areas are of sands and gravels, which are often the best agricultural land locally and used for agriculture. It is possible that persistent ploughing has reduced the chances of discovering shallow sites through remote sensing from the air, compounding the difficulties of detecting them through geophysical surveys.

The truncated nature of many Early Prehistoric features can make interpretation difficult or controversial when features are discovered. At New Cowper Farm on the Abbeytown Ridge (C), Structure 4 had been damaged by ploughing but consisted of a four-post structure associated with pits containing a large quantity of Beaker pottery, and surrounded by stakeholes. It was subsequently sealed by a deposit of charcoal and stones also containing Beaker pottery and produced a radiocarbon date of 2400-2140 cal BC. The structure and its associated deposits have been interpreted as evidence of secular occupation by Churchill et
al (2017, 64), but was previously interpreted as a sequence of funerary activity, represented by a timber structure constructed around a central grave (no unburnt bone survived at this site), subsequently sealed by a stone cairn (Railton 2007).

At Overby quarry (C), about one kilometre from New Cowper Farm on the same Abbeytown Ridge of sands and gravels, excavations recovered definite evidence of mortuary and funerary activities that probably just post-date the activities at New Cowper Farm. There are two main clusters of features. One has an outer ring of pits (approx. 11 metre diameter) that appears to respect a central feature or marker, but there were few or no traces of any stone ring cairn (Jackson 2017).

Again, it is difficult to assess whether this is due to truncation (the pits were very shallow) or to an original absence, but this, plus the total lack of evidence for a central barrow mound caused Jackson to suggest that the site was most probably a flat cemetery. An outlying group of pits with an arc of postholes lay 15 metres away from the main concentration and appears to have been associated with it, as a trace amount of cremated human bone was recovered from the fill of the posthole closest to the main group.

Eight burial vessels were identified: a Food Vessel, a group of Collared Urns and a miniature Collared Urn. Four (possibly five) contained cremation burials, and three were accessory vessels. The features containing the vessels appear to form the latest phase of activity at the site.

Lipid analyses on six sherds was inconclusive: either the Collared Urns had not been used previously for food storage or food preparation, or lipids had not survived. Although the Food Vessel had a visible encrustation, this only had small quantities of undiagnostic organic matter surviving and had not been affected by heat (Šoberl & Evershed 2017).

At least eight people were cremated, ranging in ages from infant to over 45 years, and including both male and female adults. Of these eight people, six were buried either simultaneously or sequentially with another person. McKinley (2017) discusses the pyre technology, the possibility of a cenotaph, and other aspects associated with mortuary behaviour, as well as the cremated human remains themselves (McKinley 2017).

Radiocarbon dates on three samples from human bone and one sample of charred residue encrusted on the Food Vessel all clustered in the Early Bronze Age, stretching from 2130–1700 cal BC, but with two main date ranges (at 2023-1700 cal BC and 2120-1880 cal BC), possibly indicating that the burials in the main concentration started in the centre and were added to at the peripheries (O’Meara & Gardiner 2017).

Wessex Archaeology investigated groups of funerary remains near Bucklow Hill (Ch) on the route of the A556 Knutsford upgrade that links the M6 and M56 motorways (Wessex 2016).
Geophysical survey along the route had not located any definitive anomalies likely to date to prehistoric periods, but one of the trial trenches produced an unburned deposit of cremated human bone near Bucklow Hill. This led to further investigation in the area. Large-scale strip map and record excavations successfully revealed the complexity and extent of the features.

The main cluster of features included a ring ditch, subsequent cremations and pyre deposits inserted inside and around the ring ditch, and a final phase consisting of several grave-size cut features aligned east-west. No unburnt bone survived, and phosphate analysis was inconclusive due to the proximity of the cremated remains. One, possibly two, of the cremations was associated with an urn. The site is located on the crest of a low ridge, with long distance views over the Cheshire Plain towards the Pennines. A second focus of cremation burials and pyre deposits was located 80 metres away. Preliminary radiocarbon dates indicate funerary activities at the site during the Early Bronze Age and Middle Bronze Age. There are also indications (radiocarbon dates, pottery sherds and lithics) for activities on the ridge top in several other periods, both predating and post-dating the interments in the burial monuments (Wessex, 2016; Daniel et al in prep).

Another site, where a feature well outside of an obvious ring feature produced definite funerary remains has been investigated near Poynton (GM), on the route of the A6 Manchester Airport Relief Road. A ploughed out ring gully did not produce any finds or human remains, but cremated human bone was recovered from a pit situated 17 metres away, radiocarbon dated to 1380-1130 cal BC ie the Middle to Late Bronze Age (Wessex Archaeology, in prep). Like the ring ditch at Bucklow Hill (Ch) (Daniel et al in prep), the ring gully had grave-like features dug around it but no unburnt bone survived.

At Forge Hills Kerb Cairn, Muncaster (C), geophysical survey has indicated the presence of a ring feature, probably a supporting kerb and ring of stones. The survey indicated no great level of activity within the immediate area but a large magnetic anomaly was detected to the south of the main cairn, possibly indicating funerary activity (LDNPA S1704, Brooks 2006).

