West Yorkshire Archaeology Advisory Service

Revised Report on the Enhancement of the West Yorkshire Historic Environment Record for the Palaeolithic and Mesolithic Periods

March 2016

HISTORIC ENGLAND PROJECT 6619 MAIN

EH National Heritage Protection Plan reference NHPP 4G1: Pleistocene and Early Holocene Archaeology - 6396: Palaeolithic and Mesolithic HER Enhancement (4G1.401)

Concise summary

The aim of this project was to systematically enhance the West Yorkshire Historic Environment Record or WYHER (maintained by WYAAS) for the Palaeolithic and Mesolithic periods. This was carried out by the examination of select museum holdings (mainly the primary documentation of key antiquarian collectors but also by examining a selection of lithics in the museums). It also involved the analysis of select journal articles and university work, including undergraduate dissertations and a PhD thesis and information gathered from other published and unpublished sources. Information from the Portable Antiquities Scheme was also obtained and analysed. Palaeo-environmental information was also added to the HER, and this along with the new HER records informs a suggested mitigation strategy for dealing with remains of the Palaeolithic and Mesolithic in the planning process.

All of the Local Authority Museum Services in West Yorkshire (Bradford, Calderdale, Kirklees, Leeds and Wakefield) were visited as part of the project as were the neighbouring museums at Manchester and Rochdale.

In total the project has involved the creation of 598 new HER records, of which 283 were from the Portable Antiquities Scheme. 223 previously existing HER records were also amended. Of the 598 new records, 596 new Mesolithic records (including 10 new palaeo-environmental records) were created. Two new Palaeolithic ones were also added to the HER.

This work was carried out by Jason Dodds during 2015 and project managed by Ian Sanderson.

Project funded by Historic England

Contents List

List of Appendices

List of Figures

List of Plates

Introduction

West Yorkshire Archaeology Advisory Service (hereafter WYAAS) were funded by English Heritage (now Historic England) to undertake a project of enhancement of the Palaeolithic and Mesolithic HER records for West Yorkshire. The aim of the project was to systematically enhance the Historic Environment Record (HER) through the examination of select local museum holdings of Mesolithic and possible Palaeolithic material (mainly primary documentation but also the examination of selected lithics). The project also involved select literature searches and discussion with academic researchers to attempt to identify areas in West Yorkshire with a high potential for providing significant palaeo-environmental data that might offer future opportunities for understanding better the environmental context and dating of the Mesolithic and possibly Palaeolithic material. The project included the systematic enhancement of the West Yorkshire HER with the newly acquired data and the enhancement and "cleaning" of the existing records in the West Yorkshire HER. Relevant data from the Portable Antiquities Scheme was also obtained and analysed and the significance of these collections assessed and added to the HER.

The project was undertaken with the intention of significantly strengthening the HER and thus providing a more reliable and authoritative guide to assessing the significance of West Yorkshire's early prehistoric resources when responding to future planning and management consultations. A comparative analysis was also made with the recently enhanced South Yorkshire data for the same periods and a critical assessment of the value of museum holdings for HER enhancement was also made.

At the commencement of the project the HER had 671 records for Mesolithic sites and find-spots. Following completion of the project the HER now has 1267 HER records for the Mesolithic period, including 283 records from the Portable Antiquities Scheme and 10 new palaeo-environmental records that include dates for the Mesolithic period.

For the Palaeolithic period at the start of the project there were 13 existing HER records, 2 new HER records were created and 6 were amended, as they were found on detailed examination to relate to Mesolithic material. 1 artefact previously suggested to be of Palaeolithic date turned out on examination to be an unworked piece of stone. In total at the completion of the project there were 8 Palaeolithic HER records.

Names of staff involved and parts played by each

The project was undertaken by WYAAS under the auspices of Stuart Wrathmell (Divisional Manager for Heritage). Project Supervision and report editing was carried out by Ian Sanderson (Principal Archaeologist) and the Project Officer was Jason Dodds, seconded from his post as HER Officer. Jason Dodds carried out the Museum visits and HER documentation and GIS enhancement. Matthew Cross (University of Bradford Placement Student) assisted in the research at the Yorkshire Archaeological Society (YAS) and with a literature search at Bradford University. Assistance was also provided, when required by Amy Downes (Finds Liaison Officer for South and West Yorkshire) and Rosalind Buck (HER Information Officer). Rosalind Buck also undertook the Social Media and Outreach aspects of the project. Staff at Wakefield Museum (Leanne Dodds and Ian Townend) also assisted in photography of lithic collections. For the most part photographs were taken by Jason Dodds.

Acknowledgements

WYAAS and Jason Dodds would like to thank the Museum staff for their help and assistance and provision of museum documentation. Particular thanks are due to Katherine Baxter, Yvonne Hardman & Gemma Pollard (Leeds Museums Service), Leanne Dodds (Wakefield Museum Service), Gavin Edwards (Bradford Museum Service), Natalie Rhodes (Rochdale Museum), Brian Sitch (Manchester Museum Service), Jeff Wilkinson (Calderdale Museum Service) & Chris Yeates (Kirklees Museum Service) for all their help and assistance and provision of objects and documentation. Thanks must also be

given to Zoe Horne of ASWYAS for the provision of information and also to Zac Nellist (South Yorkshire Sites and Monuments Record) for the provision of comparative data. Thanks are also due to Dr Paul Preston for access to and provision of data from his 2011/12 PhD thesis. Dr Preston has also been available for consultation and discussion throughout the project. Thanks are also provided to Professor Jeffrey Blackford (Hull University).

The Research Area, Geology, Topography and Land Use

West Yorkshire on its westernmost side includes the Southern Pennines, with a small area of its south western side lying within the Peak District National Park. West Yorkshire is administratively separated into 5 districts, namely Bradford, Calderdale, Kirklees, Leeds and Wakefield (Figure 1). The geology of the western part and the northern part (within the Wharfe valley) of West Yorkshire is within the Millstone Grit Group, comprising of Mudstone, Sandstone and Siltstone. The central part of West Yorkshire and a significant proportion of the north-east is occupied by the Pennine Lower Coal Measures, which consist of Mudstone, Siltstone, Sandstone, Coal, Ironstone and Ferricrete. In the south-east of West Yorkshire the geology is an undifferentiated mix of Pennine Middle Coal Measures formation and South Wales Middle Coal Measures Formation, this again being represented by Mudstone, Siltstone, Sandstone, Coal, Ironstone and Ferricrete. On the eastern side of West Yorkshire the bedrock geology is Zechstein Group Dolomitised Limestone and Dolomite (Magnesian Limestone). This layer is intermixed with undifferentiated Permian rocks, namely Mudstone, Sandstone and Siltstone (British Geological Society GIS mapping at http://www.bgs.ac.uk/opengeoscience/ downloaded to WYAAS GIS 02/02/2009; Figure 2).

The superficial geology in much of the upland areas in the Southern Pennines in the western part of West Yorkshire is peat deposits covering Millstone Grit. This is especially the case in the north-western and south-western sections of West Yorkshire. Along the courses of the River Calder, River Aire and River Wharfe are alluvial deposits represented by clay, gravels and sands. On the Rivers Calder, Aire and Wharfe there are also sand and gravel river terrace deposits (Figure 3) (British Geological Society GIS mapping at http://www.bgs.ac.uk/opengeoscience/ downloaded to WYAAS GIS 02/02/2009).

The landscape of West Yorkshire may be described in terms of its geology. Upon the Gritstone on the Pennines on the westernmost side of the county elevations range between 520m (at Austonley) and are at their lowest at Idle at 90m AOD. However within this area heights are generally within the region of 200m AOD to 460m AOD. As you move further east in the county into the area of the Lower Coal Measures, which expands across the central parts of West Yorkshire and also into the northern eastern side of the county, the elevations run from 350m AOD in the west to as low as 50-60m AOD in the east. Within the Middle Coal Measures in the south east of the county the ground is again sloping from west to east with elevations between 80m AOD to 40m AOD. Within the Magnesian Limestone in the far eastern side of the county elevations are between 60m AOD (in the north) to 30m AOD (in the south).

West Yorkshire is dissected from west to the east by three major rivers (from north to south), the River Wharfe, the River Aire and the River Calder, which branches to become the River Colne (in the south-western part of the County). The River Wharfe demarcates much of the northern boundary of the County. The River Calder, which originates in the Pennines forms very steep valleys through the Gritstones and gradually expands until it reaches the flatter terrain of the Middle Coal Measures. The Calder valley narrows westwards toward Todmorden before running southwards toward Littleborough, Greater Manchester. The route of the River Aire valley runs through the Aire Gap from Skipton and Clitheroe in the Craven District and then south eastward to its confluence with the River Calder at Castleford (Faull & Moorhouse 1981,p.39).

West Yorkshire consists of 5 metropolitan districts (Bradford, Calderdale, Kirklees, Leeds, Wakefield), and contains the three cities of Leeds, Bradford and Wakefield and the larger towns of Huddersfield and Halifax. The Office for National Statistics (ONS) according to the 2011 census gives a population for West Yorkshire at 1,777,934 and ranks West Yorkshire as being the fourth most populous county in the United Kingdom (viewed 23/10/2015 at http://www.nomisweb.co.uk/articles/747.aspx and large areas of West Yorkshire are heavily built up (see Fig. 17).

Extraction on the Coal Measures in the form of coal mining (historically by bell pits, underground coal mining and more recently through open cast extraction) formed a significant element of the landscape of West Yorkshire. On the Magnesian Limestone in the east of the county there has also been large areas of stone and gravel extraction. In the earlier 20th Century industrial pollution led to areas of peat erosion over the western part of the county. Dr Spikins (2010, p.20) makes the pertinent point that peat erosion on the Pennine Plateau, although severe "does not typically reach the finds levels" of early prehistoric sites, however the complete destruction of Mesolithic sites may occur on "marginal peat erosion scars". Peat extraction has historically taken place on the moors, however, today (2015) no peat extraction is known.

Land use within the eastern side of West Yorkshire includes rich agricultural lands. On the Coal Measures in the centre of West Yorkshire there is a mixture of enclosed and unenclosed land (generally pasture). At the western side of the county on the South Pennines there is enclosed land (commonly along the river valleys), whilst on the higher ground the land is unenclosed moorland and commons.

Archaeological Background and Potential of the Study Area

(See Fig. 11 for location of named sites in West Yorkshire)

The Palaeolithic period in West Yorkshire has been under researched mainly due to the paucity of the material. Evidence of Lower Palaeolithic occupation within West Yorkshire may be indicated by the Early Palaeolithic hand axe from Micklethwaite (PRN 14435). In the Middle Palaeolithic period there are also two hand axes from Stanley, Wakefield (PRN 3813) and a hand axe from Lupset (PRN 3814). The precise provenance and original context of these artefacts is, however unknown, with glacial activity decontextualizing the artefacts. A late Upper Palaeolithic blade was also discovered at Monk Fryston just outside West Yorkshire (PRN 10102). Occupation by Palaeolithic hunter-gatherers may have occurred either during the Last Glacial Maximum or perhaps within later interstadials of the Older and Younger Dryas (Smith 1992, p.51, Spikins 2010, p.14).

Within the Upper Palaeolithic period most known sites nationally come from caves and rock shelters, a landscape feature which West Yorkshire does not commonly possess (unlike the neighbouring North and South Yorkshire). The absence of Palaeolithic material may reflect the fact that during this period much of West Yorkshire may have been covered by a glacier (Spikins 2010, p.14). Spikins (2010, p.14) suggested that a possible cave site worth investigation is one known to exist to the north of Boston Spa in Wharfedale known as Jackdaw Crag (PRN 12763), this has not, however, ever been investigated archaeologically. A known rock shelter is at Light Hazzles, Langfied (PRN 10745) where a Mr Kesshaw discovered a bladelet, 3 scrapers and a hammer stone in July 1978, artefacts which would more comfortably fit a Mesolithic, or perhaps even a later context. The hand axes listed above may have an association with the glacial Lake Humber, a possible focal point for Palaeolithic hunter-gatherers [on the basis of an analysis carried out as part of the project (see below)]. A 'bruised edge' Late Upper Palaeolithic blade (PRN 10102) has also been discovered within close proximity of the estimated margins of the lake, just outside the study area in North Yorkshire.

The Mesolithic period in West Yorkshire has for a long time been a major focus of study with early published works including that of Petch (1924), Raistrick (1964) and also more recently in 1981 in the "West Yorkshire an Archaeological Survey" by Keighley in Faull and Moorhouse (see chapter 6, vol. 1 pp.75-89). Studies of the Mesolithic period in West Yorkshire may also be found in Barnes (1982) Stonehouse (2001) and Manby et al. (2003), and in more recent times in Spikins (1999, 2002 & 2010) and Preston (2008a, 2008b, 2011/12). West Yorkshire has frequently been a focus of collectors with a keen understanding and knowledge of the landscape, most notably the amateur archaeologist Francis Buckley, from whose sites charcoal samples were later used to provide radiocarbon dates for the Mesolithic (Switsur & Jacobi 1975, p.32-4). Buckley discovered an Early Mesolithic lithic industry similar to the type site of Deepcar, South Yorkshire within an upland setting at Warcock Hill, Marsden (Radley, Tallis & Switsur 1974, p. 1-19) and from Buckley's other excavations within West Yorkshire at Lominot, Cupwith Hill, Windy Hill and at Badger Slacks (Greater Manchester) he also discovered clear evidence

for Early Mesolithic occupation. At Buckley's Warcock Hill North Site, he also discovered hearth features. Radio-carbon dates recorded by Radley, Tallis & Switsur (1974, p.18) for Warcock Hill date to 6766 - 6546 cal BC and from Buckley's Lominot Site 3 radiocarbon dates of between 10350 to 7840 cal BC (with a 95% confidence level) are recorded by Preston (2011/12). Lominot is also a good example of an Early Mesolithic site that was found to be only minimally disturbed (Spikins 2010, p.16). Mesolithic sites in West Yorkshire can vary from a single find to large lithic scatters, sometimes found to be associated with notable features, such as hearths, anvil stones or even suggestions of possible structural features (such as post-holes/stake holes, believed to represent traces of temporary shelters). According to Spikins (1999, p.11) the contrasts between upland and lowland sites can be clearly seen on a regional scale. Sites in the uplands (commonly found above 350m OD and becoming rare above 450m AOD) are where the large majority of Late Mesolithic sites are found in West Yorkshire. They are not only smaller in size than the majority of known lowland sites (typically found below 100m OD) but are also more widely distributed. Artefact assemblages also appear to differ between the two geographical areas: Mellars (1976, pp. 15-46) compared the artefacts discovered at upland locations and found that assemblages were dominated by microliths along with small site dimensions. This differed from the larger lowland sites commonly dominated by scrapers. Microliths are believed to represent the barbs of composite tools used during hunting activities whereas scrapers have a domestic function. Spikins, following Mellars, suggests on the basis of ethnographic sources that the small upland sites represent 'hunting camps' likely to be occupied in the summer, while pursuing deer. Lowland sites, in contrast, are interpreted as representing occupation sites used for more prolonged periods, possibly during the winter. Certain areas in the uplands have very high densities of artefacts, and these have been interpreted as representing the repeated movement of hunting parties through key points in the landscape over a very long period of time. However, it is noted by Spikins that there can be marked differences in assemblages between sites across the upland region. The most notable element of small scale patterning of upland sites is that most sites generally seem to be found around a specific altitude (of approximately *circa* 380-430m OD) in areas where is good visibility over the surrounding areas, with an apparent marked preference for south-facing slopes close to river heads. (Spikins 1999, p.13)

Lithics from the Earlier Mesolithic commonly include end scrapers, awls, burins and adzes, as well as obliquely truncated microliths, triangular microliths, microdenticulates and tranchet axes. The appearance of axes and adzes are interpreted as an indication that Mesolithic inhabitants were dealing with a wooded environment (Preston 2008b, p.28).

Late Mesolithic sites appear to be more widely distributed across the landscape in West Yorkshire than Early Mesolithic sites and are found in both upland and lowland settings though in West Yorkshire the vast majority are known from the Pennines; they are also much smaller than their earlier counterparts (Spikins 2002, p.10). Late Mesolithic sites tend to be a few metres in size rather than the tens of metres in diameter as found in the Early Mesolithic. According to Spikins (2010, p. 16), Late Mesolithic sites are heavily dominated by microliths, an aspect which is not seen in the Early Mesolithic period. Excavated examples can comprise nearly 100 microliths (which are typically 1 cm long, typically dominated by the scalene triangular forms of late Mesolithic microliths). It is the view of Spikins and of Myers (1987) that the differences in site size between the Earlier and Later Mesolithic represents a different use of the landscape over time.

West Yorkshire has a number of distinct landscape types which may afford the potential survival of Palaeolithic and Mesolithic remains. Firstly the area of the former Lake Humber in the far east of West Yorkshire (see Figure 7), Spikins (2010, p.24) suggests there is potential for the survival of early prehistoric remains on what would have been wetland edge environments, such as the margins of Lake Humber. Looking at the suggested margins of Lake Humber from the BRITICE project (Clarke et al. 2004; Figure 7) the margins of the former lake extend across the lowland areas of the Wakefield and Leeds Districts.

Within the upland areas of West Yorkshire, lithics have long been found in areas of eroding peat and this peat may potentially provide unique preservation conditions; this along with "remarkably low levels of disturbance" (Spikins 2010, p.11) may lead to the future discovery of early prehistoric sites, perhaps

from both the Palaeolithic and Mesolithic periods, which are considered to be internationally significant (Spikins 2010, p.11). Peat is seen to cover western areas of West Yorkshire from about 300m OD (see Figure 8). Palaeoenvironmental and palynological research within this peat may also not only enable landscape reconstruction (see Brown 1982, Keen et al. 1988, Williams 1985, Ryan & Blackford 2010 for palaeoenvironmental work), but may also provide further information on the way the landscape was managed in the early prehistoric period, where woodland disturbance episodes (such as burning can be identified), charcoal from which can be dated. Peat when removed from a secure stratigraphic context may also be radiocarbon dated. This work also makes it possible to reconstruct dated climatic changes from the earlier prehistoric period. Former pools and ponds and other areas of standing water can also be identified (e.g from macrofossils of Phragmites (reeds) or spores indicative of open water) (Blackford pers. comm. 2015).

Mesolithic sites within upland locations are according to Spikins (2002, p.11) almost exclusively found above 350m OD, with upland sites being rare above 450 OD. The suggestion has been made that these elevations are the preferred locations for 'lookout' points for hunters. In a similar vein Radley and Marshall (1963, p.96) commented that on the Central Pennines "Mesolithic sites prefer the 1,250-1500ft (381-458m) zone, on east to south east facing slopes". Spikins (2010) states that Mesolithic sites are most commonly found on south facing slopes on the plateau edge at between 380m and 430m in elevation. Preston records that as part of his 2011/12 PhD research almost two thirds of Mesolithic sites were discovered on slopes or relatively close to streams in cloughs. In addition to elevation Spikins (2010, p.2) and Preston (2011/12, p.219) also stress the importance of a site's association to landscape features such as March Hill Top where the anvil stone was recovered (PRN 13636).

Dr Penny Spikins of York University and Dr Paul Preston (a post-doctorate researcher) on a visit to the HER on 09/06/2010 identified a number of 'Persistent Places' within West Yorkshire. A 'Persistent Place' was defined by Spikins and Preston as a cluster of sites which were repeatedly visited by Mesolithic hunter-gatherer groups often for a short duration for different tasks or purposes. Often but not exclusively 'Persistent Places' are located near prominent highly visible landmarks such as conical hills, crags, watersheds or lakes. The areas identified are regarded by both Preston and Spikins to be of potential national archaeological importance as a significant site where there may be evidence for all or some of the following: integrity of deposits; a density of lithic artefacts; certain special features such as 'anvil stones' or hearths (either stone-lined or charcoal concentrations) and significant concentrations of Early and/or Late Mesolithic artefacts. Figure 9 illustrates the boundaries of the four Persistent Places identified by Spikins and Preston (on their visit to the HER 09/06/2010).

Within riverine settings within the lowland of West Yorkshire (to the east of West Yorkshire) Mesolithic sites have also been discovered, such as the sites at Pugneys and Sandal Castle (both in Wakefield District) and Boston Spa (Leeds District). Lowland sites are commonly discovered at an elevation of at or below 100m OD (Spikins 2002, p.11). Spikins (2010, p.2) states that these lowland sites, which are often associated with rivers and terrace levels may potentially include preserved remains such as worked wood or plant remains.

Although the large majority of Mesolithic sites have been found on the Millstone Grit in upland locations) there is still a potential for Mesolithic sites to be discovered (albeit on a lesser scale) within the Middle and Lower Coal Measures. On the Magnesian Limestone in the lowland areas there is also potential for perhaps residential Mesolithic sites, especially in those areas in proximity to the former margins of the former glacial Lake Humber and those areas associated with rivers and terrace levels. This part of West Yorkshire has received the greatest development pressures in recent years including housing, commercial, roadbuilding and extraction and is also the most fertile agricultural land within West Yorkshire, but the techniques typically employed in developer funded archaeology are generally not conducive to identifying scattered lithics in the topsoil (see discussion below).

Project Aims and objectives

The principal aims and objectives of the project were:

1. To check the current records for Palaeolithic archaeology in the West Yorkshire HER with primary material held in local museums with the aim of establishing an accurate identification of all previously identified Palaeolithic material.

2. To add to and improve existing HER records for the Palaeolithic / Mesolithic material by the systematic examination of primary data held in selected museums. This material is typically the notebooks and other documentation that accompanied the deposition of lithic collections with the various museums. The aim was that the HER should have for all reliably identified early prehistoric 'sites' within the project's boundaries, the most reliable information available (within defined parameters of accuracy) on the location, extent, nature and approximate date of the material. Where possible, select Mesolithic material within the museum holdings that could be confidently "tied" to documented "sites" was to be examined to attempt to better identify whether the material was "Early" "Late" or "Terminal" Mesolithic. The records were then to be fully referenced and mapped as accurately as was reasonably possible on the WYAAS GIS, including areas with high palaeo-environmental potential.

3. To enhance the HER with relevant Portable Antiquities Scheme records

4. To attempt to determine where there are apparent gaps in the HER record and whether these are due to an absence of investigation/collection rather than an absence of potential.

5. To critically assess the value of museum collections and archives for the enhancement of HER records for the earlier prehistoric.

6. To define gross areas where there is a high potential for the survival of Palaeolithic/Mesolithic material, and the potential form of this evidence.

7. To define gross areas where there is a limited potential for the survival of Palaeolithic/Mesolithic evidence, or where evidence cannot be known without further work.

8. To produce GIS-based maps highlighting areas of high and limited/unknown potential of material, in association with geology, topography and land-use, where appropriate.

9. To produce a fully illustrated written report summarising the results of the project.

10. To present the project results to the wider public through the use of social media, and WYAAS' digital newsletter.

11. To disseminate the methodology and results obtained, to neighbouring HERs to facilitate their wider understanding of the project's findings.

Methodology and Sources

The starting point of the project were the records held by the West Yorkshire Historic Environment Record (HER). The HER is curated by the WYAAS. The HER was originally known as the Sites and Monuments Record (SMR), and initially existed as a card based system compiled in the late 1970s, primarily as a by-product of the data gathering exercise carried out to permit the compilation and publication of "West Yorkshire: An Archaeological Survey to AD 1500" (published 1981). Information on known, vanished and potential sites was derived from all readily available secondary sources (published books and articles) and also from primary sources. Sites were recorded as point data on 1:10,000 OS paper maps.

During the mid to late 1980s, the system was both modernized and computerized with the help of funding and technology from English Heritage. With this modernization, supporting information for many sites was added and areas of probable archaeological interest, as apposed to purely point data was

added to constraint mapping. Each site was also assigned a site specific numerical identifier, known as a Primary Record number or PRN. All sites were also organized into individual folders containing a site map, the record sheet or card and any supporting documentation (such as historic maps, offprints and photographs). Site polygons were also colour coded to indicate probable levels of archaeological significance. Summary information was entered onto a flat-file computer database Superfile system.

The system continued in use until late 1999, and at this time Superfile was not compatible with Windows and became obsolete, with no technical support available. The computer system was therefore migrated to a Microsoft Access database, to comply with the MIDAS data standard (produced by English Heritage). In 2006 the 1:10,000 constraint maps were developed during the development of a MapInfo based Geographical Information System (GIS). The GIS system depicts the spatially referenced areas of sites and find spots and their associated polygons (site boundaries). Unlike the earlier paper mapping the WYAAS GIS system is an evolving product, which can be amended and interrogated with ease. In 2009 the Access database system was upgraded to a Microsoft SQL database system. In 2015 a live database GIS layer was added, which made it possible to link data in both the GIS and database system. As of 2015 WYAAS use a bespoke SQL database and MapInfo version 12.0 GIS System.

The scope of the project included the examination of primary documentation held in selected museums (detailed below). Examination of select lithic materials held in the collections was also carried out where collections were confidently identified with particular sites, with the intention of dating the material (Early, Late or Terminal Mesolithic) and confirming the identifications of tool forms and relative numbers. All previously identified and available Palaeolithic material was examined and recorded. Select published literature was examined specifically with regard to enhancing the palaeo-environmental data held in the West Yorkshire HER.

Stage 1: Data Checking & Collation

Prior to the commencement of the project, an initialisation meeting was held at WYAAS offices with project staff and English Heritage, in which any issues or queries regarding the project were addressed.

The existing HER records relating to the Palaeolithic and Mesolithic periods in West Yorkshire were checked with regard to adequacy of description, location, referencing etc. with regard to collections of material held in local museums; and to identify potential lithic collections to examine at the museums.

The current Portable Antiquities Scheme records for West Yorkshire were obtained and checked to establish whether there was any Palaeolithic or Mesolithic material to add to the HER. Paul Preston's research (Preston, 2011), relevant details of which have recently been obtained by WYAAS, derived mainly from a study of the data from The Littleborough Historical Archaeological Society Collection and forming the core of Preston's D.Phil research, were collated, re-cast and organised to aid data entry into the HER. Searches were undertaken at the following museums to extract comparable data from their collections and archives, including the notebooks of the collectors where these were available. Elements of this data (from some of the West Yorkshire museums) form part of the existing HER records, but the material needed systematic enhancement and re-casting to meet modern HER standards of referencing and to improve the accuracy and adequacy of the existing records. Searches also included relevant university theses and any other unpublished material that was available.

The Museum Services visited were:

Leeds Museum
Manchester Museum
Cartwright Hall Museum and Art Gallery, Bradford

Heptonstall Museum, Heptonstall
The Tolson Museum, Huddersfield
The Touchstone Museum, Rochdale
Wakefield Museum

The visits included the re-examination of all previously identified Palaeolithic items from West Yorkshire available in the above collections to check the validity of their identification. Wherever possible the material was digitally photographed and the images discussed with relevant specialists (Dr Paul Preston) so that authoritative statements could be made on their dating.

Select Mesolithic lithic material was examined to attempt to refine the dating of Mesolithic records (Early, Late, Terminal) for particular sites/ HER records and to confirm the identification and numbers of tool types.

The Yorkshire Archaeological Society library (Leeds) and the University of Bradford's library were also consulted to check references and to obtain data for palaeo-environmental records and these were input into the HER. Discussions were also held with Professor Blackford of Hull University who has been researching the central and Southern Pennines, to better identify areas of palaeo-environmental potential (see below for further details).

Stage 2: Update the HER Records

All information collated in Stage 1 was inputted directly into the West Yorkshire's HER database and the GIS system was updated so that polygons of sites and sensitive areas are as accurate as they can reasonably be. All data is now MIDAS-compliant and English Heritage's published thesauri have been used.

All new or enhanced records now include (where possible) the following:

– accurate geographical information (within defined parameters)
– the extent of site (where known)
– the nature of site (lithics, other finds, features)
– depth of deposits (where known)
– approximate date (where this can be established from the nature of the recorded lithics)
– potential for organic survival (where known)

In addition the GIS allows relationships to other known sites and the relationship to topography to be shown. All GIS information contains the necessary meta-data required.

Stage 3: Analysis and Interpretation

The locations of enhanced records have been plotted on a suitable scale Ordnance Survey base maps (according to the accuracy of the data) using MapInfo GIS software, to identify known concentrations and areas of recorded Palaeolithic and Mesolithic sites. Locations have been plotted against geology, topography as appropriate with the aim of identifying possible 'character areas' (see Figure 13, 14, 17 & 18).

The data set was analysed to identify the following:

- Areas where there is a known high potential for Palaeolithic/Mesolithic evidence and the form that evidence might take.
- Areas where there are clear gaps in the record due to a lack of investigation/ collection but where there is potential for surviving evidence.
- Areas where there is limited potential for Palaeolithic/Mesolithic evidence.

For areas where there are clear gaps in the record, an attempt has been made to identify the reasons for this, whether it be lack of archaeological activity / lithic collecting; the absence of erosion scars; lack of development etc. The analysis has been informed by comparing data in West Yorkshire with the recently enhanced Palaeolithic/ Mesolithic data for South Yorkshire (Grassam and Weston, 2014). This allows for a comparison of data sets based on similar areas of geology, topography and land-use between the two counties and help to determine reasons for gaps in the archaeological record.

Products, Dissemination & Archiving

The project has resulted in the following products:

- Significantly enhanced HER records for West Yorkshire for the Palaeolithic and Mesolithic periods;
- An end of project report (this document)
- The dissemination of key findings and possible mitigation strategies to neighbouring HERs, namely:

- South Yorkshire
- Greater Manchester
- Lancashire
- North Yorkshire

The final report has also been sent to the following Museums

- Wakefield Museum
- Leeds Museum
- Calderdale Museum
- Kirklees Museum
- Bradford Museums
- Manchester Museum
- Rochdale Museum

- Wider engagement has been carried out via the use of WYAAS' digital newsletter, social media, and the final report, a shortened version of which will be offered for publication in the *Yorkshire Archaeological Journal.*

The HER enhancement has resulted in a greatly expanded, more accurate, better referenced and up to date record of the known Palaeolithic and Mesolithic resource within West Yorkshire, held within the West Yorkshire Historic Environment Record.

The West Yorkshire HER supports the Online Access to Index of Archaeological Investigations (OASIS) project. An online OASIS form at http://ads.ahds.ac.uk/project/oasis/ was completed for the project.

Results from stages 1 & 2

Enhancement of HER records

All of the information collated in stage 1 was added to both the HER Database and also to the WYAAS GIS. The database records were added to the WYAAS HER database to the requirements set out by MIDAS heritage and using the pre-imported MIDAS pick lists. Although at the commencement of the project it was intended for stage 1 & 2 to be undertaken separately, the two stages were undertaken

together. This allowed for the comparison of current HER records with new data sets which allowed for new records to be created and pre-existing records were both amended and enhanced.

At the commencement of the project there were 671 HER records for the Mesolithic period and 13 records relating to Palaeolithic find-spots within West Yorkshire. A significant amount of Information was gained from Paul Preston's 2011/12 PhD thesis. In the first instance site location information was taken from Preston's thesis (which had involved visiting sites on the ground using the name and description of the site in the collectors' notebooks and then precisely locating them using a GPS). This meant that the HER was able to significantly improve the known site locations of 212 HER records, which had previously had very general or inaccurate locations whilst 35 of these records received substantial additional enhancement from Preston's PhD database, which was supplied to WYAAS.

In total, as part of the project some 598 new HER records were created, of which 283 were from the Portable Antiquities Scheme and 267 from visiting the seven museums and from the primary and secondary information gathered there. In addition 223 existing HER records were also amended and populated with additional new information.

For all of the new and amended HER records, database records (new PRNs) were created and monument polygons were created on the WYAAS GIS system. The new polygons were scaled to reflect the level of accuracy of the grid references i.e. a 6 figure grid reference had a polygon of 100m diameter. Paper file information for each of the new records was also created and where records were amended new paper information was added to the record files.

At the museums visited (see below) there was a varying level of success in viewing original primary documentation relating to lithic collections, however, the museums did hold some associated information regarding their collections (discussed below). Where primary documentation existed, if the collector recorded an accurate location (such as a grid reference) it was possible to locate the site locations and to create both new or amended HER records, and also to update the GIS. Where very detailed records were kept (as was the case with Buckley's material) accurate and authoritative HER records were created. This was also the case with the environmental records (discussed below). Where undergraduate dissertation or PhD theses (such as Preston 2011/12) had been undertaken it was possible to precisely locate early prehistoric sites and to create new GIS records.

Palaeo-environmental work

Using the Environmental Archaeology Bibliography or EAB (http://archaeologydataservice.ac.uk/archives/view/eab_eh_2004/index.cfm?REDSQUIDARCHIVES_4456_8D84D6C1-F35F-4DA1-8E2205AFEBF3A097), created by the University of York in 2004 and updated in 2008, 5 site locations were identified and the referenced documentation was sourced. From both the sources in the EAB and from sources retrieved from the University of Bradford and the Yorkshire Archaeological Society and from other references identified by the author, 10 new HER records were created for palaeo-environmental research within West Yorkshire.

This information provided significant and reliable palaeo-environmental evidence something, which had previously been lacking from the HER records. Dr Penny Spikins' 2010 Research Agenda on West Yorkshire's Palaeolithic and Mesolithic periods stated that within West Yorkshire "Palaeo-environmental work is… limited to certain locations and accurately dated pollen cores, particularly in association with archaeological sites, are needed to build up our understanding of Mesolithic landscapes". The project gathered available information on any published palaeo-environmental fieldwork in West Yorkshire and subsequent data from these activities was incorporated into the West Yorkshire HER. Palaeo-environmental work has been carried out at Bingley Bog (north site; PRN 14428), Bingley Bog (south site; PRN 14429), Rocher Moss Site 2, Saddleworth, (close to the WY border but in Greater Manchester; PRN 14430), Warcock Hill South, Marsden (PRN 14431), Dean Clough Site I, Saddleworth (PRN 14432), Soyland Moor Sites A (PRN 14443), B (PRN 14444), C (PRN 14445) and D (PRN 14446; Williams 1985), Black Heath, Slaithwaite (PRN 14544; Ryan & Blackford 2010, pp.545-558) and Cupwith

Hill, Slaithwaite (PRN 14588; Scarlet 2013). Where radiocarbon dates have been published to date the palaeo-environmental evidence, this has also been added.

From a palaeo-environmental viewpoint a present focus of research is the analysis of the transition between the Mesolithic and the Neolithic periods. From a discussion with Professor Blackford (Hull University) and the work of Dr Jim Innes (Durham University) a current strand of research is specifically looking at the Terminal Mesolithic period, which is associated with rod microlithic cultures (Blackford pers. comm. 10/11/2015). According to Professor Blackford, Innes has identified through palynological research the possibility that Terminal Mesolithic environments may contain cereal type pollens. The work of Innes may suggest the presence of groups of hunter-gatherers who have partially adopted the cultivation of cereal. This work is apparently based on fungal spore analyses and the use of very fine resolution palaeoecology and microcharcoal analysis.

At sites where palaeo-environmental work has been undertaken (specifically Black Heath (PRN 14544) and Cupwith Hill (PRN 14588), Slaithwaite), clear evidence of burning is evident from the presence of the pollen of re-colonising species (such as Melapyrum etc.) which follow fires. While these burning episodes may not represent large scale fires, burning may have been used by Mesolithic hunter-gatherers to create bare areas or openings, towards which game would be drawn, as grasses and other pioneer species are seen to reoccupy burnt areas and would have been a good food source for roaming animals thus facilitating targeted hunting areas (Spikins 2002, p.44).. The use of fire could thus have been a form of landscape management used by Early Prehistoric hunter-gatherers. Naturally occurring fires cannot, however, be discounted.

Former Glacial Lake Humber

As part of the literature review the former major significant element of the prehistoric landscape, the glacial Lake Humber was identified. This lake is regarded, with the exception of the larger British ice sheet, as being to be the most prominent single feature depicted on the map of Late Devensian Britain, and is thought to have covered an area of *circa* 4500km2 (Bateman et al., 2007). The Department of Geography at the University Sheffield's project BRITICE has produced a map for the last British Ice Sheet. This work includes the geographic extent of the ice-dammed lake and includes information from fieldwork evidence where lake deposits have been observed. In such instances the estimated lake level has been calculated and the lake extent inferred. For the glacial Lake Humber the extent of the lake was estimated by using published lake levels deduced from deposit elevations, limits or geomorphological shoreline evidence (Figure 7 shows the suggested extent of the lake).

A caveat is placed by the authors of the BRITICE project report (Clark et al. 2004) that "such assessments are absent or too schematic in the literature. All such interpretations should be regarded as a hypothesis based on the fragmentary data" therefore although the presence of the former Lake Humber may be estimated, the precise boundary of the lake cannot be marked. For this reason in addition to adding the suggested margin of the former lake the WYAAS GIS now also includes a 1km buffer zone around the postulated extent of the lake within which evidence of the lake may still be discovered. The lake level suggested in most literature suggests levels of between 30m and 7m OD (Straw 1979, Gaunt 1976 and 1994). As part of the BRITICE project researchers analysed the disposition of glacial lakes in relation to the topography and from this deduced where the approximate ice margin would have lain, however, this is not extrapolated from field evidence but shows the approximate position required "in order to impound the lake" (Clark et al. 2004). The general opinion from the project is that lake deposits should fall within this margin. The BGS superficial geology map appears to confirm this proposed margin on the basis of the location of both alluvium and river terrace deposits (Figure 3).

Excavations at Ferrybridge identified elements of the lake which were dated by optically stimulated luminescence to 16600 BP (14650 BC) and it is suggested that the lake will have gradually become silted up by 11100 BP (9150 BC) (Roberts et al. 2010, p.3)

Spikins in her 2010 Research Design for the Palaeolithic and Mesolithic in West Yorkshire states that "Particular attention should be paid to the potential for early prehistoric material in what would have

been wetland edge environments (for example around the edges of the prehistoric Lake Humber)" . This statement may be supported by the finding of the two Palaeolithic hand axes at Lee Moor, Stanley, Wakefield (PRN 3813), c. 1km north west of the proposed extent of the glacial lake and also the hand axe from Lupset, Wakefield (PRN 3814), located c. 1.14km west of the proposed extent. A 'bruised edge' Late Upper Palaeolithic blade within North Yorkshire has also been excavated from a location c. 300m inside the proposed boundary. Figure 7 shows the relationship of confirmed Palaeolithic find spots with the proposed extent of glacial Lake Humber

Stage 3: Analysis and Interpretation

The locations of the new and enhanced records were plotted on WYAAS' MapInfo version 12.0 GIS. These records were then combined with pre-existing records to illustrate the known distribution of both Palaeolithic and Mesolithic sites in West Yorkshire. This information has been plotted against geology (Figures 13 & 14) and topography (Fig. 12). The distribution plots were again plotted in relation to the predicted former boundary of glacial Lake Humber (Figure 7) and also against the boundary with a 1km buffer to identify where sites are visible on the margins of the former glacial lake.

From these plots the data was analysed to identify:

- Areas of high potential for Palaeolithic (see Fig.7) and Mesolithic sites (see Fig.18).
- Areas were preferential preservation may be identified (see Fig.18)
- Areas were collection biases (from frequent collection from a single area) are visible (see Fig.15).
- Gaps in the distribution of recorded sites and the reason(s) for this
- Distribution of sites with regard to former glacial features (i.e. Glacial Lake Humber in the east of the county) (see Fig.7).
- Areas with limited potential for Palaeolithic/Mesolithic site preservation (see Fig.5 & Fig.16).

The project also compares the data from South Yorkshire Sites and Monuments Record and the findings of a similar project run by the SMR & ASWYAS, with that represented in West Yorkshire (see Fig.17).

It was not possible to compare data with Historic Landscape Characterisation data from West Yorkshire as the project is currently ongoing.

Museum Collections

In total 7 Museums visits were made to all five district Museums within West Yorkshire (Bradford, Calderdale, Kirklees, Leeds and Wakefield). Visits were also made to the neighbouring museums of Manchester and Rochdale which were known to hold lithic material collected from West Yorkshire. The institutions visited (and date visited) are listed below:

- Bradford Museum Service, based at The Cartwright Hall Art Gallery, Bradford – visited by Jason Dodds 22/04/2015
- Leeds Museums and Galleries (Leeds Discovery Centre, Leeds) – visited by JD 07/05/15 & 08/05/2015
- Wakefield Museum Service (Wakefield Museums Store, Wakefield) – visited by JD 10/05/15 & 16/05/2015
- Kirklees Museum Service The Tolson Memorial Museum , Huddersfield) – visited by JD 06/05/2015
- Calderdale Museum Service (Heptonstall Museum, Heptonstall) – visited by JD 12/06/2015

- Manchester Museum (Manchester) – visited by JD 09/06/2015
- Rochdale Arts and Heritage Resource Centre (Rochdale) – visited by JD 18/06/2015

Visits were also made to the following organisations:

- The Yorkshire Archaeological Society (Leeds) – visited by JD
- The University of Bradford (Bradford) – Library Catalogue searched through Matthew Cross' (Bradford University Placement student) University access.
- Archaeological Services WYAS at WYJS, Morley, Leeds

Museums services within West Yorkshire use Museum collections management databases, and with the exception of Leeds Museums and Galleries use MODES software systems. Museum services catalogue objects and archaeological archives to SPECTRUM collections management standards. Museums in West Yorkshire, with the exception of Leeds Museums (who use Multi MIMSY software; http://www.selagodesign.com/overview.php) use MODES software, which enables them to meet the eight SPECTRUM Primary Procedures required for Museum Accreditation (MODES website at http://www.modes.org.uk/). The other documentation management system used by Rochdale and Manchester is the KE Emu system (https://www.kesoftware.com/ke-software/ke-emu), and this software again meets the SPECTRUM standards. All of the museum document management systems were used to retrieve the specific information regarding finds and collections, and these could hold dates, names and specific data regarding a museum's collections. Each of the museums below provided information from their system and often provided exported data in pdf. format.

With regards to the provenance of finds this varies greatly between museums. It is common for museums only to record to the level of a site name such as "Pugneys", "Lake Lock" etc. Museums do not generally record to an exact grid reference, as this is often unknown, especially with historical finds (Leanne Dodds pers. comm. 09/10/2015). In this study, the only exceptions to this was where a collector had recorded an apparently precise grid reference (as is the case with J L Turner, or has been ascribed to them by previous researchers as with Samuel Crowther and the Darby brothers' collections; see below).

The individual museums are discussed as follows:

Bradford Museum Service, based at The Cartwright Hall Art Gallery, Bradford – visited by Jason Dodds 22/04/2015

When Jason Dodds visited Bradford Museum it was immediately following a move from previous premises at the Manor House Museum, Ilkley (now permanently closed). The Museum holds documentation in both the form of archival information (in the form of notebooks and written texts) from lithic collectors (notably from Samuel Crowther and John Turner). It was not possible to view the lithic collection at the museum store because of the recent closure and move of material. Within the museum collection a supposed Palaeolithic hand axe (PRN 3811) discovered by Crowther (see Plate 1) was, however examined, and was identified as being only a piece of gritstone and can thus be discounted.

The Museum Service also held the undergraduate university dissertation of Stephen Hobson (discussed below) and also further project reports such as an anonymous and undated document regarding the collections of John Turner (aka J L Turner). Bradford Museums Service record finds locations to 6 figure grid references (where possible) on their museum card system, and are the only museum service in the study area to record site locations. From the information held by Bradford Museum 45 new HER records were created and 3 HER records were amended.