Investigations at the barrow cemetery of the Seven Lows, Delamere (Ch) were undertaken as an extension to the HLF Landscape Partnership’s Cheshire Hillforts project. The report by Garner et al (forthcoming) contains a useful map regression of early antiquarian sources, informed by a new lidar survey and a geophysical survey. This provides a concordance list for the various numbers assigned to the individual monuments over the centuries. The geophysical survey additionally identified part of a previously undescribed monument.

The excavation focused on barrow CH 59g, on an escarpment overlooking the Sandyford Brook (possibly explaining its attractiveness to people in the Late Mesolithic period). This is one of the three barrows that were descheduled in 1994 when it was thought that persistent agricultural ploughing had destroyed some of the burial monuments. In fact, below ground features still retained interments of cremated human remains, albeit several
of them disturbed by previous investigations. A central large pit contained a charred thorn that returned a radiocarbon date of cal AD 1490-1650, possibly reflecting a period of early antiquarian investigations. The site had been noted by John Leland during his travels between 1539 and 1543.

Remains of four adults and one adolescent were contained in four Collared Urns, and further human remains and pyre debris were recovered from other features. Seven radiocarbon dates on cremated bones from the four urns and material from three of the pits all fall within the date range of 1950 – 1510 cal BC ie the Early Bronze Age. Besides the Collared Urns, two sherds of Grooved Ware were recovered from topsoil, and may be contemporaneous with a large blade of Early Neolithic style, manufactured from high quality flint which may have come from Yorkshire or Lincolnshire.

The site was clearly a feature in the landscape, being visited in the Late Mesolithic, the Early Neolithic, and for a few centuries during the Early Bronze Age. The form of barrow CH59g is unusual and may have been a saucer or bowl barrow. The natural knoll had been skilfully landscaped: a shallow ditch had been scraped out, following the contour and leaving the intact adjacent subsoil looking like an enclosing bank (Garner et al forthcoming).

In 1982-3, Robina McNeil excavated two barrows at Church Lawton (Ch), near to the eastern edge of the Cheshire and Staffordshire Plain. A third barrow in the cemetery had been destroyed in the 1950s. This important group has now been published by Reid (2014).

One of the surviving barrows was defined by two arcs of nine glacial boulders. The gaps between the ends of the arcs appear to be original and to lead towards the other monument. The remains constitute a rare example of the use of stone to enhance a Bronze Age barrow in the lowlands of central western England.

Beneath the mound demarcated by the boulders were the burnt remains of a small, roughly rectangular turf stack associated with fragments of clay daub and pieces of timber. No direct evidence of burial was found within the monument. A radiocarbon date suggests that the structural sequence began sometime in the late 3rd–early 2nd millennium cal BC.

Pollen analysis by Innes (in Reid et al 2014) of the turf structure and the old ground surface beneath both barrows also provided a picture of relatively undisturbed mixed deciduous woodland composed of alder, oak and lime, with a considerable understorey of hazel. A few herbaceous plants may suggest that the structure was in a woodland glade.

The second barrow was principally a two-phased construction and contained urned and unurned cremation burials. A polished stone battle-axe was placed next to one of the burials. Radiocarbon dates obtained from the cremations and associated deposits indicate that individuals were being interred from the late 3rd or early 2nd millennium cal BC, with the practice continuing until the middle of the 2nd millennium.
Cremated human remains were recovered from several features, including two burial pits containing urned cremations, and three fire pits. Cremation slag was also recovered, possibly due to the high temperature and long duration of the fires (the bones were well calcined) in conjunction with the sandy soil. The cremations were re-examined as part of Walsh’s PhD and derive from a minimum of 23 people, with a maximum of 26 people. Most people were buried individually. All age groups were identified, from infant to older (40+ years) adult (Walsh 2013).

Near Stockport (GM), the long running community excavations by Mellor Archaeological Trust (MAT) at Mellor vicarage have produced a small assemblage suggesting Late Neolithic and Early Bronze Age activity. Most notable was the recovery of a polished flint chisel, believed to be Late Neolithic in date. Such chisels are rare: in northern England only a handful have been found outside of East Yorkshire, where such tools are present in some numbers. The closest parallel to the Mellor example comes from a quarry site in the Derbyshire limestone, currently on display at Buxton Museum and Art Gallery. The Mellor excavations also produced a complete example of an Early Bronze Age flint dagger. It has been suggested by Myers and Noble (2009) that the dagger may have originally been deposited accompanying a burial which was subsequently disturbed by the extensive later prehistoric, Roman and medieval activities on the site.

Mellor Archaeological Trust has undertaken a number of season’s investigations at Shaw Cairn near Mellor (GM), which is located on a flat hill top site with uninterrupted views from the edge of the Pennines. This Early Bronze Age burial site has produced a series of both inhumation and cremation burials. Excavations from 2007-9 were supported by the University of Manchester Archaeological Unit as part of the Mellor Heritage Project (Noble, 2010, Noble et al., forthcoming) NOT IN BIBLIOG- AnDY? NORMAN do you know what this is?

Fragments of at least 10 Food Vessels were found. Radiocarbon dates of cremation burials all fall within the Early Bronze Age, confirming the evidence of the Food Vessels and the lithics. The flint assemblage appears to be overwhelmingly the product of careful tertiary thinning, suggesting that knives of one form or another were being maintained or finished on the site. Two plano-convex knives were recovered, including one exceptionally fine example that ended up being cremated and incorporated with cremated bone in a pot.

Most remarkable was the recovery of half of an amber spacer necklace, deposited with a crouched inhumation in a cist burial. Spatially the discovery of this necklace is truly remarkable. The necklace represents the production of a piece of jewellery in the ‘northern’ style, whose distribution of discovered examples, as the name suggests, has been confined to northern Britain. Furthermore, hitherto all necklaces of this style have been manufactured from jet. By way of contrast, spacer necklaces made in amber have previously shown a strong spatial association with the Wessex region. The discovery of an amber necklace made in the northern style in Greater Manchester represents a significant
departure from the established distributional, stylistic and raw material patterns for such jewellery (Noble, 2010, Noble et al., forthcoming) NOT IN BIBLIOG- AnDY? NORMAN do you know what this is?

Although the remote sensing survey of Cumbria’s aggregates-rich agricultural areas was not very successful in identifying new ceremonial or burial sites through crop mark data, field survey of upland areas has been much more successful in locating earthwork sites.

In the uplands of Cumbria, field survey has identified a series of potential burial and ceremonial sites. A group of five ring cairns have been identified in Duddon Valley (C) (LDNPA S1840) and two further ring cairns at St Johns’, Castlerigg (C) and Wythburn (C) (LDNPA S1841). On Thwaites Fell, survey has identified possible ring and burial cairns whilst on Woodland Fell, Kirby Ireleth (C), possible prehistoric burial cairns and cairnfields have been recognised (LDNPA S5269, LDNPA 2013). On Gawthwaite Moor and Subberthwaite Bank, Blawith and Subberthwaite, volunteer fieldwork has identified hut circles and ring cairns (LDNPA S5326, LDNPA 2009).

In the Morecambe Bay area, metal detectorists found and reported a copper alloy tanged chisel and knife blade in 2016. Initial investigations by the University of Central Lancashire (UCLAN) and the Portable Antiquities Scheme (PAS) confirmed that the site is a burial mound. DigVentures undertook an excavation at the site which overlooks Morecambe Bay (L), using crowd-funding and the Heritage Lottery Fund (HLF). They have created a small virtual museum online https://digventures.com/barrowed-time/virtual-museum/ but the excavation report is not yet available. The barrow contained a complete Early Bronze Age urn of Food Vessel type, up-side-down and sealed with a clay bung. This contained an unusually large quantity (almost three kilos) of well-preserved cremated human remains from a single individual: a young adult with few pathological indicators. The bones have been radiocarbon dated to about 1600 BC ie the cusp of the Early and Middle Bronze Ages. The metalwork may include Middle and Late Bronze Age items.

Mention Halstead & Johnson welsh marches barrows

**Burnt Mounds**

During the past decade, burnt mounds have been discovered and investigated in many parts of the UK, including several in North West England, although they were previously thought to be mainly an Irish phenomenon. Their functions and significance are still unclear, but they appear to date predominantly to the Bronze Age, although a few have been dated to earlier or later (up to the Early Medieval) periods. Their common characteristics are a location close to a freshwater source (either still or flowing) and a concentration of heated or burnt stones. Several have a tank, presumably where water was heated, but this is not always located or preserved in excavated sites.
At Sizergh Castle (C), a burnt mound was partially excavated in conjunction with palaeoenvironmental assessment of the peats infilling the adjacent kettle hole. There were insufficient radiocarbon dates to date the peat exactly contemporaneous with the use of the burnt mound, but extrapolation indicates that the surrounding vegetation still contained abundant mixed woodland with open areas and some wet areas. Whether or not the hollow of the kettle hole itself still retained open fresh water, adjacent springs still persist today and are highly likely to have been available to the people constructing and using the burnt mound (Druce and Rutherford 2014).

The mound was built immediately on top of peat radiocarbon dated to 2580-2460 cal BC, and another radiocarbon sample from the infilling of the wooden trough of 2460-2140 cal BC confirms a Late Neolithic/Early Bronze Age date for the earliest uses of the mound.

This wooden trough was infilled and covered over with more burnt stones, which implies that use continued or resumed around another (unlocated) trough. The burnt and fractured stones are probably glacial erratics of Silurian slates and shales that had been collected from the local area. Their thermal properties may have been preferred to that of the underlying limestone bedrock as much as their ease of access.