Calderdale Museum Service (Heptonstall Museum, Heptonstall) – visited by Jason Dodds 12/06/2015

Heptonstall Museum was visited after discussion with Jeff Wilkinson, as this museum was identified as holding the collection of E V Darby and H Darby. The museum collection for the Darby Material had been catalogued in a very detailed manner as part of Paul Rawson's undergraduate dissertation (see below) and the accuracy of his finds identification was checked by Jason Dodds and found to be good. Rawson's dissertation on the Darby material includes a high level of precision for find spots, with site locations identified to within 6 figure grid references. Calderdale Museum Service use the MODES documentation management system, however, as discussed above, unless finders have recorded locational information, sites are generally identified either by site location or by site name only in the museum's documentation.

98 new HER records were created using the Rawson dissertation and information from the Darby archive and 15 records were amended.

Kirklees Museum Service, (The Tolson Memorial Museum, Huddersfield) – visited by JD 06/05/2015

The Tolson Memorial Museum in Huddersfield holds a lot of relevant information for the project. The Museum Service is the best source of primary documentation for lithic collectors and holds both notebooks and drawing books for Francis Buckley and notebooks for J L Turner (both were copied and utilised for the project). The J L Turner notebooks are accompanied by 1:25000 1950s/60s Ordnance Survey maps, which had been annotated by Turner with his find spot locations and permission was also granted to copy these for the project. The Tolson Memorial Museum accession register, which was filtered by Chris Yeates (Museum Curator) to provide only records relating to the Mesolithic, is labelled by site name, with a detailed record of each individual part of the collection, and this allows for comparison with Turner's notebooks and maps. Buckley's notebooks and drawing books, for which site locations could be identified from Paul Preston's (2011/12) PhD thesis, also proved to be extremely informative.

112 new records were created and 40 amended.

Leeds Museums and Galleries (Leeds Discovery Centre, Leeds) – visited by JD 07/05/15 & 08/05/2015

Upon visiting the Leeds Museums Discovery Centre the most notable artefact an Early Palaeolithic hand axe (accession number LEEDM.D.2010.0012.005.025; PRN 14435) was not available and could not be viewed. ASWYAS have, however, provided photographs of the artefact (Plate 2). No original documentary information was held by the Museum. In addition to the Palaeolithic axe HER records were also created for finds from Miles Hill, Meanwood (PRN 15166) and Frying Pan Rock, Otley Chevin (PRN 15266). It was not, however, possible to give precise locations for these finds, with only the approximate location identifiable. A large number of lithics were viewed at Leeds Museums Discovery Centre, however part of these collections were from outside West Yorkshire (from East and North Yorkshire). In total 3 new HER records were created with information from Leeds Museum and 3 were amended.

Wakefield Museum Service (Wakefield Museums Store, Wakefield) – visited by JD 10/05/15 & 16/05/2015

All of the lithic collection at Wakefield Museum for the Palaeolithic and Mesolithic periods were viewed and analysed by Jason Dodds. Wakefield Museums hold a significant amount of Francis Buckley's lithics from Kirklees District. The Museum hold the original information and dates of Buckley's donation and from searching their collections database , which was matched with existing PRNs and compared to Preston's PhD thesis, it was possible to correlate the collections with site locations and to identify these sites with the museum's accession numbers. Using Buckley's notebooks which recorded the locations of the museums to which he had donated artefacts it was possible to match Buckley's notebook entries with the finds in question (see Plate 3 for an example of a Buckley notebook entry and Plate 4 for images of the artefacts). In addition to the selected lithics from the collections of Francis Buckley

(from White Hill Rishworth (PRN 13614;Plate 7); Lominot (PRN 13730; Plate 8) Pule Hill, Marsden (PRN 14322; Plate 9); Cupwith Hill, Marsden (PRN 14343; Plate 10) & Warcock Hill, Marsden (PRN 14384; Plate 11), Wakefield Museums also hold an example of a Mesolithic axe hammer (PRN 3817; Plate 12; on loan from John Goodchild) and also a Mesolithic tranchet axe (on loan from the Tolson Museum, Huddersfield) from Netherton (PRN 2054; Plate 13). In addition to these lithics Wakefield Museum also hold lithics discovered on lowland sites such as Pugneys, Wakefield (PRNs 668, 670, 7180, 13514), Holywell Wood, Ferry Fryston (PRN 3901), Castleford (PRN 3912) Sandal Castle (PRN 1548), Woolley Edge and Woolley Beacon (PRN 2853).

Three lithics (PRN 3812) at Wakefield Museum, originally recorded as being of Palaeolithic date were viewed by Jason Dodds (10/05/2015) and were identified as being of Early Mesolithic date. These had been misidentified by J W Walker in his "History of Wakefield" (published in 1934; Plate 14). The HER record (PRN 3812) was amended to reflect the change of date. Two Middle Palaeolithic hand axes (PRN 3813) were also viewed by Jason Dodds and photographed (Plates 15 &16). A further Palaeolithic hand axe from Lupset Wakefield (PRN 3814) drawn by J W Walker (Plate 16), could not be located on visiting the museum. However, an examination of the drawing confirms the Palaeolithic date.

At Wakefield Museum Service it was relatively easy to match artefacts in Buckley's collections with the exact records of the artefacts from his notebooks using the dates provided in the museum records and using drawings of the artefacts in his drawing books. The Palaeolithic material held by the museum also held exact page references to J W Walker's History of Wakefield.

5 new HER records were created and 12 HER records were amended from information from Wakefield Museum.

Manchester Museum (Manchester) – visited by JD 09/06/2015

Manchester Museum hold a small proportion of Francis Buckley's collection. Although the museum did not hold any primary documentation from Buckley the lithics were presented in frames and had been annotated with find dates, site names and specific details (see Plate 18). It was possible by looking at dates within Buckley's notebooks and also information from Preston's PhD thesis, to identify the specific locations of the sites. A good example of this was the site at White Hill (PRN 13675), where Manchester Museum held 8 of "a series of 33 pygmy tools found in a straight line 6 feet long at intervals of 1½ to 2 inches", possibly representing a hafted projectile. The record of these finds was found in Buckley's drawing book no. 9 and the location added from Preston's thesis. (Preston has visited the sites in the field based on the finder's documentation and identified sites from descriptions and taken GPS readings to provide as precise and accurate locations as possible.) The remainder of the Buckley collection from Manchester Museum was located to relatively precise locations and the museum information was added to the HER. With the exception of the Buckley collection Manchester Museum also held a number of other lithics from West Yorkshire which were identified only by very general site names which cover a very broad area and the precise location of these sites could not be located.

Manchester Museum Service use the Ke Emu document management system, however Bryan Sitch **(**Deputy Head of Collections and Curator of Archaeology) kindly exported information from this in the form of Pdf files for the use of the project. From the museum collections 4 new HER records were created and 2 HER records were amended.

Rochdale Arts and Heritage Resource Centre (Rochdale) – visited by JD 18/06/2015

Rochdale Museum service were very helpful with the project. The Museum documentation system is Emu document management software, which recorded a number of sites from West Yorkshire. The lithic material was all recorded on temporary museum numbers (T references) by very general site name or area names. it was not however possible to match this material with any finder, find date or to find any precise locations for the sites and therefore no HER records were amended or created.

Museums and the Usefulness of Collections for HER Enhancement

The museums visited as part of the project all work to precise Museum Standards (Spectrum), However museums' recording focuses specifically on an artefact as opposed to the location of where it was found. Where collectors have given locations for finds these are generally recorded, however this precise level of detail is not a prerequisite of a museum collection, with sites identified by name or general location being viewed as acceptable by museums. For typological identification the examination of museum collections is definitely helpful but it is usually not possible (without supporting finds documentation) to place artefacts within anything other than a most general landscape setting. This was most problematic with collections such as those held at the Rochdale Museum where wide stretches of moorland such as Saddleworth Moor (which extends across both West Yorkshire and Greater Manchester over several square kilometres encompassing a range of smaller moors) is named as the origin of material.

The identification of material within museums can also vary markedly. Within catalogues of material artefacts may just be listed as "flint" rather than an attempt made to identify specific artefact-types other than those which are most obvious. It is apparent than cataloguing in museums has been carried out by non-lithic specialists in the past and within current tightly constrained budgets, museums may employ no archaeologists at all now as part of their curatorial team. It seems unlikely that resources will be available within museums to improve the identification and cataloguing of their lithic collections, as they can appear to be of marginal interest to all but enthusiasts.

The level of detail from collectors who may donate material to a museum also differs massively. The author is aware of modern collectors (recording with the PAS) using GPS to accurately locate site and find spot locations. However, for others only the find itself is seen as being of any importance, although again correct artefact identification can again be problematic with some finders. The education of collectors (and museum professionals) to accurately identify and record both the nature of the lithics found and the location of the find spot is key to the future creation of useful HER records and to provide a better understanding of the wider prehistoric landscape. Future research on this subject within museums will require a detailed knowledge of the collections (obtained from primary and secondary sources) to understand the degree to which reliance can be placed upon particular written material. There also needs to be the existence of associated primary documentary information containing locational detail to provide a context for a find that is to be of anything other than general use to an HER. In the case of modern archaeological archives, this should not be an issue with the precise location of finds being easily identifiable. For antiquarian and later collectors the amount of available information will differ, if any is available at all. Some antiquarian collectors' site locations can be accurately identified, such as Buckley's sites, which were identified in the 1993-6 excavations at March Hill by Spikins (2002, p.15, 32) and also a significant number of sites were identified by Preston's PhD research, but this involved a further stage of work than carried out on this project, involving a significant amount of fieldwork to attempt to identify the location of specific sites in the field (or rather, on the moor). Other antiquarian and perhaps later find spots may be much more difficult to locate and identify.

Any future similar project involving the examination of museum collections for HER enhancement in other parts of the country would be best preceded by a pilot project to examine the existence and usefulness of any associated data available, given the variation in the usefulness of material that this project has revealed.

It is suggested that Historic England (and HERs) could usefully engage in a dialogue with their colleagues in the Society of Museum Archaeologists to encourage them both to appreciate the value of their lithic collections, but also to stress the importance of detailed and accurate locational information to accompany the registration of all finds in museum collections. However, given the absence of archaeological curators from some museums with significant archaeological collections, non-archaeologists in the museums world are also going to have to be engaged and persuaded that recording this information adds significant research value to their collections.

The Lithic Collectors

As part of the literature review and also through museum visits, four main collectors were identified in West Yorkshire: Francis Buckley, Samuel Crowther, the brothers E V and H Darby and J L Turner. These collectors were notable both for the size of their collections in the local museums and the fact that they were known to have attempted to locate their sites in their notebooks which had accompanied the deposition of their collections to the museums.

Each of these collectors and their collections are discussed below:

Francis Buckley Collection

Francis Buckley is an extremely important figure in the history of Mesolithic archaeology on the Pennine landscape. Buckley began collecting lithics in the 1920s and continued until the 1940s. Buckley is described as the 'Godfather of Mesolithic' by Paul Preston in his 2011/12 PhD thesis. Buckley first became interested in the Mesolithic by meeting Aamon Wrigley and during the First World War Buckley excavated a Mousterian site at Coigneaux in France in 1918 (Preston 2011/12 and Buckley 1921).

Buckley was one of the first proponents of the differentiation between the Early and Late Mesolithic microlithic cultures. He was the first to discuss a distinction of a basic typological division between 'Broad-Blade' and 'Narrow-Blade' microlithic industries in the Pennines. Interestingly Grahame Clark who in 1932 published his book 'The Mesolithic Age in Britain' spent time with Buckley prior to writing his text and developing the idea of the differentiation between non-geometric (broad blade) and geometric (narrow blade) microlithic culture (Clark 1932).

Buckley in both his notebooks and drawing books made extremely detailed records of each collecting trip and all of his excavations, in addition to drawing selected lithics in his drawing books (Plates 3 & 4). These drawing books are held by the Tolson Memorial Museum in Huddersfield and were used both to enhance the HER's records and to create new records for Buckley's work. Buckley's notebooks were viewed by Jason Dodds 06/05/2015 during a visit to the Tolson Museum and copies were made for use within the project.

Through a combination of both locations identified from Buckley's notebooks, Dr Paul Preston's PhD thesis and locations previously recorded in the HER, it was possible to create new HER records and to amend existing HER records. In Buckley's notebooks he gives a detailed description of his "field walking" and excavations by date and Buckley's typological description (albeit of his time) were very good and he clearly and accurately identified Early and Late Mesolithic tool types.

Buckley distributed his finds to various museums throughout the country and although the majority of his collection is held at the Tolson Memorial Museum, Huddersfield, his lithics can be viewed in West Yorkshire at Wakefield Museum, Heptonstall Museum and also outside the county at Manchester Museum, Rochdale Museum, Saddleworth Museum and further afield in the Pitt Rivers Museum, Oxford, Cambridge Museum and Liverpool Museum amongst others (Preston 2011/12, p.108).

Jason Dodds viewed elements of Buckley's collection deposited with Wakefield Museum, The Tolson Memorial Museum (where the large majority of his collections are held) and at Manchester Museum. Although Buckley's notebooks record that part of his collections were also held by Rochdale Museum, this collection was not available on a visit to the museum (18/06/2015). Figure 15 shows the spatial distribution of Buckley's sites and find spots.

Samuel Crowther Collection

A University of Bradford undergraduate dissertation on Samuel Crowther's collection was written in 1997 by Stephen Hobson entitled "Lithic Collections and their value for future archaeological research: The value of Samuel Crowther's collection as a resource". As part of his undergraduate dissertation Hobson photographed Crowther's artefacts and copies of these photographs were provided to the project by Gavin Edwards (Bradford Museum's Collections Manager). Each of these artefacts had been given an accession number by the museum and these were added to the new HER records created

from Crowther's Collection. With the exception of lithics held in a personal collection by the Crowther family all of the lithics are believed to be held by Bradford Museum Service.

From the date ranges given for Crowther's artefacts, he collected between 1907 and 1928. Crowther's collection is 100% lithic in nature and Bradford Museum Service's Crowther collection comprised 454 artefacts from periods from the Mesolithic to the Bronze Age. Crowther paid particular attention to the collection of both arrowheads (of Neolithic and later date) and to microliths (of Mesolithic date). Crowther's collection resulted from "field walking" undertaken within a number of distinct areas, both in West and North Yorkshire. Within West Yorkshire he collected at Haworth Brow Moor and Hallas Rough Park, Low Bradley Moor, Carleton Moor, Elslack Moor, Steeton Moor, Sutton Moor, Keighley Moor, Cat Stone and Catstone Ring Moor, Harden Moor, Ovenden/Ogden Moor, Boulsworth Hill (or Boldworth Moor), Stanbury Moor, Wadsworth Moor, Baildon Moor, Ilkley Moor, Addingham Moor and Wadsworth Moor.

Nearly all the artefacts from the Samuel Crowthers collection have a certain amount of information relating to their acquisition written on paper and affixed to one face (Hobson 1997, p.17). Some of this information has, however, been partially or totally lost, possibly when the artefacts were re-boarded in 1960-62 (when all his collection was mounted on boards). Crowther's journal and subsequent board arrangements of artefacts can be dated to between 1928 and the time of his death in 1932 (Hobson 1997, p. 23). Hobson's inference was that Crowther's journal (or notebook) was compiled from previously made notes, with the journal entries containing additional information including the nature of the artefacts, a description, as well as details of the place and date found. Crowther's descriptions of locations of finds was detailed and used by Hobson to create 6 figure grid references. These are believed to be relatively accurate.

Crowther's collection information had been copied to Bradford Museum's Record Card system, which contained accession numbers, descriptive information and a grid reference (commonly to 6 figure grid references, taken from Hobson). This information was added to the new HER records and the WYAAS GIS system was upgraded with polygon sizes reflecting the confidence level that Hobson had expressed in the accuracy of the grid reference.

The Crowther lithic collection was rapidly viewed within Bradford Museum Stores by Jason Dodds 22/04/2015, however, due to the upheaval of the recent museum closure and move from the former premises at the Manor House Museum, Ilkley to the museum stores (which has now been completed) it was not possible to view the artefacts in detail. One artefact discovered by Crowther, which was viewed from the collection, was a supposed Palaeolithic hand axe (PRN 3811), which proved to be a natural piece of gritstone (Plate 1). According to Gavin Edwards (pers. comm. 22/04/2015) it had always been a wish of Crowther's to find a Palaeolithic hand axe on the moors.

Stephen Hobson's identification of the lithics was checked and was found to be accurate, when comparing his description to the images of the collection. His dating of artefacts was also found to be sound.

See Appendix 2 for further details. Figure 15 shows the distribution of Crowther's find spots.

E V & H Darby Collection

Jason Dodds visited the Bankfield Museum, Heptonstall, Calderdale on 12/06/2015 to view the Darby Collection. The Darby family consisted of Mr S Darby, who was recorded as collecting at the turn of 20th Century (in the 1900s) and he introduced his sons E V Darby and H Darby to lithic collecting and they continued to do so in the 1920s/30s. Although some of the Darby's family lithic collections may still be held by the family, the collection held at Heptonstall Museum, is the only known collection of the Darbys' lithics.

The collection has previously been the subject of a 1993 Bachelor of the Arts degree dissertation by Paul M. Rawson for the University of Nottingham, a copy of which was available at the museum. Rawson carried out an analysis of the flint collection of E V Darby and H Darby. Rawson, who had received direct supervision from Roger Jacobi, viewed the documentary information as well as the lithics.

Dodds was able to check a selection of the lithics to establish that Rawson's identification were accurate. Rawson had catalogued the collection with each individual artefact being given its own separate catalogue reference number (linking his catalogue to finds drawings, where they exist) and mapped to a specific location. The Darby collection is unusual in that almost every find had been precisely located to a 6 figure NGR (by Rawson using the Darbys' documentation). It is not known how accurate these are or whether they were checked in the field. Rawson identified 9 specific areas within which the Darby's had collected. These are the Ringstone Edge area, the March Hill area, the Manshead area, the Wessenden Head area, the Green Withens area, the Cupwith area, Dovelaw Rocks, the Readycon Dean area and the Glossop side of Snake Pass; the latter two of which are outside West Yorkshire.

The Darby Collection consisted of lithic artefacts from the Mesolithic through to the Bronze Age. 12 lithics in the collection are of certain Early Mesolithic date and 24 of certain Late Mesolithic date, the majority of the remainder purely having a generic Mesolithic date. One artefact discovered near Lodge Greave, Rishworth, had been identified by Rawson as Palaeolithic in date and had previously been described as an Upper Palaeolithic convex backed blade in the HER (PRN 15032). However after viewing by Dodds (Plate 19), it should be more accurately described as an Early Mesolithic backed microlith, or due to its broken nature possibly be viewed as a microlith fragment, and can no longer be regarded as Palaeolithic. Figure 15 shows the distribution of the Darbys' find-spots.

J L Turner Collection

J L Turner collected lithics in the 1950s and 1960s. Turner produced a series of both notes and more detailed notebooks, which on certain collecting occasions included drawings of site locations (Plate 5). From Turner's notebooks it would appear that mostly Turner collected during field walking and in his notes he comments "being neither an early bird, a man of means, nor a drinker [comparing himself to Aamon Wrigley and Francis Buckley] I do my collecting on a Saturday afternoons, Sundays, and, in summer, in the evenings". Turner, although he did on occasion undertake excavation states that "generally I let the rain do all my digging for me and only carry a small trowel with me, for the stubborn pieces, large excavations making an unholy mess of the site, besides being unrewarding". Turner also recorded that for himself "the big well known sites as a rule yield very few flints, by the very fact they are well known I suppose" (J L Turner's notes c.1961). J L Turner's notebooks produced in 1961 are held by The Tolson Memorial Museum in Huddersfield. (The notes and notebooks were viewed by Jason Dodds and copied on a visit to the museum 06/05/2015.) Turner also produced a series of apparently precisely annotated 1:25,000 Ordnance Survey maps to indicate the location of his findspots (plate 6). Digital copies of these maps along with information on the museums collections were provided to WYAAS by Chris Yeates (archaeological curator at the Tolson), and these made it possible to enhance the HER records with more accurate and precise locations and add the Tolson's accession numbers for Turner's finds to the records. In certain instances it was possible to provide 8 figure NGRs for Turner's sites (from his annotated OS maps) that were both clear and precise.

Turner's collection is mostly held by the Tolson Memorial Museum in Huddersfield along with his annotated OS maps showing the find spot locations, however, as Turner collected in both the Kirklees and Bradford districts, some of his collection is also held by the Bradford Museum Service. Figure 15 shows the distribution of Turners findspots .

Littleborough Historic and Archaeological Society

As part of Paul Preston's 2011/12 DPhil research he studied the collections of the Littleborough Historic and Archaeological Society and also field notes produced by the society between1972 and 2010. According to Preston (2011/12) the society holds one of the largest private lithic collections amassed from over 200 sites (see Fig.15) in the Southern Pennines. The locational accuracy of these sites (to 6 figure NGRs) is regarded by Preston as accurate. The Society frequently carried out field walking episodes, in some cases visiting the same sites repeatedly. The Society also undertook excavation of identified sites in the 1970s. The distribution of the LHAS sites and find-spots is shown on Figure 15.