A radiocarbon sample from the upper levels of the later mound gave a date of 2200-1980 cal BC, in the Early Bronze Age. The early dates are very similar to those at some other Cumbrian burnt mounds such as those at Drigg (C), and the earliest phase at Garlands Hospital, Carlisle (C) (Druce and Rutherford 2014).

At Drigg (C), peat, charcoal, timbers and burnt stones were noticed eroding out of the low coastal cliffs and some investigations were undertaken in 2000. Coastal erosion here is fast at times of spring tides and storm surges: between November 1999 and January 2000, one and a half metres of coastline was eroded; a series of timbers exposed in the cliff in July 1999 had gone by June 2000; and, despite great care being taken to reinstate and protect the two 2000 excavation trenches, these, too, were lost within six to twelve months (Quartermaine and Cook 2010).

The main features of the site are a steep-sided palaeochannel flanked by layers of charcoal and burnt stone (notably burnt granite, not the red sandstone bedrock underlying the boulder clay and sand dunes), and a series of timbers and brushwood.

Most of the wood does not appear to have been worked, although the surfaces are not very well preserved. Some or all of them may be material brought and deposited by flowing water, or they may be the remains of trees and shrubs growing then dying on site as the water-table rose. But the stratigraphic position of the wood, lying alongside the palaeochannel and associated with the charcoal, burnt peat and burnt cobbles, also hints that they may have been laid deliberately as a platform. Two slender timbers and one substantial timber did appear, at the time of investigation, to bear worn tool facets indicating light working, mainly the removal of side branches but also in the case of the
substantial timber, possibly bark removal as well. A dendrochronological sample from the substantial timber was not successful in finding a match to date it.

Pollen was abundant and well preserved in the peat and indicates a well-wooded landscape with trees (including alder, which grows well in damp places) and shrubs but also some herbaceous species. Plant macrofossils include seeds of blackberries, grasses and various ruderal weed species, possibly indicating that the site itself lay in a clearing.

Bayesian modelling was undertaken of the radiocarbon dates and indicates that activities associated with the burnt mounds occurred during the Late Neolithic to Early Bronze Age periods between 2460-2230 cal BC and 2480-2280 cal BC. The site must have gone out of use later in the Early Bronze Age, by which time it was sealed by further peat formation ie by 2310-2130 cal BC (Quartermaine and Cook 2010).

At Stainton West (C) there was a sequence of several burnt mounds constructed alongside the palaeochannels of the River Eden that had previously been a focus for Mesolithic and Neolithic activities. Dates from these burnt mounds show a long period of continual or intermittent use spanning almost one and a half millennia reaching from the Late Neolithic to the Middle Bronze Age, c 2890 – 1430 cal BC (Brown et al in prep).

Survey work along the route of the Nether Wasdale (C) pipeline, running through the centre of the Lake District National Park, located seven burnt mounds (Blythe et al 2009).

Follow-up excavation work by Oxford Archaeology North targeted one of these sites. It produced burnt materials, probably relating to one or more burnt mounds, forming a primary phase that has been dated to the Bronze Age. Several postholes located close to the primary burnt mound, however, returned Iron Age dates. It is thought this may indicate the continued use of this feature. The dated Bronze Age features are closely comparable to similar examples elsewhere in Cumbria, but the identification of an Iron Age component represents a rare example of such activity. Remarkably, along with several pits and a posthole, the mounds have also produced early medieval dates (Oxford Archaeology North, in prep).

A probable burnt mound has been located at Dancing Gate (C) in the low valley between Bassenthwaite Lake and Derwent Water in the Lake District National Park during a walkover survey in advance of the West Cumbria pipeline construction (Schofield and Leighton 2014).

On Blawith Fells (C) a possible prehistoric burnt mound and clearance cairns were identified during a National Park survey undertaken by volunteers (LDNPA S5326).

**ANDY, ELEANOR, RACHEL** - I HAVE NO IDEA WHERE THIS PARAGRAPH ABOUT NETHER WASDALE ORIGINATED AND HAVE NO REFERENCE FOR IT. SHALL WE SIMPLY PUT OAN IN PREP? I CAN’T LOCATE ANYTHING ON ADS OR OAN WEBSITES
Although most of the known burnt mounds are situated in upland areas (such as much of Cumbria), where sources of stones or rocks are numerous, they do also occur in more lowland areas where pebbles or cobbles are available from superficial glacial deposits or waterside exposures. It is noticeable that people at some of the upland sites deliberately selected similar sources to those used in the lowlands.

In the coastal lowlands of Lancashire at The Harbour, Whyndyke Farm, Blackpool, a Neolithic arrowhead and a burnt mound have been reported (Wegiel 2014).

At South Arclid, near Sandbach (Ch), excavations and watching briefs were undertaken in 2014 by the Clwyd Powys Archaeological Trust in advance of a quarry extension. The local area contains several lowland mires that have developed in depressions and hollows in the surface of the underlying fluvio-glacial sands and gravels. An irregular spread of charcoal and stones overlay a large pit, containing silts and much charcoal. The pit was located at the edge of a former mire and may have been deep enough to reach the natural watertable. Its upper fill contained a single, undiagnostic sherd of probably prehistoric pottery, and charcoal in its primary fill yielded a Middle Bronze Age radiocarbon date of 1530–1420 cal BC (Jones et al 2017).

The charcoal was from stems or branches of a wide range of woodland and hedgerow tree species; predominantly alder and hazel with lesser amount of oak, but also including evergreen shrubs and climbers (holly and ivy) and coniferous trees (pine and yew). Many of the pieces indicated dead wood, often affected by insects. Charred remains of a soil fungus that is associated with the roots of trees (*Cenococcum geophilum*) was found in the basal pit fill. Together with the wide range of species and the plethora of dead wood, this suggests that the area may have been surrounded by well-established woodland that contained mature and over-mature or fallen trees. It is also possible that fuel was collected and then stored for some time (Jones et al 2017).

Trade and industry

*Polished stone axes*

A number of Neolithic axe working sites were recorded by targeted field survey in the Lake District National Park (C) (Schofield 2009). The programme of work was intended to inform and guide upland footpath conservation work and, specifically, to ensure that the winning of stone for nearby path repair would not affect any archaeological resource. Some of the sites were new identifications. Previously known sites received detailed examinations of their condition.

Groups of Neolithic stone axe factories were recorded on Scafell Pike, Great End, and Fairfield Summit. Most of the sites represent primary working of naturally detached rock but,
significantly, some of the sites are physically removed from the source outcrop, and the source rock was probably carried to the site. As such, they would appear to reflect camp sites, and the presence of one of them on an easterly orientated access route, would suggest that this was a route used in antiquity (Schofield 2009).

Clare’s (2009) study of the stone axe trade recommended systematic petrological analyses of other lithics in addition to the axes themselves, and he noted that the trade in stone axes and their sources of procurement probably developed out of preceding Mesolithic practices. Although trade patterns probably changed during the Neolithic, it does appear that Group VI axes were being exchanged over long distances by the end of the earliest Neolithic. Clare suggests that the stone axes may have been traded in exchange for perishable commodities, possibly domestic livestock.

The Portable Antiquities Scheme (PAS) [https://finds.org.uk/database] has recorded 60 Neolithic polished stone axes from North West England since the scheme started. These are chance finds, and should be considered in addition to those recovered in excavated assemblages. Although most of the PAS finds have come from Cumbria, there are also a few from Lancashire, Merseyside and Cheshire.

Cowell’s distribution map of pollen sites, excavations and finds spots for Mesolithic and Neolithic archaeology in the Mersey Basin (mainly M) and adjacent areas (L, GM and Ch) shows that Neolithic stone axes are widespread throughout the area. His map includes excavated items as well as chance or single finds (Cowell 2010, Fig 16).

The quantity of new information indicates that synthetic work, accompanied by petrographic analyses of artefacts and potential sources, would provide a useful overview and potentially new insights into the methods and routes of extraction, production, reuse, recycling, and deposition of polished stone axes and the sources of their materials.

Other lithics

Cherry (2009) reviewed finds of prehistoric worked flint and tuff in Cumbria, and identified the strong possibility that two, largely exclusive, exchange networks operated in Cumbria between the Late Mesolithic and the Early Bronze Age.

He also notes that during the period in which large numbers of stone axes of Lake District origin were being accumulated in eastern Yorkshire, substantial quantities of flint of presumed Yorkshire origin found their way into Cumbria.

Cherry (2009) makes useful suggestions for topics deserving further investigation: (1) St Bees VIII has an unusual industry based on chalk flint that might derive from Antrim, not Yorkshire (and he notes that the site is adjacent to some waterlogged deposits that might repay palaeoenvironmental investigations), (2) The area around Ambleside Roman fort
offers the first prospect of finding significant prehistoric lakeside activity in central Cumbria, potentially contemporaneous with the Langdale axe factory sites, and (3) Aughertree Fell shows potential for Neolithic upland activity comparable with that from eastern Cumbria, and which can place the identification of a possible causewayed enclosure into better context.

The small assemblage (N=51) of worked lithics from the very Early Neolithic site of Holbeck Park Avenue (C) mainly consists of pieces of raw material that could all have come from local beaches and glacial drift (ie pebble flint, chert and tuff) although the ultimate sources are further afield. But there are also two non-local pieces from a Yorkshire chalk or till origin (Cherry 2009).

Ceramics

At Holbeck Park Avenue (C), fabric analysis of the Early Neolithic carinated bowls identified two different fabrics, both of which could have been made using locally available sources of clay (Sheridan et al 2018).

Sheridan et al’s (2018) study of the 15 pots from Holbeck Park, plus ceramics from several other sites within and beyond the region, has highlighted the frequent presence of very early forms of Carinated Bowls (‘traditional CB’) in the Furness peninsula. These ceramics are indicators of mainstream styles and technology that were a widespread new tradition introduced by Continental potters in the very early stages of the British Neolithic. They also note that it would be useful to revisit several other assemblages from Cumbria, which might also contain very early Early Neolithic pottery.