The Portable Antiquities Scheme

In total the Portable Antiquities Scheme (PAS) added another 283 relevant finds to the record. These were largely finds made during informal/non-archaeological field walking (268 finds), as chance finds (5 finds) and during metal detecting (10 finds). Figure 15 shows the spatial distribution of finds made by collectors who have recorded their finds with the PAS. The lithics recorded by the PAS include 24 blades, 2 awls, 1 borer, 11 burins, 21 cores, 38 pieces of debitage, 1 endscraper and 10 other scrapers, 2 knives, 22 flakes, 1 chopper, 4 microburins, 123 microliths, 12 retouched flakes and 11 other lithic implements. 63 of the finds were recorded as being of Late Mesolithic date and 36 of early Mesolithic date, for those finds which were diagnostic enough to date. The PAS hold no records for any Palaeolithic finds in West Yorkshire. The PAS' Finds Liaison Officer for South and West Yorkshire (Amy Downes) is hosted by the WYAAS and the identifications of lithics for the PAS in West Yorkshire have previously been made by Dodds or by known reliable recorders working as volunteers within WYAAS and are regarded as reliably accurate.

Of the 283 PAS finds, 244 were discovered from the upland areas in the western part of West Yorkshire. The remaining 39 finds were discovered from the north-east of West Yorkshire and the south east in lowland settings. Finds discovered in the north-east of West Yorkshire have a close association with the River Wharfe (and its associated terrace levels). Finds including a flint core (SWYOR-3F2165,) and a flint flake (SWYOR-DCF067) were found near Kilnsey/Havercroft, Wakefield and a flint burin (SWYOR-8B335D) was also found near North Elmsall, Wakefield. The distribution of the PAS find spots is shown on Figure 15.

The recorded evidence for earlier prehistoric archaeology – potential & refinements in dating

Palaeolithic West Yorkshire

Prior to the project the West Yorkshire HER held 13 records of Palaeolithic find spots. Each of these finds were (where possible) viewed by Jason Dodds. Any new records relating to Palaeolithic sites and find spots have been sought and new HER records created, where appropriate producing the following results:

Lower Palaeolithic (500000BC to 150000BC)

Evidence of Lower Palaeolithic activity in West Yorkshire is restricted to a single find of an Early Palaeolithic hand axe (PRN14435) from just south of Wetherby in north-eastern West Yorkshire discovered during the A1 Wetherby to Bramham Motorway excavations undertaken by Archaeological Services WYAS in 2007. There is, however, some speculation as to whether the axe is from a local deposit or has been imported, either by anthropogenic or glacial activity, the latter being most likely. I P Brooks (the lithic specialist who examined the find) comments that "the hand axe was heavily rolled suggesting it had probably been in moving gravel for a period of time, given the location this is most likely a glacial gravel, although a riverine gravel could not be ruled out" (pers. comm. 27/07/2015; see e-mail in Appendix One).

Middle Palaeolithic (150000BC to 40000BC)

Middle Palaeolithic activity is represented by the discoveries of two hand axes from Lee Moor, Stanley near Wakefield (PRN 3813; now in Wakefield Museum viewed by Jason Dodds 10/05/2015; Plates 15&16) and a further Middle Palaeolithic hand axe from Lupset, Wakefield (PRN 3814) (illustrated in J W Walker's *History of Wakefield*), the location of which remains unknown. It has been commonly assumed that these artefacts may not have been found *in situ* due to disturbance by glacial ice, however, these finds were discovered in close proximity to the estimated former margins of the glacial Lake Humber (Figure 7). It is suggested that Palaeolithic Hunter-Gatherers were possibly active in this specific area during the Middle Palaeolithic, focusing their activities on the margins of the lake.

Upper Palaeolithic (40000BC to 10000BC)

In addition to the 4 earlier Palaeolithic hand axes discussed above the West Yorkshire HER at the start of the project held 10 records relating to Palaeolithic find spots. However, many of the supposed Palaeolithic finds recorded in the West Yorkshire HER were discovered in the early 20th Century, when the dating system used was still based on the"hiatus theory" proposed by Evans, where the Mesolithic period was not accepted and many lithics of Mesolithic date were regarded erroneously as being of Palaeolithic date (Preston 2011/12, p. 118; Preston pers comm. 02/07/2015). This inaccurate dating can clearly be seen where 'batter-back' microliths have been described as Palaeolithic, such as at Fly, Warley (PRN 3810) Midgley Moor, Midgley (PRN 3978) and at West Nab, Meltham (PRN 5501). The 'several small blades' found on Midgley Moor in 1914 (PRN 3809 and which have subsequently been lost) were also possibly misidentified at the time as Palaeolithic. At Fells Plantation in Pool, Leeds, Upper Palaeolithic knives along with lithics ranging in date to the Bronze Age (PRN 1220) have been claimed to have been found. It was not possible to confirm this identification as the lithics are held by the finder and they have not been published.

Another confirmed misidentification is the supposed Palaeolithic hand axe from Baildon, Bradford (PRN 3811), found by Samuel Crowther. A viewing at Bradford Museum's store (22/04/2015) proved it to be a natural piece of gritstone (see Plate 1). Mr Crowther, a prolific collector had always wanted to find a Palaeolithic hand axe on the moor (Gavin Edwards pers. comm. 22/04/2015). The HER record for this find has now been amended to reflect its natural origin.

Dr Preston has identified a possible Late Upper Palaeolithic open air site at Washburn Foot, Farnley (PRN 7672) but this is located on the north side of the River Wharfe and is approximately 70m outside West Yorkshire. This site contains an example of a Late Upper Palaeolithic "*Zinken*", or borer-like tool. The site itself, however may be Mesolithic, as most of the material from the site are microliths, although there are also a number of more substantial blades.

A 'bruised edge' Late Upper Palaeolithic blade (PRN 10102) was recovered during the A1 (M) motorway works undertaken by Oxford Archaeology North between February 2003 and May 2006. As with the hand axe from Bramham, this blade was a residual discovery and was found during excavations 1.5km north-east of the eastern boundary of West Yorkshire (Brown et al., 2007, p.22). This find is located 900m west of the suggested edge of the former glacial Lake Humber.

A possible rock shelter known as Light Hazzles in Langfield (PRN 10745) is suggested to have contained both Palaeolithic and Mesolithic lithics by the finder (a Mr Kesshaw July 1978) .The rock shelter contained a sand and silt deposit and three scrapers and a bladelet, one of which is suggested to be heat altered, a flint hammer stone and a bladelet with a flaked tip, which were apparently found on the surface. Although this site may represent Palaeolithic occupation, the type of finds discovered (a bladelet and three scrapers) are more suggestive of a later prehistoric date, i.e. Mesolithic or perhaps later.

Near Lodge Greave, Rishworth, in the west of West Yorkshire, a retouched broken blade found by E V and H Darby was described as an Upper Palaeolithic convex backed blade (PRN 15032). This artefact has been examined and is more accurately described as an Early Mesolithic convex backed microlith, or given its broken nature a microlith fragment. (This artefact was viewed by Jason Dodds at Heptonstall Museum on 12/06/2015; Plate 19.)

Wakefield Museum have identified a number of lithics from Lake Lock near Wakefield as being of Palaeolithic date (viewed by Jason Dodds at Wakefield Museum 10/05/2015; Plate 14). The dating is based on an incorrect description in J W Walker's '*History of Wakefield'*, originally published in 1934. The artefacts actually are an Early Mesolithic shouldered point, a retouched blade (of Mesolithic date) and an Early Mesolithic graver.

The comparison of the distribution of the new and the previously recorded sites (Figures 10 & 11) shows that the Palaeolithic sites - which all exist as 'findspots' with the exception of the possible *zinken* from Washburn Foot, Farnley (North Yorkshire) and the un-excavated rock shelter at Light Hazzles, Langfield - have been found from within the eastern part of the County. It is the view of the author and academics (such as Spikins and Preston) that these finds' location are due to the close proximity of the former margins of the glacial Lake Humber. The key potential sites in West Yorkshire would be the possible two cave/rock shelter sites at Bramham (PRN12763) & Light Hazzles, Langfield (PRN 10745) which could have the potential to contain deposits of Palaeolithic date.

In summary although only limited evidence for Palaeolithic activity in West Yorkshire has been recorded from artefactual evidence, much of West Yorkshire was covered by the British Ice Sheet throughout this period and as West Yorkshire has very few known caves or rock shelters, the likelihood of there being good archaeological survival of Palaeolithic remains other than occasional lithics is very limited. However, the possibility of Palaeolithic lithics being recovered is significantly higher in two specific areas: firstly around the margins of the former glacial Lake Humber (Figure 7) and secondly within the known cave or rock shelter locations (two of which are known and discussed above). However, the possibility of the survival of ephemeral buried land surfaces and occupation levels in the known cave and rock shelter, should not be discounted until proven otherwise.

The project has been very useful though for increasing our understanding of the Palaeolithic in West Yorkshire in that it has allowed for the examination of all previously identified Palaeolithic lithics where these were available and has confirmed some of them in this date, whilst discounting others which had been recovered from areas where an Early Mesolithic presence was more likely.

Mesolithic West Yorkshire

In the Mesolithic period a significant number of new find-spot locations have been recorded on the north side of the Bradford District, in the areas around Ilkley Moor, Baildon Moor, Silsden Moor, Keighley Moor, Burley Moor and Morton Moor (Figure 11).

Prior to the project all the HER records were identified on the HER database under the generic period date 'Mesolithic'. However through the project it was possible to refine such dating and separate certain sites in to either an 'Early Mesolithic' (35 records) or 'Late Mesolithic' (114 records) date, whilst 37 sites can be identified as having been occupied through both these sub-periods. Sites potentially occupied during the Terminal Mesolithic are also now recognised on the HER database (for which a new date of 5000-4000 BC was created within the HER database and an addition to the MIDAS compliant pick lists created). The West Yorkshire HER now contains 35 records for Terminal Mesolithic sites and find-spots (a period of great interest to current researchers). This dating is based on the reported presence of rod microliths (Griffiths 2014, pp. 221–243). With notable rod microlith-dominated assemblages at March Hill Top and Cupwith Hill, in West Yorkshire (Spikins 2010, p.16; Spikins 2002). One caveat, however, which must be placed on the identification of such a Terminal identification is that not all academics/researchers are in agreement with the identification of rod microliths as being a purely Terminal Mesolithic indicator. There are known sites where occasional rod microliths have been found in association with what are identified as more typically Later Mesolithic tool types (Preston pers. comm 21/01/2016).

The West Yorkshire Historic Environment Record now holds 1243 records for the Mesolithic period, which is nearly double the 671 Mesolithic HER records from before the project. The final total includes some 283 records added from the Portable Antiquities Scheme data (Figure 15). A GIS layer was also created to map the locations of the PAS finds and a url. link between the WYAAS GIS and the PAS online database was also created.

The large increase in new HER records and the increased accuracy of the locational data is due to the information sourced from the museums as well as the academic texts. Dr Paul Preston's PhD research,

information which was supplied to WYAAS, has also significantly improved the HER's knowledge of sites and has led to the creation of a large number of new records. The provenance of HER records, which was previously lacking in parts, has also been significantly increased for Mesolithic sites. The new site and find-spot locations have been added to the HER database, including the level of confidence attributed to the grid reference, which again is reflected in amended polygons on the HER's GIS.

Figure 18 shows areas of significant potential for the future discovery of Mesolithic remains. The area of greatest potential for recovering Mesolithic remains lies in peat at an elevation of between approximately 380m AOD and 430 AOD, particularly on south-facing slopes with extensive views. These areas - based on Spikins' work (2010) – are thought to be a focal area for Mesolithic activity, a point apparently confirmed by the distribution of Mesolithic sites and find spots shown on Figure 18. Peat deposits are also associated with these areas of high altitude and these may contain Mesolithic deposits with the potential to include organic remains as well as a high level of spatial integrity. Mesolithic remains in the west of the County are also less affected by the development pressures seen in the east. In addition to these areas in the west of the County, alluvial deposits and river terrace deposits (Figure 18) also have to potential to contain Mesolithic sites, albeit within less secure deposits.

Of the Early Mesolithic sites identified from the project only 4 sites were located in a lowland setting (PRNs 3812, 3901, 13550 & 14433).The remaining 31 sites are from an upland setting. For Late Mesolithic sites 114 sites are from an upland setting and only 8 (PRNs 3901, 3912, 14411, 14433, 14434, 14617, 15164 & 15165) were from a lowland setting. This is suggestive of the upland areas being utilised to target game. Of the 35 suggested to be of Terminal Mesolithic date only 1 site (PRN 15164) is from a lowland setting at Micklethwaite, Leeds.

Bias in the distribution of sites and find spots and identified problems of visibility

In the upland areas in the south west of West Yorkshire within the peat deposits (see Figure 8) there are a large number of new HER records, supplementing the Mesolithic sites already present within this area. Looking at the whole of West Yorkshire there is a clear difference in the number of recorded sites between the western and north western parts of the County and other areas of West Yorkshire. The large number of early prehistoric sites within this area *may* be explained by the higher altitude, with a preferential selection of spots located to provide good viewpoints across the landscape, making it possible to observe the movement of game. The presence of areas of eroding peat, which expose early prehistoric lithics may also explain the prevalence of known early prehistoric sites in this area. However, the number of early prehistoric sites known in this part of West Yorkshire is almost certainly due to the activity of collectors, with Francis Buckley, The Darby brothers, and J L Turner all active in these areas (Figure 15). The activities of Samuel Crowther in the north west of the County can also be seen to help create a bias in the distribution (Figure 15). These individuals were collecting during the period when air pollution blowing east from the from the industrial cities in Lancashire was eroding the peat in the Pennines. Since then, with the clean air Acts and the almost disappearance of heavy industry, peat erosion is much more localised and likely to be due to localised physical ground disturbance.

There is a clearly visible bias towards western parts of the county. Looking at the distribution of sites and find-spots identified by collectors on Figure 15, there are identifiable areas routinely visited by collectors. A somewhat similar pattern can be seen by the Portable Antiquities Scheme data, although not exclusively, with a similar bias to the west of the County. It is not known to what extent the PAS finds represent *ad hoc* chance finds or whether targeted collection is being carried out. A large amount of the material from this part of West Yorkshire is coming from flint collectors (some of it historic) rather than ancillary material collected during the course of metal detecting.

For those western areas of a similar topography and superficial geology which appear blank on Figure 11, the absence of recorded sites is likely to merely reflect the absence of documented collecting activity. It is possible that this bias may be explained by the collectors' concentration on areas known to provide 'richer pickings'. Turner for example, in his notebooks states that in discussing sites with other collectors he identified specific areas and records that specific sites were visited by other collectors in the past and now provided few flints to find. If such finds have gone unrecorded they are now lost for ever.

The accessibility of the open moorland in the past when the peat was heavily eroding was also undoubtedly a major factor in creating the opportunities for observant individuals to spot the presence of earlier prehistoric artefacts and to allow opportunities for collection to take place. Neither of these factors pertain for agricultural land at lower levels, the majority of which in the west of West Yorkshire, is pasture rather than arable and relatively inaccessible.

Archaeological survival is also undoubtedly a major factor in biasing the distribution of known early prehistoric activity. Large areas of West Yorkshire are urbanised – as can be seen by Fig. 17 - and the county has also been subject to a wide range of different forms of extraction as is shown by Figure 5. This development and extraction has led to both a reduction in the archaeological visibility and an increase in probable destruction of early prehistoric remains. Early prehistoric material found in urban and suburban West Yorkshire is typically small scale and residual and these areas can be regarded as being of low potential for prehistoric material of all periods.

For the east of the county, the relatively ineffective nature of field-walking as an archaeological prospecting technique in West Yorkshire; the fact that development activity has no relationship to agricultural cycles when ploughed fields may be available; the very small size of Mesolithic artefacts; and the tendency on archaeological field projects to machine strip the topsoil from developer-funded investigations following geophysical survey, all militate against the discovery of earlier prehistoric remains unless they are found as residual artefacts within later features archaeologically hand-excavated. This undoubtedly has led to biases in the known distribution of sites as early prehistoric archaeology is not amenable to the standard suite of archaeological prospecting techniques typically employed and there are so few records from this part of West Yorkshire for alternative approaches to be felt to be justifiable given the costs and time constraints of test pitting and sieving significant samples from areas where nothing of earlier prehistoric date has been recovered(I. Sanderson pers. comm.7/12/15).

A comparative analysis of the recorded material in West Yorkshire with that recorded in South Yorkshire

The Archaeological Services WYAS report (Grassam and Weston, 2014) on the early prehistoric period for South Yorkshire contrasted South Yorkshire's records with that of West Yorkshire for the Palaeolithic. Prior to the commencement of this project (February 2015) a significant number of Palaeolithic records in West Yorkshire were from the Millstone Grit western uplands. However, following the recasting of the West Yorkshire HER as part of this project, the Palaeolithic records from this area of the county have now been reclassified as being more accurately Mesolithic in date. Palaeolithic sites in both West and South Yorkshire are now seen to be located within the eastern parts of both counties, with the one exemption in West Yorkshire of the un-excavated rock shelter at Light Hazzles, Langfield (PRN 10745), where the possible Palaeolithic identification is not confirmed. It is suggested that the comparable distributions may be explained by the position of the former glacial Lake Humber to the east (see Figure 7 for the distribution of Palaeolithic sites in West Yorkshire).

A comparison of the distribution for earlier prehistoric sites and find-spots in both West Yorkshire and South Yorkshire may be seen on Figure 17. This shows that the majority of Mesolithic sites in both West and South Yorkshire are known from the western upland Millstone Grit which is covered by peat deposits, but for South Yorkshire there is a perceptibly more uniform spread of Mesolithic finds across the county than is apparent in West Yorkshire where there are fewer recorded find-spots from the central area of the county. This may be explained by a difference in the spread of both urbanisation and development pressures. In West Yorkshire development attracting archaeological interest has tended to focus on the eastern area of the county in recent decades (where the geology is amenable to archaeologically-significant cropmark formation) and archaeological evaluation techniques employed have not been suited for the recovery of earlier prehistoric material other than that present as residual finds in later cut features. It is likely that Mesolithic activity was as widespread in West Yorkshire as in South Yorkshire.

Prospection and Mitigation Methodologies for Developer-Funded Work

This section draws heavily upon the mitigation approach detailed for South Yorkshire in Grassam and Weston (2014) which itself drew heavily upon the approach to mitigation put forward previously by Spikins for West Yorkshire (2010). It is also informed by Dickson et al (2014). It has been written in consultation with those members of staff responsible for implementing development management in West Yorkshire to establish an approach that is robust and practical in the context of the planning system.

Predictive modelling can be used to identify areas of high potential: with south-facing slopes near the sources of springs and unique landscape features such as conical hills or rock outcrops, being particularly strong candidates for Mesolithic sites on the plateau-edge at *circa* 380-430m. elevation. Given that one of the results of this project is that the pattern of known sites can be seen to reflect biases in collection, the WYAAS GIS will be amended to identify all areas in the Southern Pennines that appear to fall within the identified parameters, to create a Mesolithic alert layer for use in development management. However, it will be noted that as little work or collection has taken place on plateau centres, these cannot be ignored should they be affected by future development proposals.

An alert layer will also be created in the HER GIS to reflect the believed former extent of glacial Lake Humber and its shore-line, including a one km buffer zone as an area where there is a higher likelihood of finding both Palaeolithic and Mesolithic remains.

Prospection / evaluation in upland areas

Given the typically very small size of Mesolithic artefacts, watching briefs are known not to be suitable to use as an evaluation technique to try to identify the presence of early prehistoric sites.

Geophysical survey, where it is known to work, may be a suitable technique to employ to attempt to identify hearth sites and other features.

For upland areas it is the opinion of Spikins that where the potential for Early Prehistoric sites is known to be relatively high then large bore auger surveys should be employed to identify the presence of sites and identify site margins. This needs to be done on a relatively large scale, the samples being wet sieved using a 3mm sieve with the samples ideally allowed to dry before sorting to improve the recovery of small artefacts. As an important rod microlith site at March Hill Top was found to exist within an area 2m x 2m, auger survey intervals should be at every metre. Artefacts are typically found within 10cm either way of the base of the peat.

The evaluation report should include a section on the analysis of the lithics by a recognised lithics specialist detailing the quality of the lithics, their technology and chronology. This lithic report may then be used to inform the need for further work either in the form of further evaluation or more excavation or perhaps palaeo-ecological analysis.

Excavation/mitigation in upland areas

Mesolithic sites have the potential to be preserved in situ with a high level of spatial integrity. During the excavation of early prehistoric sites all finds should (at least initially) be piece-plotted in 3 dimensions. This level of recording is necessary to ensure the full recovery of small finds, which in some cases may be minute in size. To ensure this level of finds retrieval in bad weather conditions it may be necessary to erect a covering tent. If the integrity of the site is established not to be high, then finds may be plotted in a 50cm grid square system.

All evidence for burning should be plotted with any evidence of transient burning and the location of burnt lithics also planned. Any in-situ hearth features should be dated from charcoal samples using AMS dating in order to provide a sequence of dates. Micromorphology and charcoal identification should be carried out and care should be taken to identify and record apparent phases of use. It may also be considered necessary to block lift hearth features to excavate them in laboratory conditions.

Charcoal samples from layers containing diagnostic lithics should be radiocarbon dated. During excavation, particular attention needs to be paid to the possibility of revealing structural features and stake and post holes.

Sites should be sampled for the survival of palaeo-environmental evidence and any environmental evidence found associated with early prehistoric artefacts should be scientifically analysed and dated. Anywhere with secure peat deposits would almost always be suitable for palaeo-environmental research, except where the peat has dried or where there is low preservation of pollen or where no macrofossils may be identified. Future peat analysis could potentially be used to produce an independent climate record (Blackford pers. comm.10/10/2015).

Post excavation typological, metrical and raw material analyses are essential. Microwear analysis should be undertaken where it is believed to be worthwhile (i.e. where suitably large cutting edges can be analysed) to allow the identification of wear patterns. Although the traditional approach has been to select microliths for microwear analysis, it is now recognised that it would be useful to select a wider range of tool types for analysis. Following excavation, re-fit patterns should also be established for any lithic material where possible.