Nationally, there has been some work on potential maritime routeways around the western coasts of the British Isles, around the Irish Sea, and along the Atlantic seaboard. Some have looked at changes in relative sea levels (eg Sturt et al 2013), which affected access routes inland along estuaries and tidal creeks such as those on the Furness peninsula, around Morecambe Bay, Walney Island and the Solway. Others have looked more at seasonal changes in tidal and wind patterns that would affect or facilitate boat travel (eg Garrow and Sturt 2011) and some have looked at cultural parallels suggesting contact between people on these potential routes (eg Cummings 2017).

In total, a minimum of 10 Early Neolithic vessels has been identified by Young (2017) from New Cowper Quarry (C). They are all rather friable and it is not possible to ascertain whether the bowls are simple, plain round bottomed vessels or whether any of them were carinated. They are all, probably, of Grimston/Lyles Hill ware. One of the pots is associated with a hazelnut shell radiocarbon dated to 3650-3510 cal BC.
Evidence for activity continuing into the Middle to Late Neolithic comes from two vessels of Mortlake style impressed Peterborough ware and a rim sherd of possible Grooved ware.

Twelve definite Beaker vessels including five All Over Cord (AOC) decorated pots and two Long Necked Beaker type pots were recovered from New Cowper Quarry, making this a substantial and important assemblage for North West England. Young (2017, 80) notes that the Long Necked Beakers have regionally distinct and unparalleled decorative repertoires, and that all of the material came from domestic settlement activities rather than funerary monuments.

Levens Local History Group commissioned petrographic analysis of some Beaker sherds to try to assess the minimum number of Beaker vessels represented with the central inhumation burial at Levens Park (C). The excavator in the early 1970s (David Sturdy) thought that there were three, but Turnbull and Walsh (1996) thought there were only two, of Developed/Late Northern Beaker type. Although all four analysed sherds have fabrics that share some characteristics and two of them are very probably from a single vessel, there are three different fabric types. Either one of the pots was constructed from two different types of paste, or three Beakers are represented (Quinn 2018).

At Overby Quarry (C), ceramic studies of Early Bronze Age cremation urns identified a combination of manufacturing and decorative traits that suggest that one person made some of the pots, with the whole assemblage possibly being the work of two, perhaps three, potters (Vyner 2017).

Similarly, at the Early Bronze Age barrow cemetery at Church Lawton (Ch), distinctive characteristics of the decoration on a Collared Urn and a Cordoned Urn that were found in the same area of Monument B may have been made by closely related potters (Reid et al 2014).

**Metallurgy**

Major new work on Bronze Age trade and production concerns the prospection, extraction and use of copper ores, both within and close to North West England.

At Alderley Edge (Ch), where there is evidence for multi-period exploitation phases of metal ores (see Prag 2016), the National Trust recently commissioned a landscape and condition survey to inform their management plan (Oxford Archaeology North, 2018). The geology is complex, and ores include copper, lead, silver, arsenic and iron. The site is vulnerable to erosion by the impacts of weather and visitors, and in 2007 an archaeological evaluation was undertaken to determine the nature, extent and condition of surviving archaeological deposits (Mottershead and Wright 2008).
This work comprised topographic, geophysical and XRF surveys, and hand dug test pits followed by environmental analysis and AMS dating. The evaluation revealed that archaeological deposits survive across the whole of the Stormy Point site including a Bronze Age prospection pit, a second prehistoric possible prospection pit, and at least one previously unknown prehistoric mine working with a collapsed ceiling. Evidence was found of intermittent periodic ore processing and dumping with a date range from the Early Bronze Age (1690-1510 cal BC for the prospection pit) to the Medieval period (Mottershead and Wright 2008).

Just outside of the administratively-defined North West region, Timberlake has recorded similar Bronze Age activity at Ecton Hill, Staffordshire (Timberlake 2014), and James (animal bones, 2011) and Williams (metal ores, 2018) have completed PhD theses on material from the Bronze Age copper mines on the Great Orme near Llandudno, Conwy.

Timberlake (2014, 2017), O’Brien (2013) and Roberts (2013) all review the evidence for Bronze Age copper exploitation in the British Isles, and draw attention to its focus in Ireland, North and central Wales, and North West England (eg Alderley Edge, Ecton Hill).

Williams (2018) analysed the chemical composition of the Great Orme copper ores and found that, contrary to previous claims, the ores do contain significant impurities of nickel-arsenic. Comparisons with all existing data on Bronze Age metalwork assemblages, suggested that there was a peak of large-scale production in the Acton Park assemblage phase (1600/1500-1400 BC). This was followed by many centuries of very low production. Artefacts of types made from Great Orme ores were distributed across Britain including all parts of North West England, mainland Europe and into Brittany and the Baltic area (possibly linked to the amber trade).

The Portable Antiquities Scheme database (accessed 18th March 2019) is not always able to discriminate between Bronze Age sub-periods (NB there are eight Late Bronze Age swords listed from the region, two from Lancashire and six from Cheshire). The 74 specifically Early Bronze Age records are dominated by 57 axe heads (mostly flat) plus seven daggers and occasional other finds including a spearhead and a chisel. The 91 Middle Bronze Age finds include 32 palstaves, 22 axe heads (almost all flanged), 18 spears, and less than five examples each of swords, daggers, rapiers, dirks and other items.

The combined new information from mining sites, excavations and PAS finds suggests considerable scope for further research including metallurgical analysis, and synthesis of Bronze Age copper-based metallurgy.

END OF REWRITTEN CHAPTER—STILL NEEDS A REWRITTEN SINGLE CONCLUSION THE FOLLOWING ARE A MIX OF OLD AND NEW REQUIRING EDITING 21st May 2019
The past 10 years has seen a great deal of fieldwork undertaken by commercial units, volunteer groups and through the support of English Heritage (now Historic England), much of the latter relating to improving the information base for site management. There are a number of clear issues that this work has raised. There would appear to be a relative dearth of evidence relating to the Early Neolithic. Is this a product of a very sparse archaeological record or does this reflect inherent difficulties in the recognition of such remains? In spite of the extensive upland surveys and lowland commercial activity of the past 10 years it would appear the archaeology of this critical and interesting period has largely eluded detection. Certainly, it is hard to see how fieldwork in the region is offering the prospect of addressing the key research questions surrounding the end of the Late Mesolithic and the appearance of Neolithic farming communities. In upland environments, the focus in the historic period upon pastoral use has ensured good rates of survival for evidence of Late Neolithic/ Bronze Age field systems. Even the most valuable palaeoenvironmental surveys that have been undertaken provide only a limited view on the possible impact of early forest clearance. It must be emphasised that, in the absence of absolute dates or artefactual associations, most of the features identified during upland field survey could be tentatively assigned dates falling almost anywhere within the Late Neolithic or Bronze Age. It is worth remembering that the long running community excavations at Gardom’s Edge (Barnatt et al., 2017), Derbyshire, run jointly by the Peak District National Park and Sheffield University, were originally designed to investigate the extensive surface evidence associated closely with a large, multi-entrance enclosure originally believed to be of possible Early Neolithic date. In the end this highly visible and well preserved monument turned out to be of Bronze Age date. This project in neighbouring Derbyshire illustrates how critical detailed excavation is in taking the mass of observations and chrono-typological assignments of upstanding features recognised through field survey and developing a well founded understanding of landscape settlement.

That said, over the past decade the impact of fieldwork and post-excitation research has certainly been far greater for the Late Neolithic and the Early Bronze Age. Sites dating to these periods can prove to be highly visible at the surface and relatively easily recognised from aerial photography and surface field survey. It is striking that throughout the upland regions of the North-West region, but especially in the north of the region, significant numbers of previously unrecognised upstanding monuments, mainly in the form of embankments, enclosures, cairns, ring cairns and hut circles, have been recorded. It testifies to the value of having experienced archaeologists surveying some of the more remote upland areas, or reviewing aerial photographic coverage. It demonstrates how absence of evidence is not evidence of absence in these infrequently visited parts of the region. At the same time, the lack of intrusive investigation of many of these has left the majority only
tentatively assigned to the Bronze Age through general typological comparison with dated examples combined with current prevailing thought about the chronology of the establishment of field systems.

Investigating and understanding the Mesolithic – Neolithic transition is a key research agenda priority that is repeatedly expressed in research frameworks at regional (Myers 2006, 2007; Spikens 2010) and national levels (Prehistoric Society 1999; Blinkhorn and Milner 2014).