Publication should include full lithic analysis (including attribution by an acknowledged specialist) to particular period and phase and illustration, with all diagnostic artefacts illustrated (especially any that are suggested to be of Palaeolithic date).

Prospection / evaluation in lowland areas

Within a lowland environment there may be significant potential for the discovery of both Palaeolithic and Mesolithic remains in areas which bear a close association with previous wetland environments. This potential can be seen within two specific locations: on the suggested margins of the former glacial Lake Humber and also on river terrace levels and upon river deposits such as alluvium. Such sites have the potential to produce artefacts and both faunal and preserved ecological evidence.

Detailed evaluation should therefore be considered on any site located at the edge of a previous wetland environment such as the littoral of glacial Lake Humber, on the bank of a palaeo-channel or on a river terrace, particularly where there are records of Mesolithic or Palaeolithic remains from a similar environment.

Prospection should first be by augering to locate and map the bank or shore deposits. This will enable the siting of targeted test pits (if the overburden is shallow enough to allow these to be used) or trial trenches. All deposits, including overlying deposits, should be sampled and sieved (as detailed in the strategy for upland areas above).

For sites where gravel deposits are the superficial geological overburden (and which can be the focus of the minerals industry) specialist advice should be sought on the geological age of the deposits to help ascertain their potential to contain Palaeolithic or later material.

Evaluation reporting should follow that for upland areas outlined above.

Excavation approaches in lowland areas once a site has been identified should follow those outlined for upland areas above. N.B. Where earlier prehistoric material is located on sites where the main interest is not the earlier prehistoric (e.g. Romano-British sites) lithics should be adequately assessed and reported on (as indicated above) in the excavation or evaluation report. This is currently often not the case.

Prospection/ evaluation in lowland ploughzone areas

If the agricultural and development cycle coincide and an area has been ploughed, archaeological field-walking at 5m. spaced transects should be used to attempt to identify lithic scatters in the topsoil. Any concentration (broadly anything in the region of 20 finds within a particular area) should be subject to systematic test pitting to an undisturbed natural with the location of any earlier prehistoric material recovered from features, recorded three dimensionally.

Where a site has not been ploughed or the agricultural/development cycle preclude the use of field-walking, sites with an identified potential for Early Prehistoric remains should be subject to systematic rapid shovel-testing and sieving (with 3mm mesh sieves) of the topsoil at 5 m intervals to attempt to identify the presence of lithics.

Potential for Further Work

The project has more than doubled the number of HER records for the Mesolithic period in West Yorkshire and has reviewed the classification of Palaeolithic records and produced a more accurate record of Palaeolithic finds. The enhancement has also identified areas of possible future research.

Other than the main collections held in the local authority museums in West Yorkshire, which were the subject of this project, there are other collectors who were active in West Yorkshire in the past. Most of these are known from secondary sources such as Wymer & Bonsall (1977) but the location of their records and whether there is any surviving documentation is generally unknown. However, it is possible that the records of other collectors such as E T Crowther (and family), Brian Howcroft, Patrick Stonehouse and Aamon Wrigley (to name a few) would be worth investigating if the material can be tracked down. In the course of the project the HER became aware of the Cowling collection at Otley Museum (a privately-run museum) and this would be available to researchers. During the course of the project an assemblage of lithic material recovered by Stuart Hunt from Ovenden Moor (an area which is located within an identified Persistent Places) has also been deposited with WYAAS. This collection will be analysed and recorded on the HER by Jason Dodds following completion of the project.

Although the site locations identified from the Palaeolithic and Mesolithic Lithic Artefact (PaMELA) database have been considered as part of the project from secondary sources such as Wymer and Bonsall (1977) a comparison of the newly enhanced HER data with the PaMELA database may lead to the discovery of additional sites and find spots from the Mesolithic and Palaeolithic periods.

In the future, the use of augering surveys may also help develop the creation of a a deposit model of the landscape, which could be utilised as a predictive tool. The use of specialist modelling software such as RockWare for example, commonly used in the petroleum industry, may allow for the reconstruction of topography and early prehistoric and later land use. Such modelling of the landscape could also be combined with an ecological model to create 3D models of both topography and former vegetation cover.

There may also be the potential for future community involvement, if funding was identified and made available, as has been the case within West Yorkshire on the Heritage Lottery funded Pennine Prospects Watershed Landscape Project, working on rock art sites of the later prehistoric. The main exemplar of community involvement on the earlier prehistoric would be the North East Yorkshire Mesolithic Project undertaken by Tees Archaeology and the North York Moor National Park, which was funded by English Heritage. On this project survey work was undertaken by members of the public (over four seasons) and was also associated with field walking and test-pitting (details at http://www.teesarchaeology.com/projects/Mesolithic/Mesolithic.html). Work involved the identification of erosion patches (on peat) with exposed lithics, which were then targeted for test pitting. The North York Moors have obvious parallels with the environment presented by parts of both South and West Yorkshire and it is possible that a similar research project run within the two counties, would have a similar benefit to the Tees Archaeology project.

This project has focused heavily on museum collections but significant numbers of records had their locations enhanced by Preston's fieldwork which had attempted to locate sites accurately in the field, using any description in the documentation as a guide and looking for evidence for excavation, accurately locating sites using a GPS. A future project involving this approach would not only probably improve the likely locational accuracy of the records, but also allow a better appreciation of the sites in relation to topography, landscape features and views. It would also provide information on the current state of peat preservation and the degree to which it may still be eroding.

There needs to be greater consideration for the requirement of palaeo-environmental work during any archaeological mitigation carried out in the peat, with peat cores or recovered charcoal, subject to radiocarbon dating.

There may also be a benefit in identifying significant lowland sites where lithics have been collected in the plough soil, to target for systematic field-walking and possible excavation. One such site that springs to mind is that at Whitwell Farm, Linton, Leeds (from where Mike Meegan has collected a diverse range of lithics). This site would benefit from further field walking and perhaps excavation in the form of test-pitting. The flints recovered should be analysed by a specialist and perhaps training for collectors would be helpful.

Conclusions

The work involved in this project has demonstrated that information derived from published secondary sources in Historic Environment Records can be significantly enhanced where adequate documentation was created by the original lithic collectors and where this documentation has been deposited with the lithics with a museum service. Carrying out this work however is time-consuming and took significantly longer than had been originally estimated, given the time it took to read and locate hundreds of sites from variously adequate sources. WYAAS recognised the importance of this material and the benefit to the HER of satisfactorily completing the project, so additional resources were put into the project by WYAAS at no additional cost to Historic England. It has also to be said that records and documentation are very variable and the results obtained in West Yorkshire cannot be guaranteed to be replicated in another part of England. As indicated above, any similar project would benefit from an initial pilot project in the area of interest to check the nature of any surviving documentation.

The project has also revealed the different nature of interest that museum archaeologists have in finds deposited with them, in comparison to archaeologists in HERs. Detailed locational information is not a primary interest to museums. It may be helpful in the longer term if greater effort were made by Historic England and Local Authority archaeologists generally to persuade museums archaeologists of the wider benefit that accurately recording the location of find-spots in museum documentation has and of sharing this data with their local HER for all newly accessioned material.

The results of this project now allows much greater confidence to be had in any discussion on the nature of finds and the location and degree of Palaeolithic activity in West Yorkshire. It has also identified a potential zone within West Yorkshire (the probable area of the former glacial Lake Humber and its margins) where there is a significantly higher probability of recovering Palaeolithic material in future if it is looked for in an appropriate way.

The project has also demonstrated clearly that the current known distribution of Mesolithic material in West Yorkshire is the result of a series of biases in collection and recording and that allowing for these means that credible arguments can now be made to extend the area of potential archaeological interest in the earlier prehistoric into additional areas where there are currently few documented Mesolithic finds.

An attempt has also been made to create a realistic and workable approach (in discussion with those who would have the job of implementing it) to managing the adequate evaluation and mitigation of earlier prehistoric remains within the planning process, particularly in lowland areas. It is to be hoped that the future application of this approach will, in rectifying acknowledged weaknesses in the current evaluation and reporting of earlier prehistoric material, create opportunities in the future to recover earlier prehistoric remains that will help transform our understanding of the period in West Yorkshire. The

large areas of peat in upland West Yorkshire certainly have the potential to contain sites that, if identified, could do this.

Distribution of the Report

Copies of this report have been provided to Historic England.

Hard copies of this report have also been sent to:

- South Yorkshire SMR
- North Yorkshire HER
- East Yorkshire HER
- Manchester HER
- Lancashire HER
- Peak District National Park

And also to:

- Wakefield Museum
- Kirklees Museum
- Leeds Museums and Galleries
- Bradford Museums Service
- Calderdale Museums Service
- Manchester Museum
- Rochdale museum

Bibliography

Barnes, B., 1982, Man and the Changing Landscape: work notes 3: Liverpool, Liverpool University

Bateman, M. D., Buckland, P. C., Chase, B., Frederick, C. D. & Gaunt, G. D., 2008 (May): *The Late-Devensian proglacial Lake Humber: new evidence from littoral deposits at Ferrybridge*, Yorkshire, England. Boreas*,* Vol. 37, pp. 195–210.

Blackford, Jeffrey, 10/10/2015 pers. comm. during telephone conversation

British Geological Society GIS mapping at http://www.bgs.ac.uk/opengeoscience/ downloaded to WYAAS GIS 02/02/2009

Darby, E. V. & H. c. c.1920s & 30s, The Darby Collection held at Heptonstall Museum, Heptonstall

Donahue, R. E., & Lovis, W. A., 2006, *Regional settlement systems in Mesolithic northern England: Scalar issues in Mobility and territoriality* Journal of Anthropological Archaeology 25, 248-258.

Brooks I P. 2013, 'Lithics' in Martin, L., Richardson, J., Roberts, I., 2013. 'Iron Age and Roman Settlements at Wattle Syke' ASWYAS Yorkshire Archaeology 11

Brown, R. L., 1982, The Palaeoecology of Three Archaeological Sites in the Central Pennines, in Barnes, B., Ed. *Man and the Changing Landscape,* Liverpool University, Liverpool. Work Notes 3, pp.86-96.

Buckley, F., 1921-1948, *Buckley's Notebooks,* The Francis Buckley Collection, The Tolson Memorial Museum, Huddersfield

Clark, J G D, 1932, The Mesolithic Age in Britain, Cambridge University Press, Cambridge

Clark, J. G. D., 1934, *The Classification of a Microlithic Culture, the Tardenoisian of Horsham*, The Archaeological Journal, *XC*, 52-77.

Clark, C.D., Evans, D.J.A., Khatwa, A., Bradwell, T., Jordan, C.J., Marsh, S.H., Mitchell, W.A. and Bateman, M.D. , 2004 *Map and GIS database of glacial landforms and features related to the last British Ice Sheet.* Boreas, 33 (4). pp. 359-375.

Crowther, Samuel, 1907-1928, The Samuel Crowther Collection held at Bradford Museum Service Stores

Darby, E. V. & Darby H. The Darby Collection held at Heptonstall Museum, Heptonstall

Dickson, Anthony. Bishop, Barry & Quartermaine, Jamie (Oxford Archaeology North), 2014, National Importance Pilot Lithics Assessment

Email between Ian Sanderson (WYAAS) and Dr. Jeff Blackford (Manchester University) dated 12/09/2012

English Heritage, 2000, Managing Lithic Scatters, Swindon

English Heritage, 2012, Designation scheduling selection guide: Sites of early human activity, London

Faull, M. L. & Moorhouse, S. A. 1981, West Yorkshire: An Archaeological Survey to A.D. 1500, Leeds

Gaunt, G. D. 1976: *The Devensian maximum ice limit in the Vale of York*. Proceedings of the Yorkshire Geological Society 40, 631-637.

Gaunt, G. D. 1994: Geology of the country around Goole, Doncaster and the Isle of Axeholme. *Memoir of the British Geological Survey*

Grassam, A and Weston, P. 2014 Enhancing the Palaeolithic and Mesolithic Records of the South York-shire SMR, unpublished report, Archaeological Services, WYAS

Griffiths, S., 2014, Points in Time: The Mesolithic–Neolithic Transition and the Chronology of Late Rod Microliths in Britain. Oxford Journal of Archaeology, Volume 33, Issue 3, pp. 221–338

Hobson, Stephen, 1997, Lithic collections and their value for future archaeological research: the value of the Samuel Crowther collection as a resource. BSc dissertation, University of Bradford

Jacobi, R. M. , 1978, The Mesolithic of Sussex, in Drewitt, P. L. 1978, Archaeology in Sussex to AD 1500, CBA Research Report 29.

Keen D H, R L Jones, R A Evans and J E Robinson 1988, Faunal and floral assemblages at Bingley Bog, Proceedings of the Yorkshire Geological Society, volume 47:pp.125-138

Manby, T.G. 2003. The Upper Palaeolithic and Mesolithic periods in Yorkshire. In T.G.Manby et al (eds.) The Archaeology of Yorkshire: an assessment at the beginning of the 21st century. Yorkshire Archeological Society Occasional Paper No.3

Martin, L., Richardson, J., Roberts, I., 2013. 'Iron Age and Roman Settlements at Wattle Syke' ASWYAS Yorkshire Archaeology 11

Mellars, P. A. 1976. 'Fire ecology, animal populations and Man: a study of some ecological relationships in prehistory. Proceedings of the Prehistoric Society 42: pp.15-45

Myers, A. 1987. All shot to pieces? Inter-assemblage variability, lithic analysis and Mesolithic assemblage "types": Some preliminary observations. In Brown, A. G., and Edmonds, M. R. (eds.), Lithic Analysis and Later British Prehistory, BAR British Series 162

Rawson, Paul M, 1993, An Analysis of the Flint collection of E V Darby and H Darby, Dissertation for a BA Honours Degree, University of Nottingham

Petch, J. A., 1924.Early man in the district of Huddersfield, Huddersfield, Tolson Memorial Handbook 3, Huddersfield

Preston, P. 2008a. An additional archaeological assessment of Mesolithic sites within
The proposed wind farm development at Crook Hill, near Littleborough, unpublished report

Preston, P. R. 2008b. The Mesolithic period, in The Handbook of British Archaeology, pp.23-35, L. Adkins, R. Adkins, and V. Leitch. Eds. Constable and Robinson, London.

Preston, P.R. 2011/12 Lithics to landscape: Hunter gatherer tool use, resource exploitation and mobility during the Mesolithic of northwest England, PhD thesis, University of Oxford.

Raistrick, 1964 A. Prehistoric Yorkshire: Clapham, Yorkshire, Dalesman Publishing Co.

Radley, J., & Marshall, G., 1963, Mesolithic Sites in South West Yorkshire., *The Archaeological Journal*, 41,pp.81-97

Radley, J., Tallis, J. H., & Switsur, V. R., 1974, *The excavation of three 'Narrow Blade' Mesolithic sites in the Southern Pennines, England*, Proceedings of the Prehistoric Society, 40, pp. 1-19

Rawson, Paul M, 1993, An Analysis of the Flint collection of E V Darby and H Darby, Dissertation for a BA Honours Degree, University of Nottingham

Ryan, P A, Blackford J J, 2010, *Late Mesolithic environmental change at Black Heath*, *south Pennines, UK,* Vegetation History and Archaeobotany 19, pp.545-558

Scottish Archaeological Research Framework (Scarf) at http://www.scottishheritagehub.com/content/5-methodologies (viewed 14/10/2015)

Scarlet, Alexandra, 2013, Environmental change in the Late-Mesolithic-Early Neolithic at Cupwith Hill, Central Pennines, UK

Smith, C, 1992, Late Stone Age Hunters of the British Isles, Routledge, London

Spikins, P. 1995. Virtual Landscapes – GIS and lithic scatters, in A.J. Schofield (eds.) Lithics in Co text, Suggestions for the future direction of lithic studies, *Lithic Studies Society* Occasional Paper no 5.

Spikins, P., 1999, *Mesolithic Northern England: Environment, Population and Settlement*. Archaeo-press, Oxford. BAR British Series 283, no.150.

Spikins, P.A. 2000. 'Go forth and multiply? Gradual population growth re-assessed - a case study from Mesolithic Northern England', in C. Conneller *New Approaches to the Palaeolithic and Mesolithic, ARC vol 17:1.* pp.99-121

Spikins, Penny, 2002, Prehistoric Peoples of the Pennines: Reconstructing the lifestyles of Mesolithic hunter-gatherers on Marsden Moor, West Yorkshire Archaeology Service, Morley, Leeds

Spikins, Penny, 2010, Research Agenda: Palaeolithic and Mesolithic West Yorkshire . See http://www.archaeology.wyjs.org.uk/wyjs-archaeology-research.asp, accessed 18.2.2016

Stonehouse, W.P.B. 2001 ,The Prehistory of Saddleworth and Adjacent Areas, Saddleworth Archaeo-logical Trust, Oldham

Straw, A. 1979: *The Devensian glaciation*. In Straw, A., & Clayton, K. M. (eds): The Geomorphology of the British Isles: Eastern and Central England. 21-45 pp. Methuen, London.

Switsur, V R & Jacobi, R M, 1975, *Radiocarbon dates for the Pennine Mesolithic*, Nature, Vol. 256

Thomson, Francis Phillip & Willershaw, Erske, 2015, *Environmental DNA – An emerging tool in conservation for monitoring past and present biodiversity*, Biological Conservation 183, p.4-18

Turner, J. L., 1961, *Turner's Field Notebooks,* Turner Collection, The Tolson Memorial Museum, Huddersfield.

Waughman, M. 2006, *North East Yorkshire Mesolithic: Phase 1 report* Tees Archaeology report TA/06/11 with North York Moors National Park for English Heritage

Waughman, M. with Innes, J, and Rowe, P 2012, *North East Yorkshire Mesolithic Project, Phase 2: Final Report* Tees Archaeology report TA12/02 with North York Moors National Park for English Heritage

Waughman, M. 2015, North East Yorkshire Mesolithic Project Phase 3 Final Report: Tees Archaeology report TA14/05 with North York Moors National Park for English Heritage

Williams, C. T. 1985, Mesolithic exploitation patterns on Soyland Moor: A palynological study of Soyland Moor, BAR series 139

Wymer, J., & Bonsall, C. J., 1977, Gazetteer of Mesolithic and Upper Palaeolithic sites in England and Wales,Geo Abstracts and the Council for British Archaeology, London. No.511.

Appendix 1. e-mail correspondence with I P Brooks re: Early Palaeolithic hand axe from Bramham

Dear Jason,

The handaxe was heavily rolled suggesting it had probably been in a moving gravel for a period of time, given the location this is most likely a glacial gravel, although a riverine gravel could not be ruled out. How the artefact got to site would only be speculation as to whether it is from a local deposit or has been imported.

I hope this has been useful, if you have any further questions do not hesitate to contact me

Regards

Ian

I.P. Brooks PhD, BA, MCIfA, FSA

Engineering Archaeological Services Ltd

From: Jason Dodds [mailto:jdodds@wyjs.org.uk]
Sent: 22 July 2015 09:39
To: 'eas@tdlmail.co.uk' <eas@tdlmail.co.uk>
Subject: Query re: early Palaeolithic Hand axe from Bramham Motorway works

Dear Mr. Brooks,

I am currently in the process of carrying out a Historic England (EH) project to enhance the West Yorkshire Historic Environment Record for Palaeolithic and Mesolithic sites and find spots. I have read your lithics report for the ASWYAS motorway scheme works at Bramham to Wetherby, and wanted to ask specifically about the early Palaeolithic hand axe discovered. I know in the publication you mention that the hand axe had spent time in a 'high energy environment', from this were you saying that the hand axe had been brought to the site by natural processes i.e. glacial movement, or do you feel the finds provenance was from the site or nearby?

Many Thanks

Jason

Appendix 2. e-mail correspondence with Otley Museum, Leeds re: E T Cowling's lithic collection.

Dear Jason

We do have in our collection numerous articles written by Eric cowling and also handwritten notebooks in which he gives accounts of his finds and their locations. Some, though not all have actual map references. In the earlier days of Otley museum these were indexed.

You are welcome to contact us again and make an appointment to visit if you think these will be helpful.

The actual flint collection is in storage at the moment as we seek new premises after leaving the Civic Centre which is now closed.

Please see our website for further details

www.otleymuseum.org

Best wishes

Margaret Hornby

Secretary

Otley Museum and Archive Trust

From: Jason Dodds [mailto:jdodds@wyjs.org.uk]
Sent: 14 May 2015 15:42
To: 'otleymuseum@btconnect.com'
Subject: E T Cowling Collection

Hello,

My name is Jason Dodds and I am the Historic Environment Record Officer for West Yorkshire Archaeology Advisory Service, who are funded by the five district councils of West Yorkshire to both provide advice to the local planning departments on requirements necessary for archaeological sites in the development process. We also curate the West Yorkshire Historic Environment Record, a record of archaeological sites and find spots. I am currently working on an English Heritage funded project to enhance our records for the Palaeolithic and Mesolithic periods. My particular query is did E T Cowling have any paper records (Maps etc.) to locate find sites from his extremely large collections? I have visited Leeds Museum and was advised to contact yourselves.