For some considerable time archaeologists have been offering contrasting views on the character of Late Mesolithic mobility and settlement. Recent discoveries of quite substantial house structures with evidence for multiple phases of rebuilding have contributed to this discussion. At the same time discussions of the character of Early Neolithic settlement have intriguingly been moving away from sedentary models to those framed in terms of degrees of mobility. The erosion of the traditional characterisation of the Mesolithic as ‘mobile’ and of the Neolithic as ‘sedentary’ has provided a much needed impetus to the exploration of the nature of the Late Mesolithic to Early Neolithic transition. Recent years have seen the publication of a number of significant positional statements that directly address the character and meaning of the Late Mesolithic to Early Neolithic transition. They express fundamentally opposing views. For example, Sheridan (2010) sees the initial Early Neolithic of Britain as being the product of the immigration and settlement of Britain by groups from the continent. Within this perspective, native Mesolithic populations were confronted with an influx of Neolithic settlers from the continent whose way of living was fundamentally unknown to the Mesolithic population. It implies that the postglacial rise in sea levels and the eventual inundation of the dry landbridge insularised Britain not only physically but also socially and economically. It suggests that cross channel contacts were not maintained as Britain became an island. On the other hand, Thomas (2004, 2013) has argued for a British Late Mesolithic population that was in regular contact with the western seaboard of the continental mainland. As such, they were aware of and, to some degree, exposed to the economic, social and cultural dimensions of Neolithic life in the late fifth and early fourth millennium BC. In his account the appearance of the Early Neolithic in Britain reflects the adoption and adaptation by Late Mesolithic groups of a way of life about which they already had some passive, if not active knowledge. Both interpretative positions struggle with an intractable archaeological record for which key radiocarbon evidence is very limited. Yet both accounts convey implications that unavoidably impinge upon archaeological research and debate in north-west England.
Mesolithic research in Britain has also been slow to contribute towards any meaningful understanding of how Mesolithic groups may have varied in terms of community size, settlement persistence and territorial extent. Indeed, Mesolithic research has been slow in achieving any kind of refinement to the basic typological framework erected initially by Clark (1932) and subsequently discussed with radiocarbon underpinnings by Mellars (1974), Jacobi (1976, 1978) and Reynier (2005). However, recent years have seen a whole series of excavations providing phased structural and dating evidence. The provision of a more detailed understanding of site chronology on differing sites and at different points in the development of the period in Britain has the potential to be of great significance. It will contribute towards enabling the development of more detailed models of settlement and mobility patterns. The last ten years have seen a number of highly significant site excavations where structural evidence in the form of post-holes and pits, most notably associated with residential structures, have been found. The application of Bayesian statistical and interpretative analyses to multiple stratified radiocarbon determinations is transforming our understanding of the duration and frequency of occupational events on individual sites (e.g. Bayliss et al., 2007). At the same time, a better understanding of microlithic typological development is emerging. Ultimately we may begin to recognise evidence for similarities and differences, both synchronically and diachronically, in microlith tool typology, raw material use, mobility and settlement patterns around Britain. This refinement is of significance not only for our understanding of the period, but it also offers the prospect of allowing Mesolithic archaeology to have a more active, participatory voice in debates regarding one of the great behavioural and societal shifts in our past, namely the shift from hunting and gathering adaptations to those incorporating the use of domesticated resources.

These new discoveries in NW England can contribute to national and international questions such as how people recolonization and moved around the country at a time of rapid changes in relative sea level, climate, and landscape and vegetation (cf Conneller et al 2016, Griffiths 2011).

In North West England the presence of pollen sequences apparently showing ‘cereal-like’ pollen within the Late Mesolithic gave rise to speculation concerning Mesolithic experimentation with domesticated cereal growing (Edwards and Hirons 1984: Williams 1989). Barrowclough (2008, 73) has explored this possibility for a Mesolithic community managing to integrate some cereal planting, tending and harvesting in short-term forest clearances whilst maintaining the traditional patterns of gathering and hunting. Such a model is attractive, and might go some way to accounting for the occurrence of these ‘cereal – like’ pollens in pollen sequences. It seems unlikely that Late Mesolithic populations in Britain were so insulated from developments on the continent that they were unaware of contemporary communities using domesticated resources. However, domesticated cereal
growth, plot management, harvesting and processing would potentially conflict with the traditional schedules of Late Mesolithic groups in Britain. At the very least, cleared plots of cereals would need to be protected from game, and require labour for tending, harvesting and processing. They would restrict the mobility of the group, undermining the productivity and reliability of hunting and gathering, and interrupting patterns of raw material acquisition. Without clear positive evidence, perhaps in the form of charred cereals, harvesting gloss on flint knives, or grinders/pounders for processing the grain, or at least evidence for a change in mobility patterns of hunter-gatherers in the sixth millennium BC this remains an interesting, potentially significant idea requiring substantiation (but see below).

Legacy

The last ten years have seen significant increases in our knowledge about changes in climate and relative sea levels in the early Holocene, and of Mesolithic activities in a range of different parts of the region. The environmental evidence highlights the need to investigate each site in its own right, as local factors including human influences are highly influential. Changes in vegetation and land use at any particular site do not necessarily follow general trends and broad patterns. Awareness of the importance of the region for Mesolithic archaeology is good within the region, partly due to events such as the CBA NW Mesolithic day (Myers & Preston forthcoming). Clear topics deserving further investigations are the sources of raw materials and how they were obtained and moved around the country. This factor is intricately linked to how people responded to and influenced the landscapes around them, and needs to be involved with any models of population movements and social groups. Awareness is good, too, for the Bronze Age funerary and mortuary sites, which have continued to receive a lot of attention. Many sites appear to have received multiple visits (whether regularly or intermittently) and good dating sequences are crucial for an understanding of the times that sites were first used, how long they were used for, and hiatuses.....

Familiarity with, and enthusiasm for, the Mesolithic and Bronze Age sites and material should encourage several synthetic studies as well as more specific, targeted research and analyses.

In contrast, the new information about the Neolithic period has been a stealthy surprise. Finds assemblages and site interventions have all tended to be small and rather isolated, and it would be very useful to have a more thorough review of the region’s Neolithic archaeology to identify potential future lines of research of this elusive period.