Many Thanks

Jason

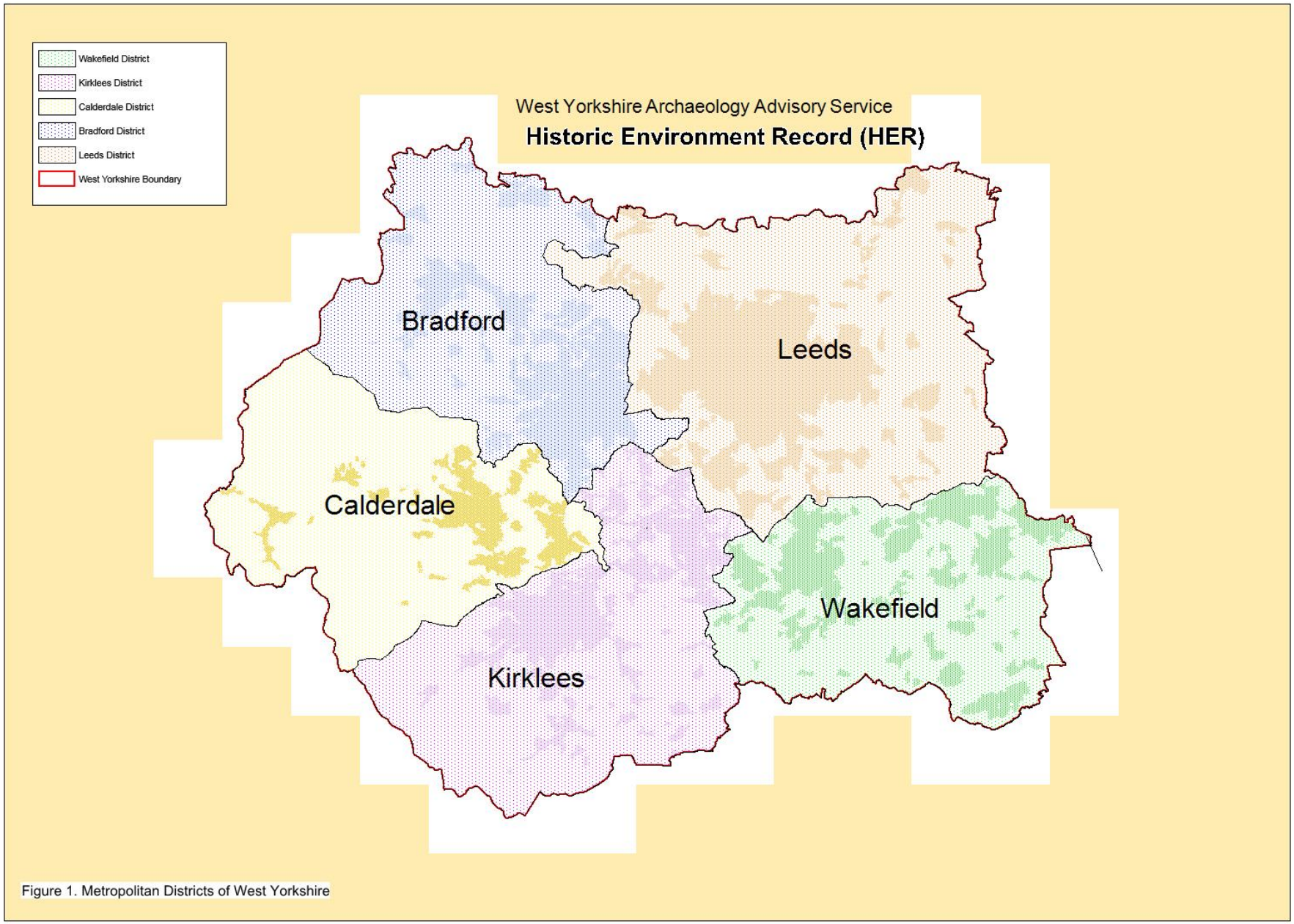


Figure 1. Metropolitan Districts of West Yorkshire

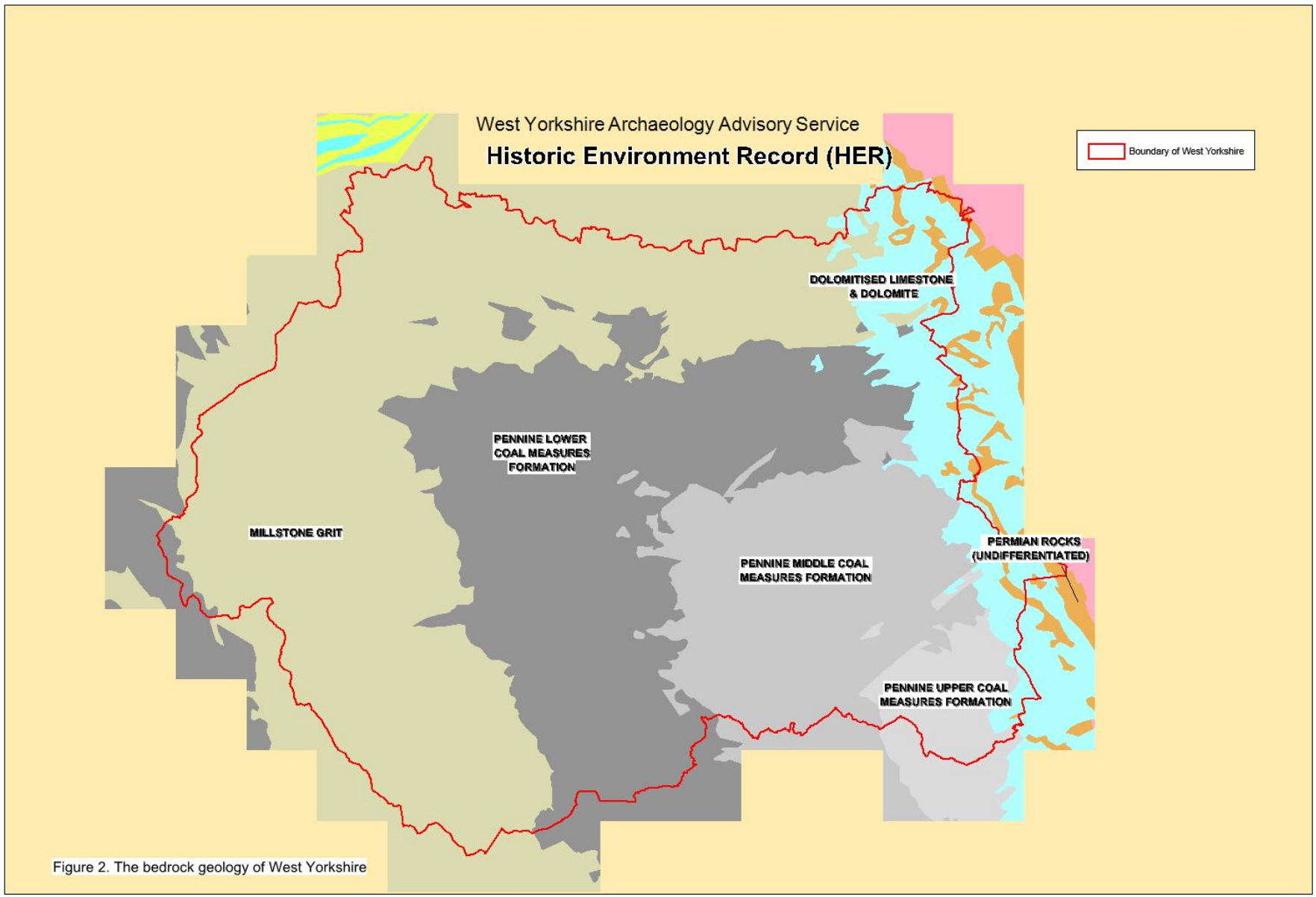


Figure 2. The bedrock geology of West Yorkshire

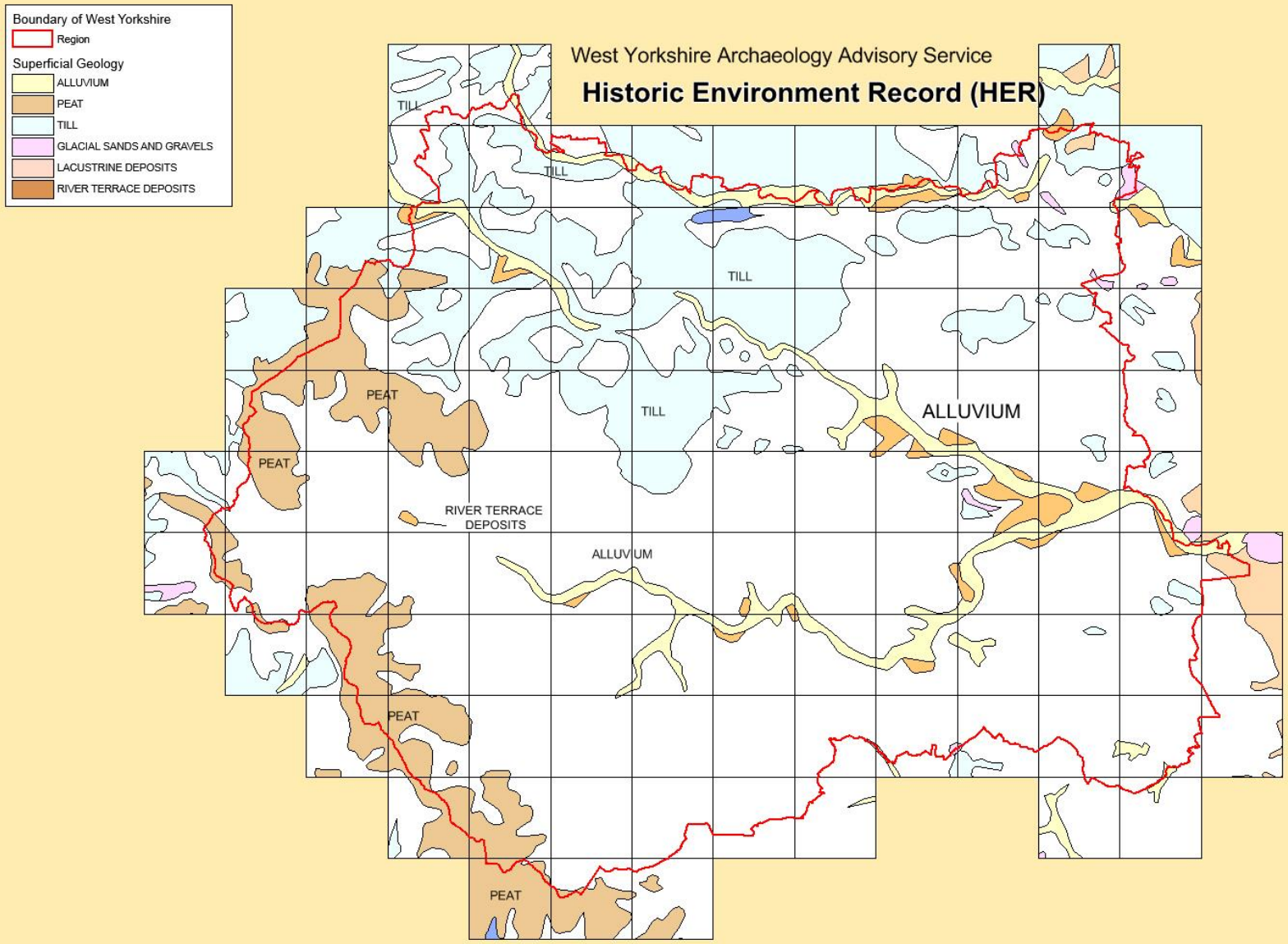


Figure 3. Superficicial geology of West Yorkshire (c) Brithish Geological Society

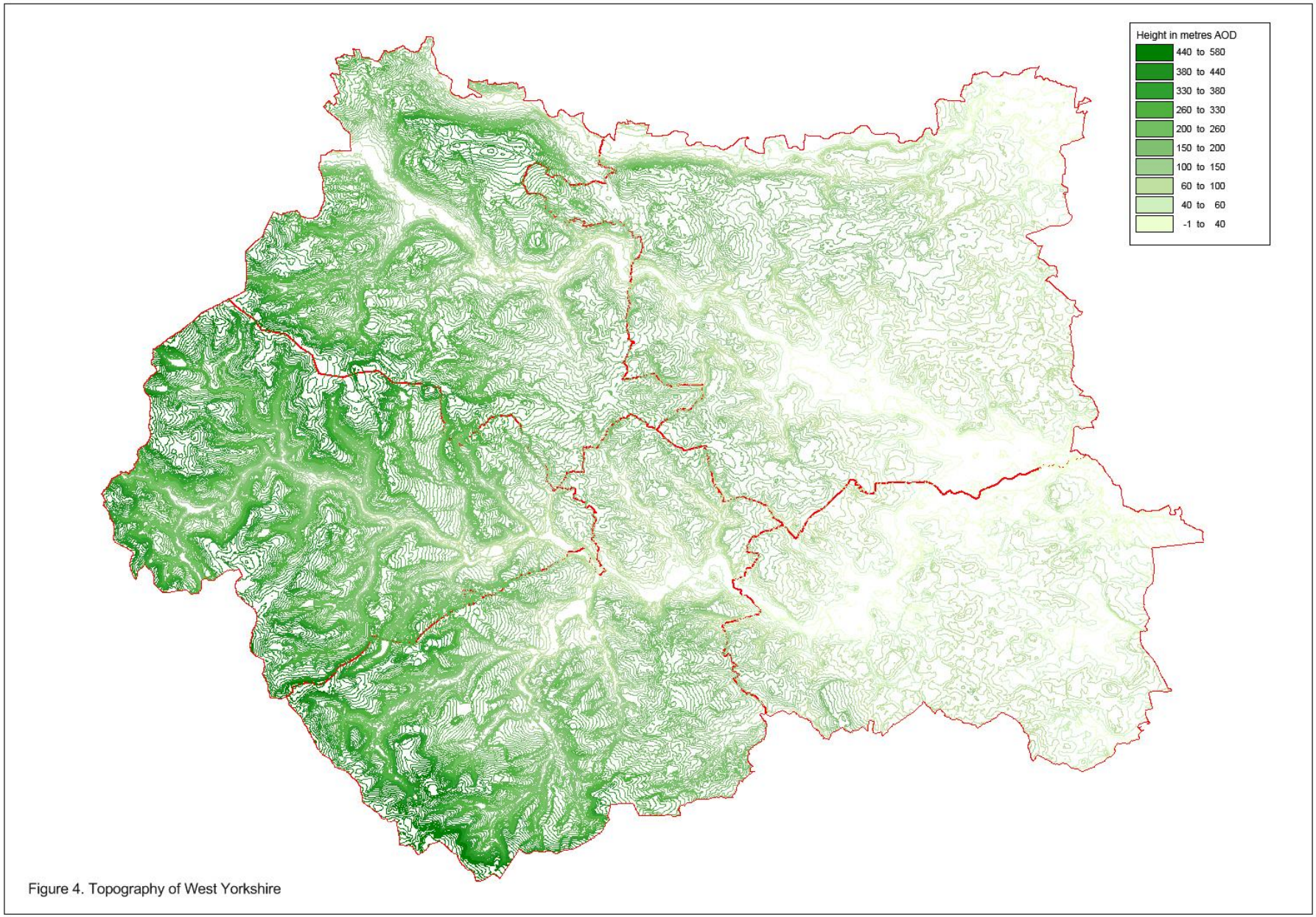


Figure 4. Topography of West Yorkshire

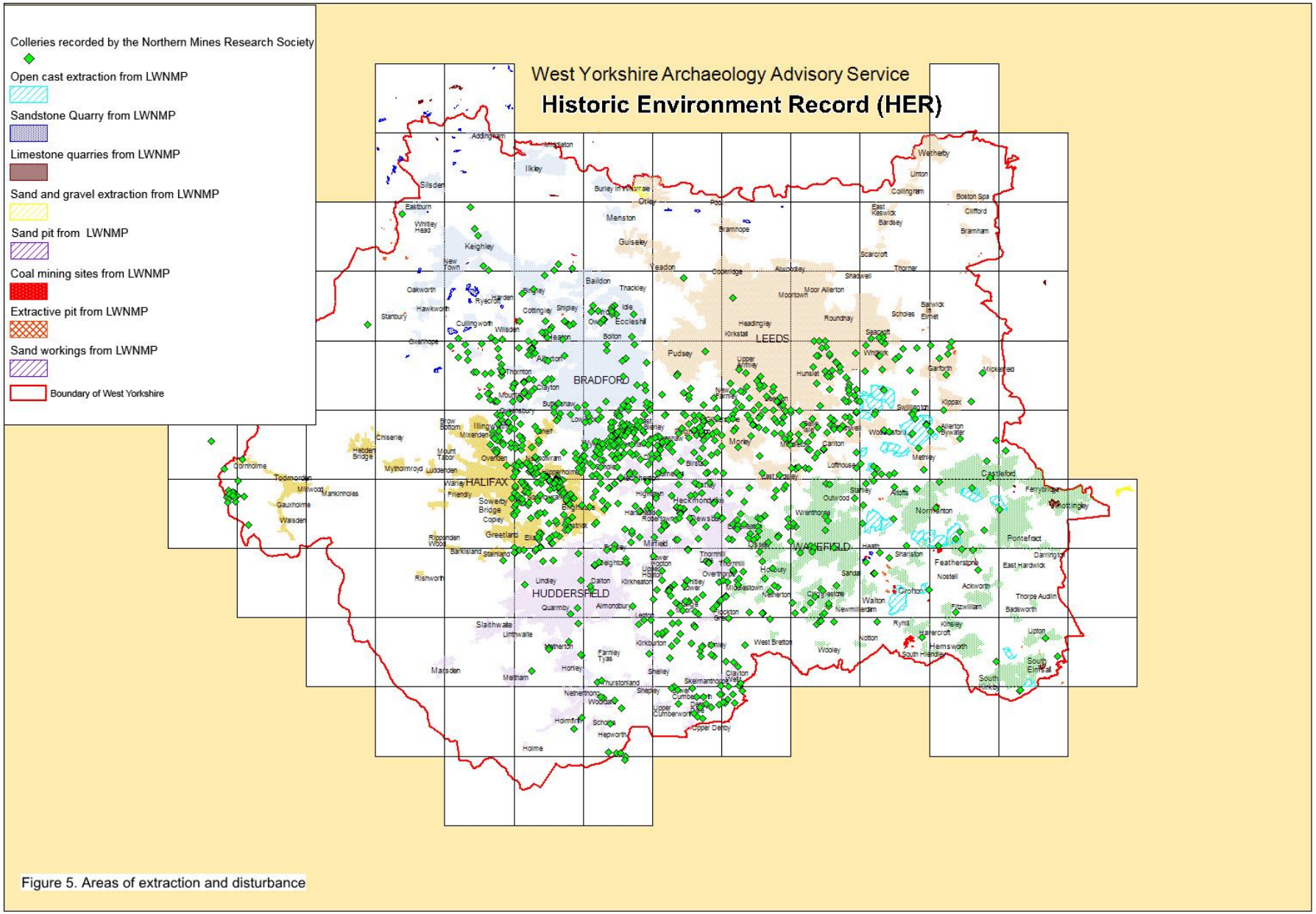


Figure 5. Areas of extraction and disturbance

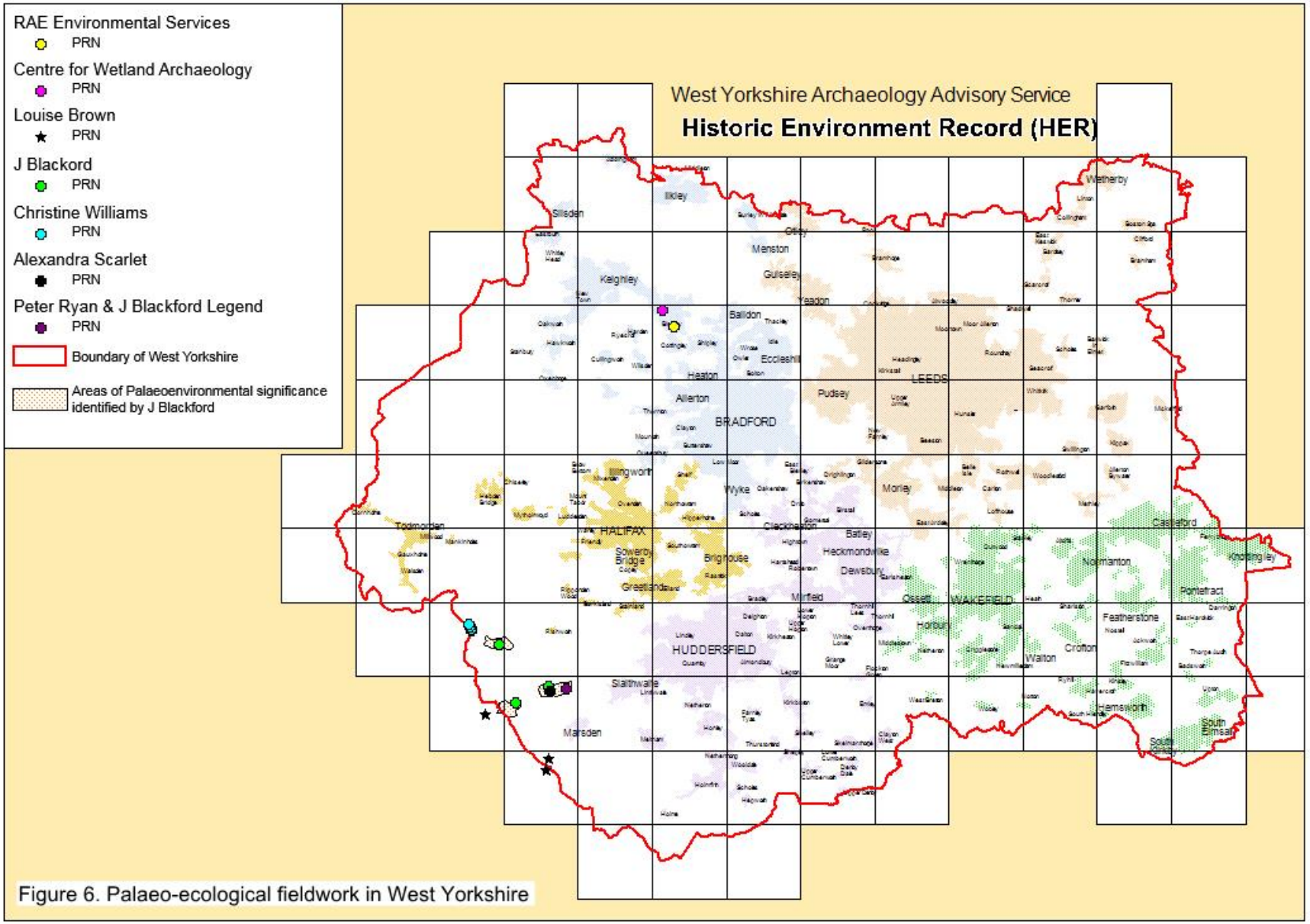


Figure 6. Palaeo-ecological fieldwork in West Yorkshire

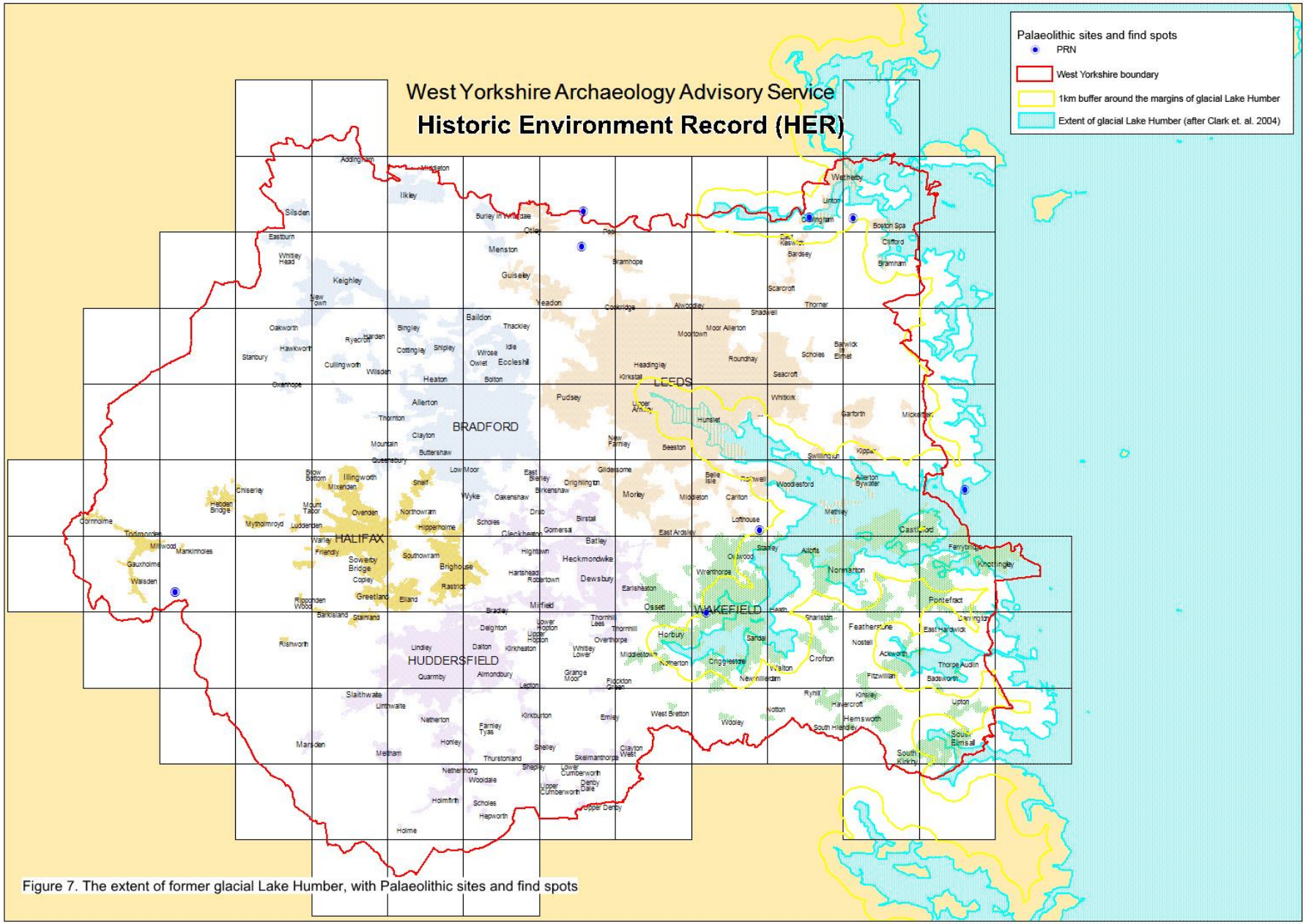


Figure 7. The extent of former glacial Lake Humber, with Palaeolithic sites and find spots

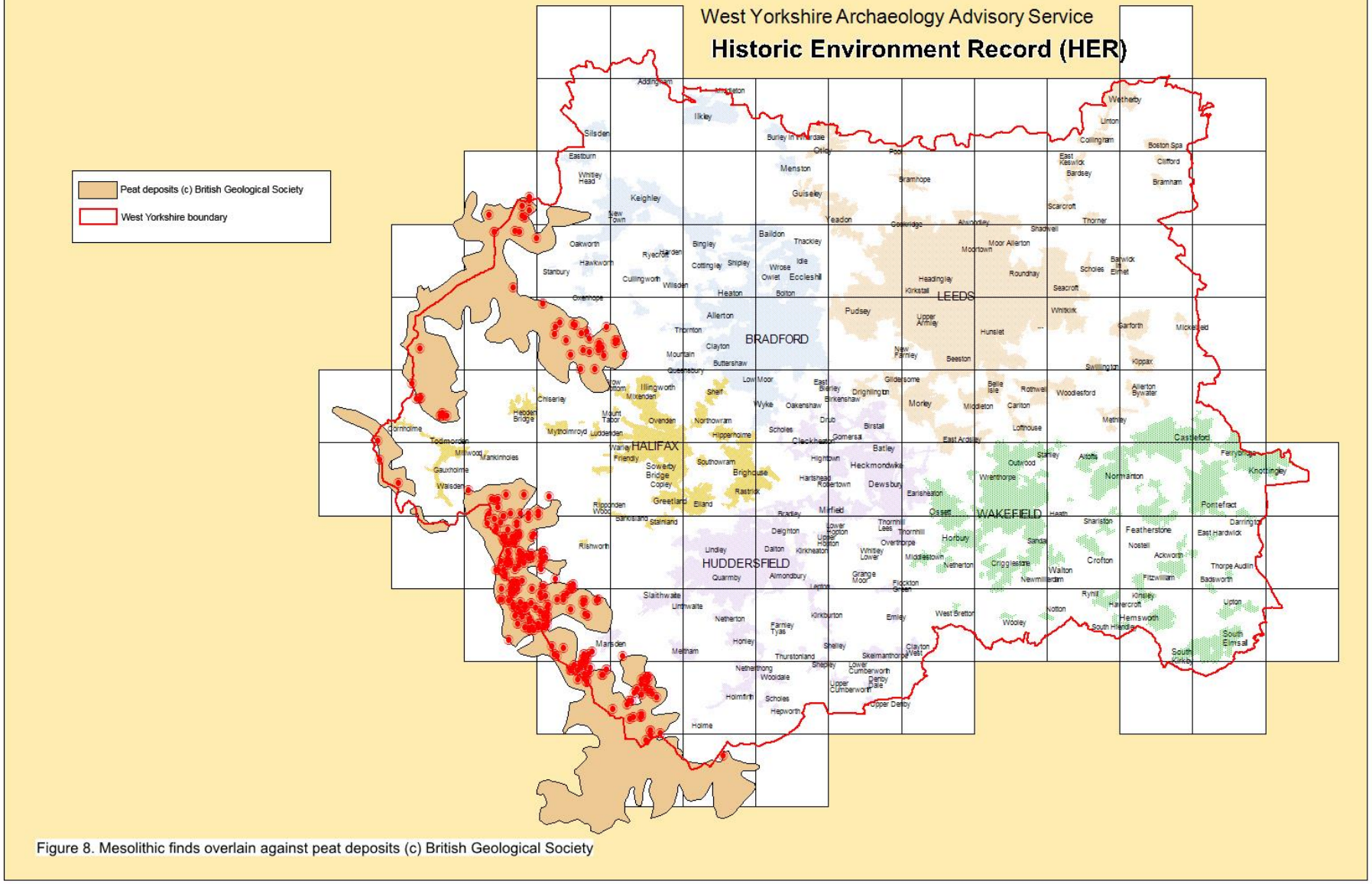


Figure 8. Mesolithic finds overlain against peat deposits (c) British Geological Society

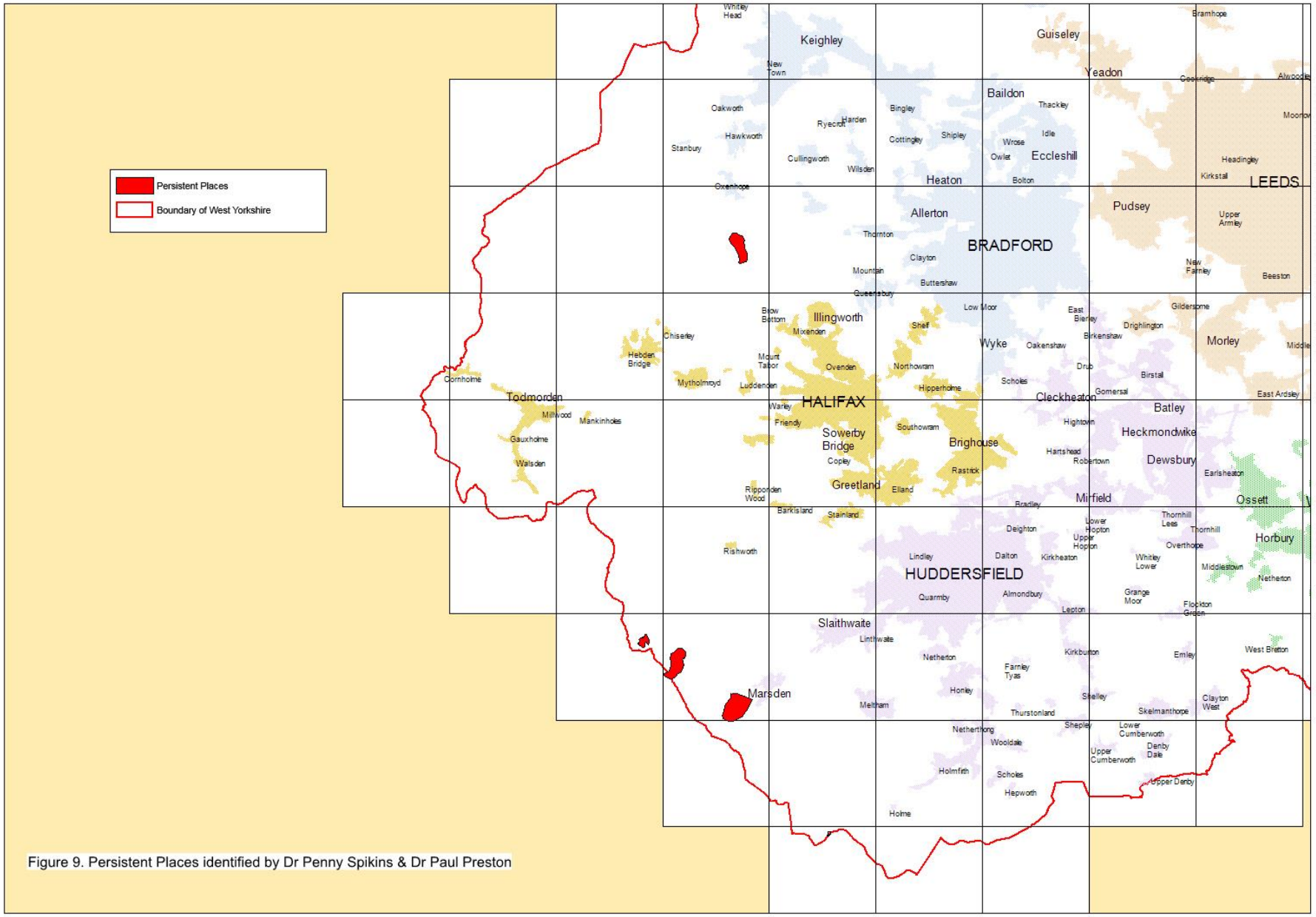


Figure 9. Persistent Places identified by Dr Penny Spikins & Dr Paul Preston

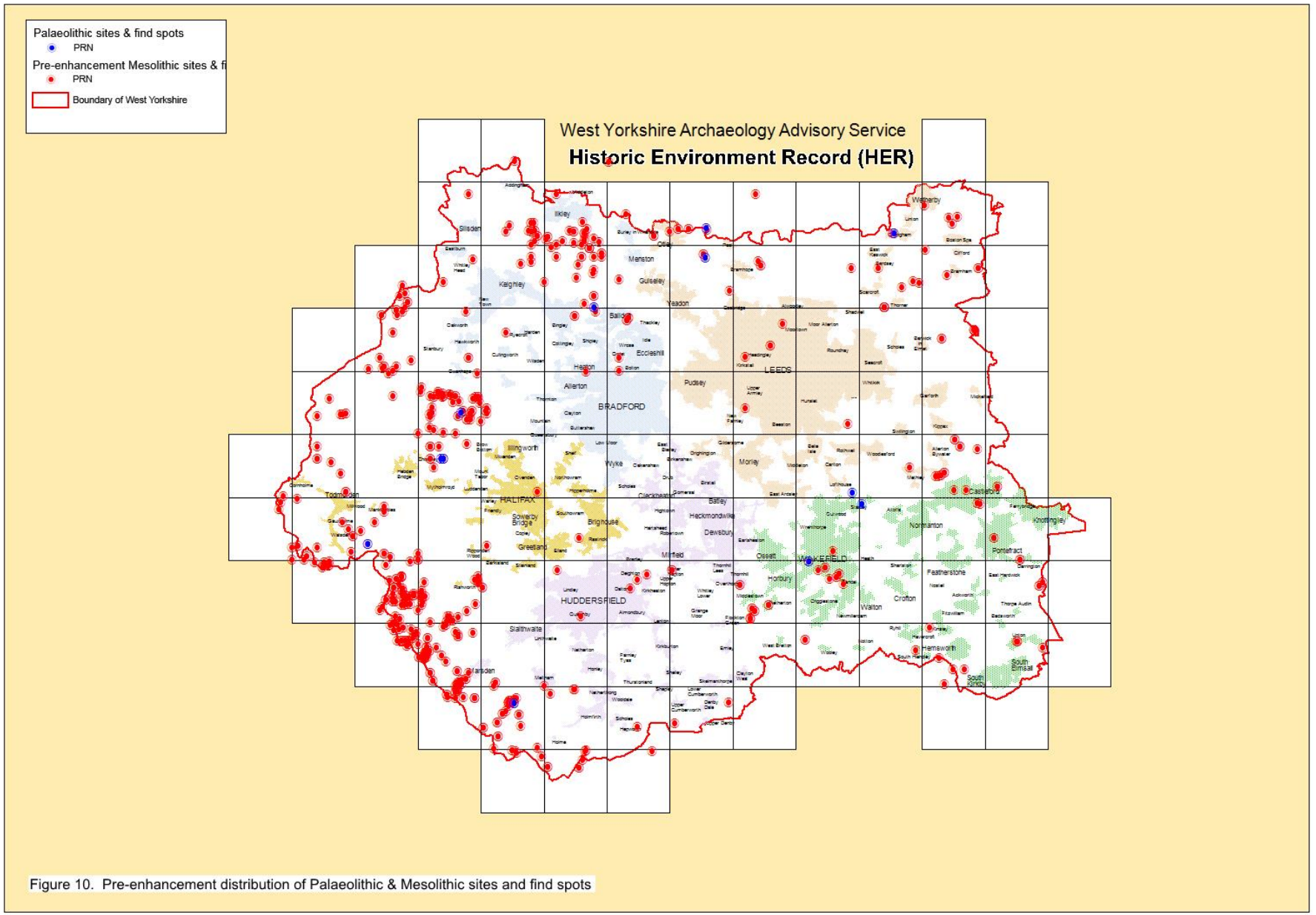


Figure 10. Pre-enhancement distribution of Palaeolithic & Mesolithic sites and find spots

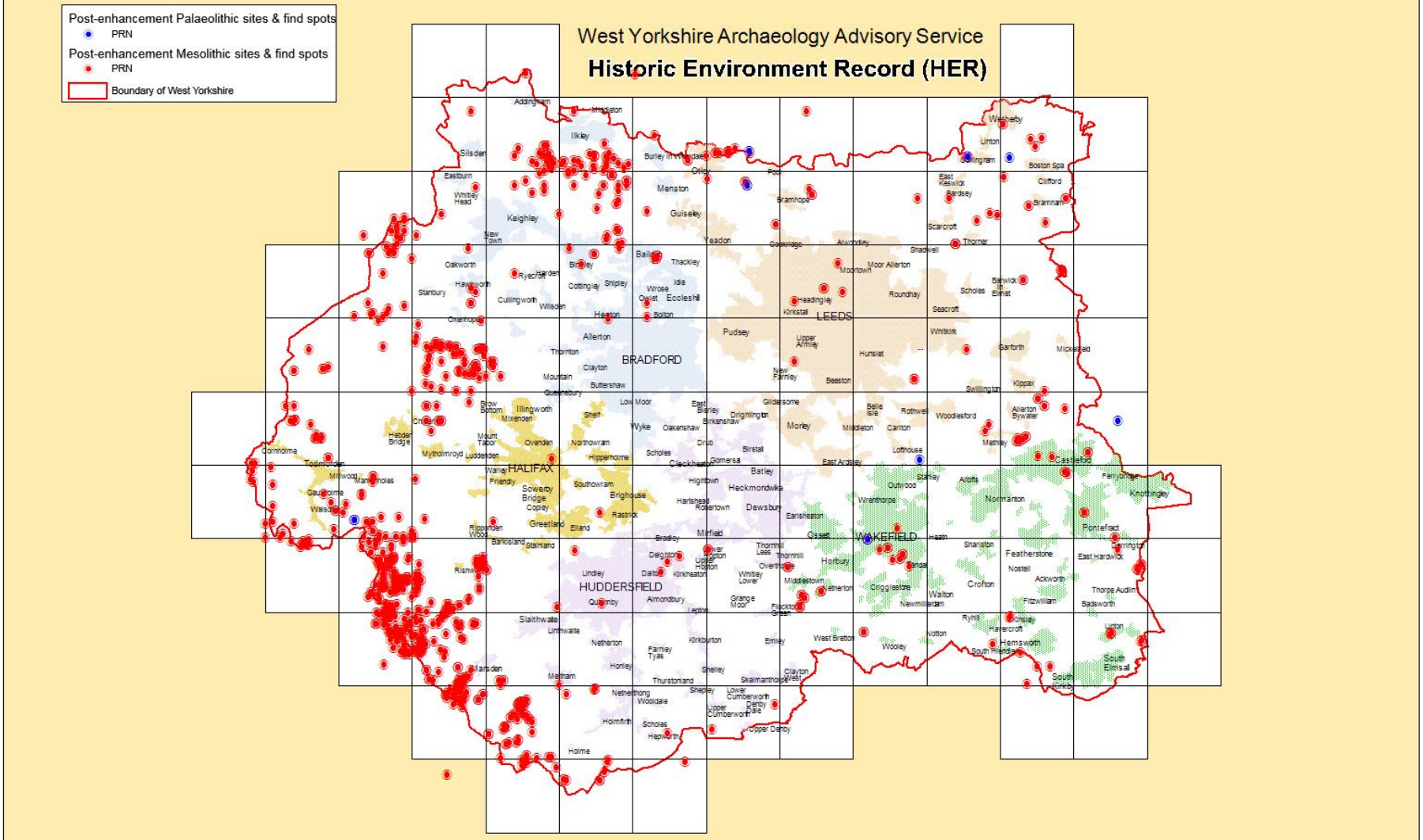


Figure 11. Post-enhancement distribution of Palaeolithic and Mesolithic sites and find spots. NB. Many PRNs are superimposed on each other at this scale

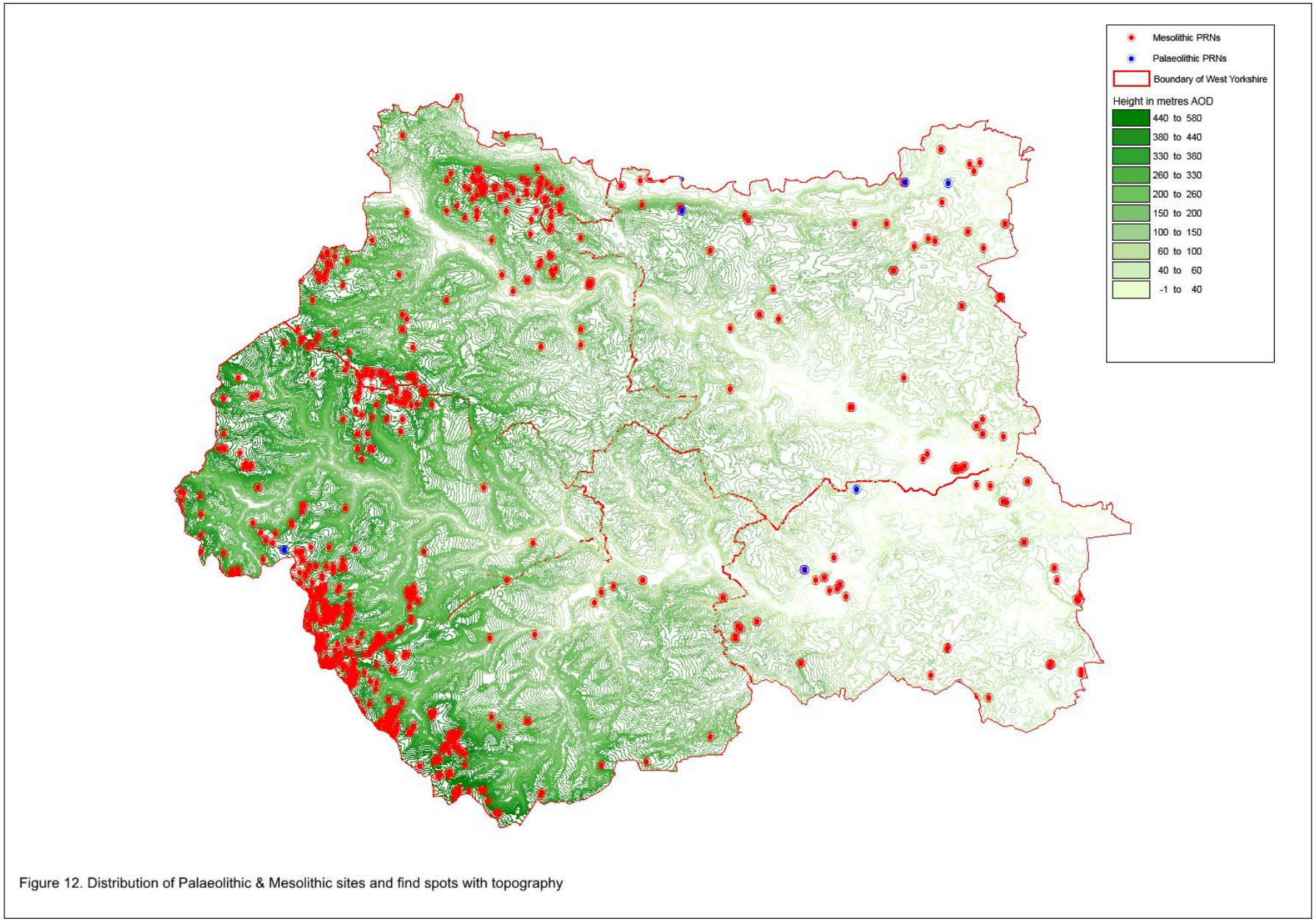


Figure 12. Distribution of Palaeolithic & Mesolithic sites and find spots with topography

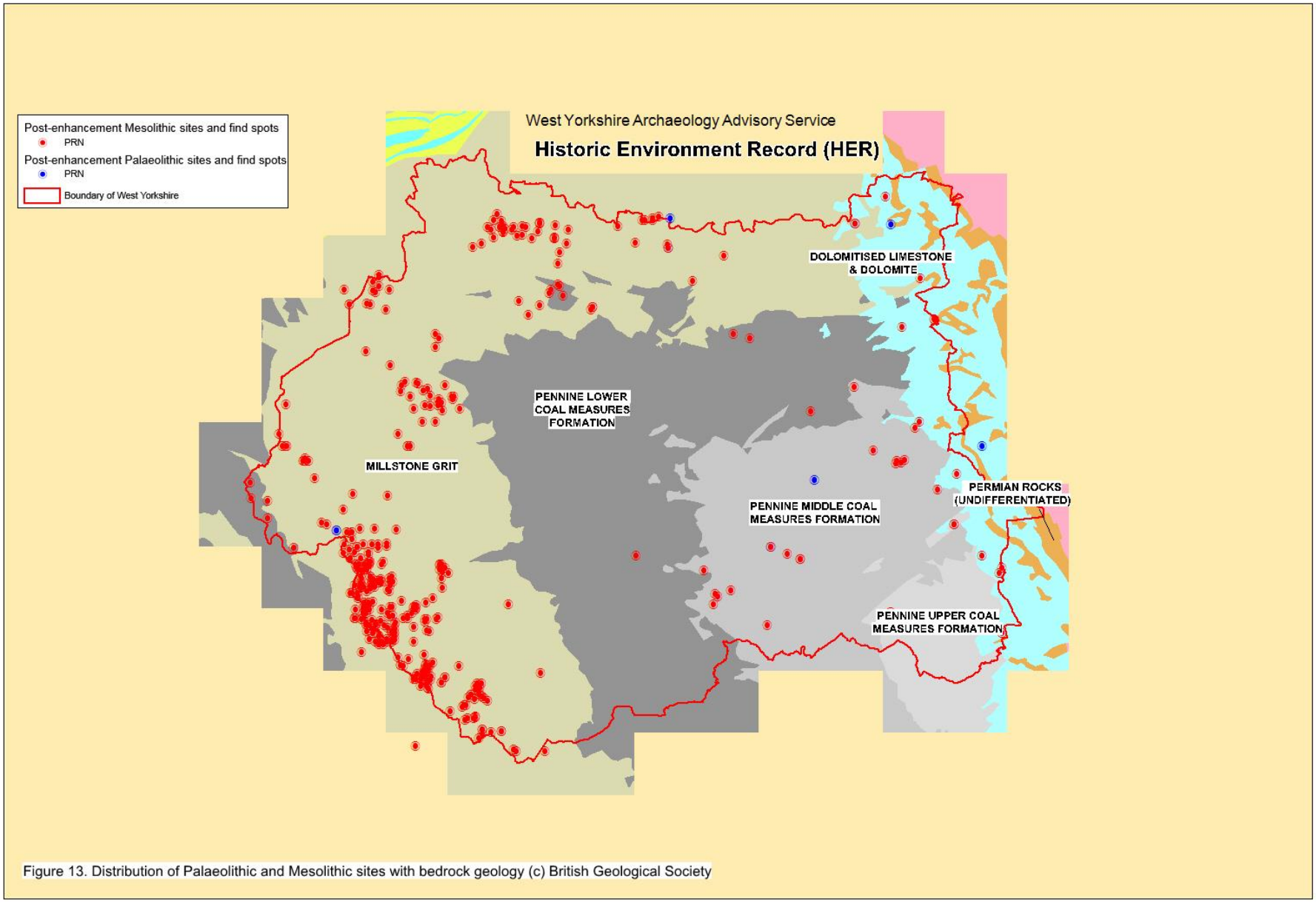


Figure 13. Distribution of Palaeolithic and Mesolithic sites with bedrock geology (c) British Geological Society

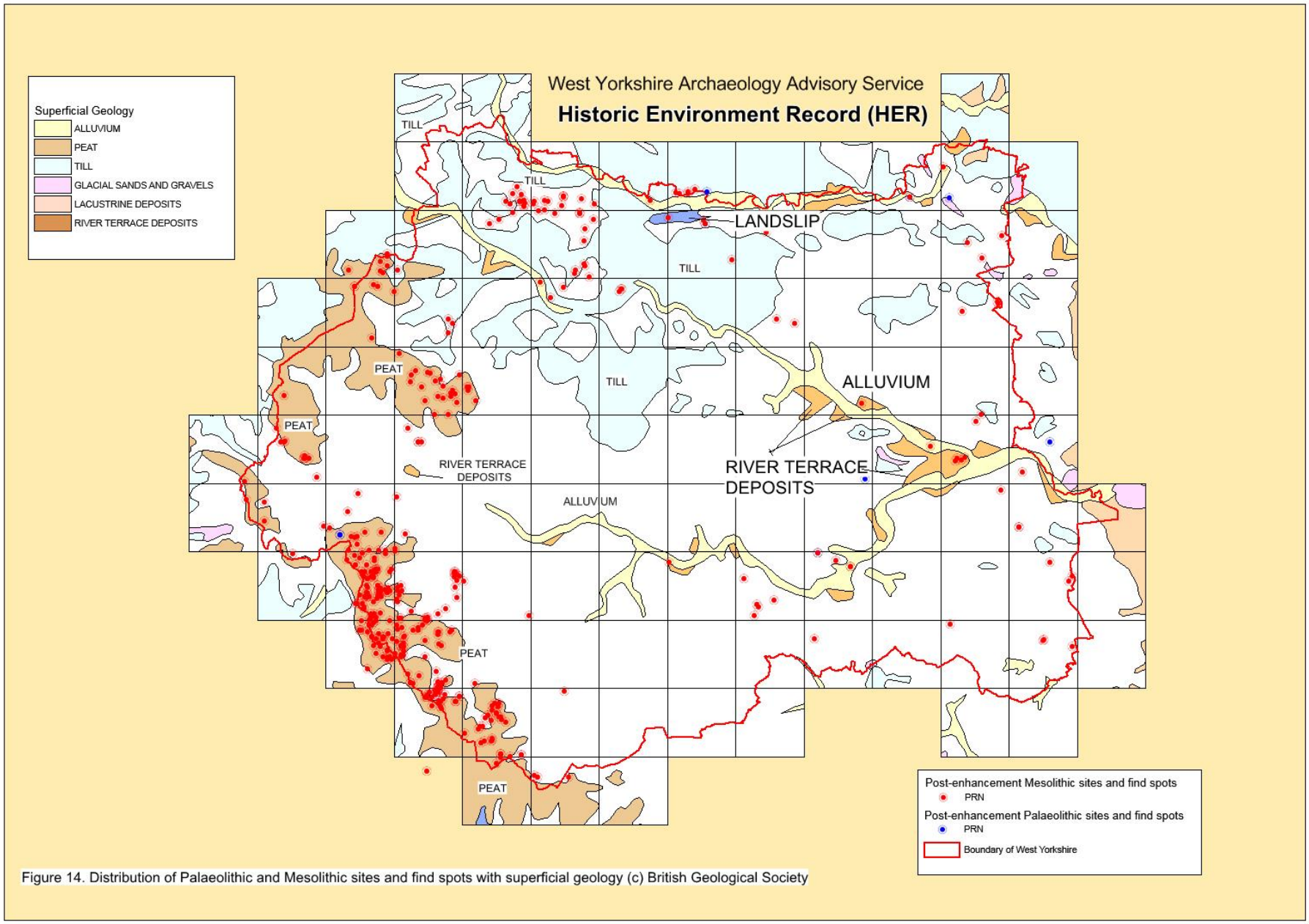


Figure 14. Distribution of Palaeolithic and Mesolithic sites and find spots with superficial geology (c) British Geological Society

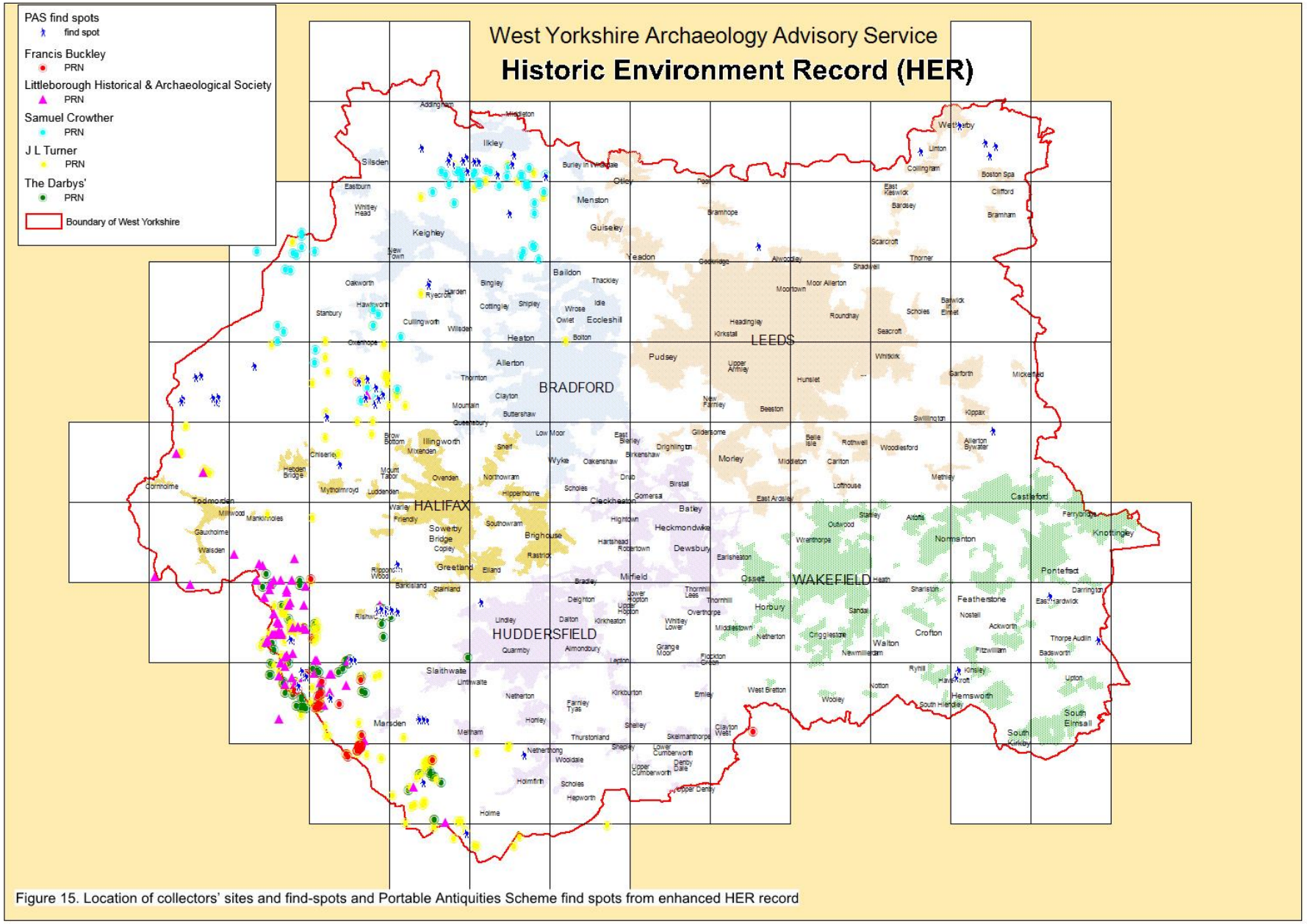


Figure 15. Location of collectors' sites and find-spots and Portable Antiquities Scheme find spots from enhanced HER record

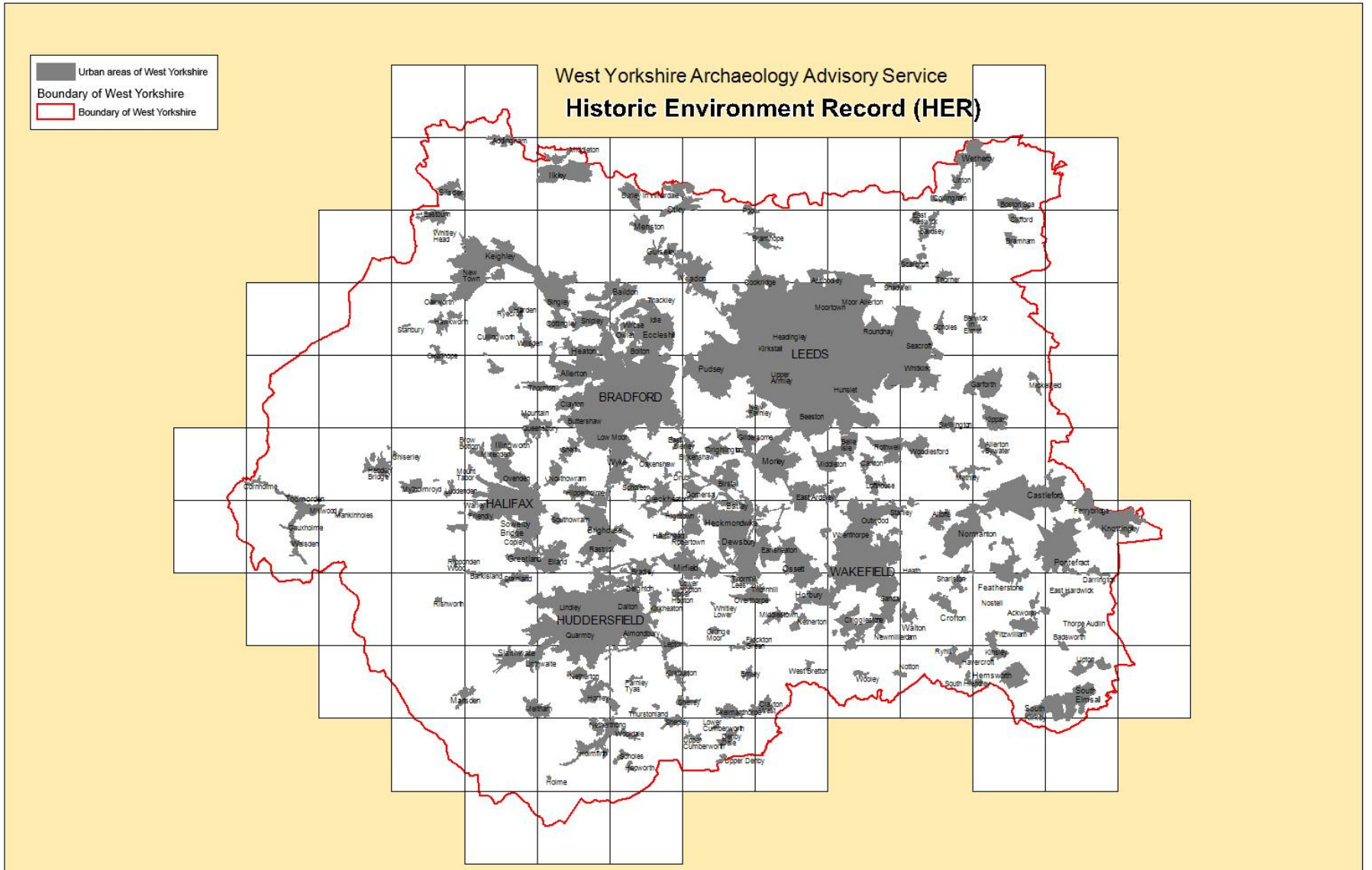


Figure 16. Urban areas of West Yorkshire indicating the lack of visibility

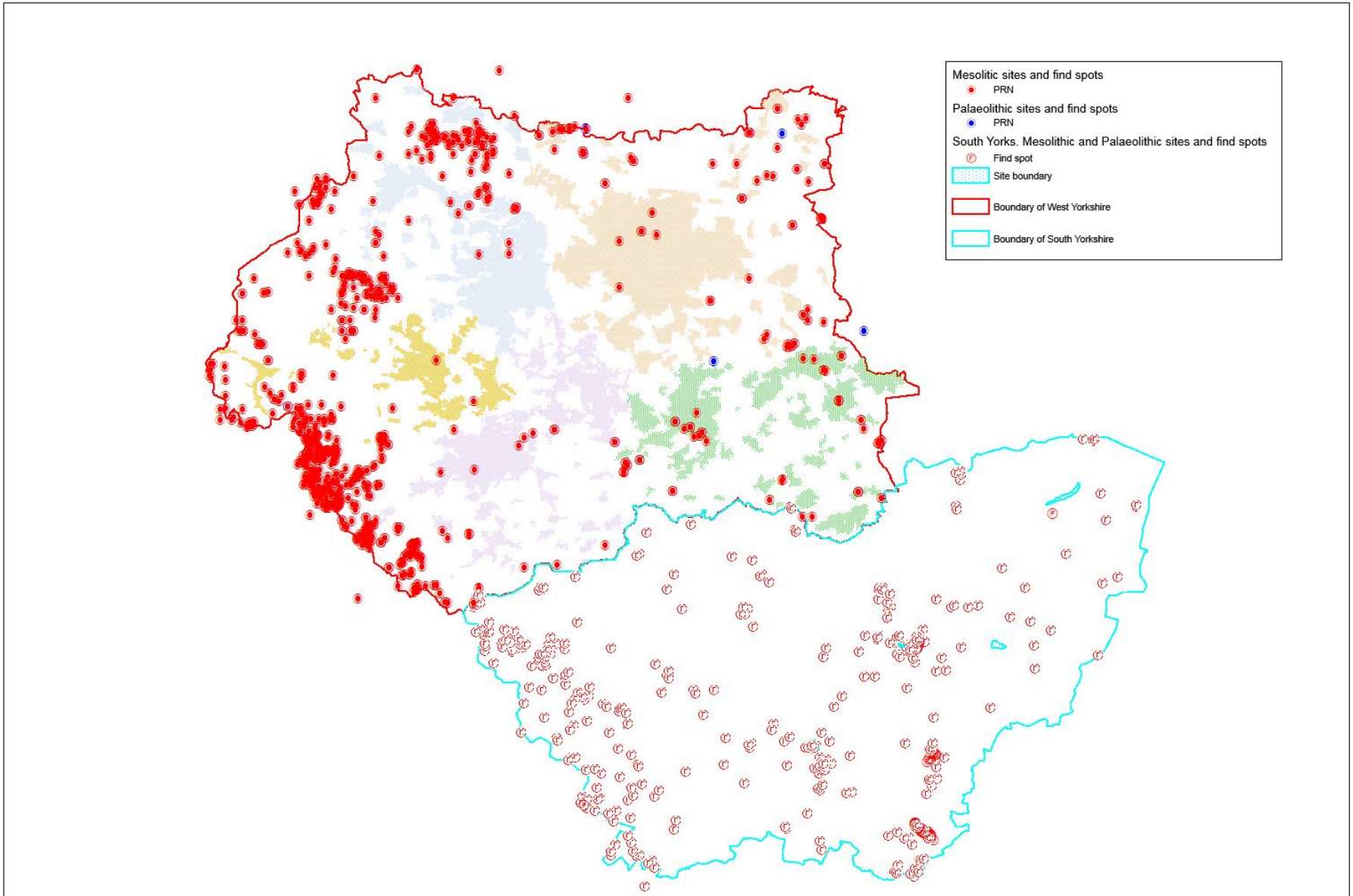


Figure 17. Comparison of early prehistoric information from South Yorkshire (SMR) and West Yorkshire (HER)

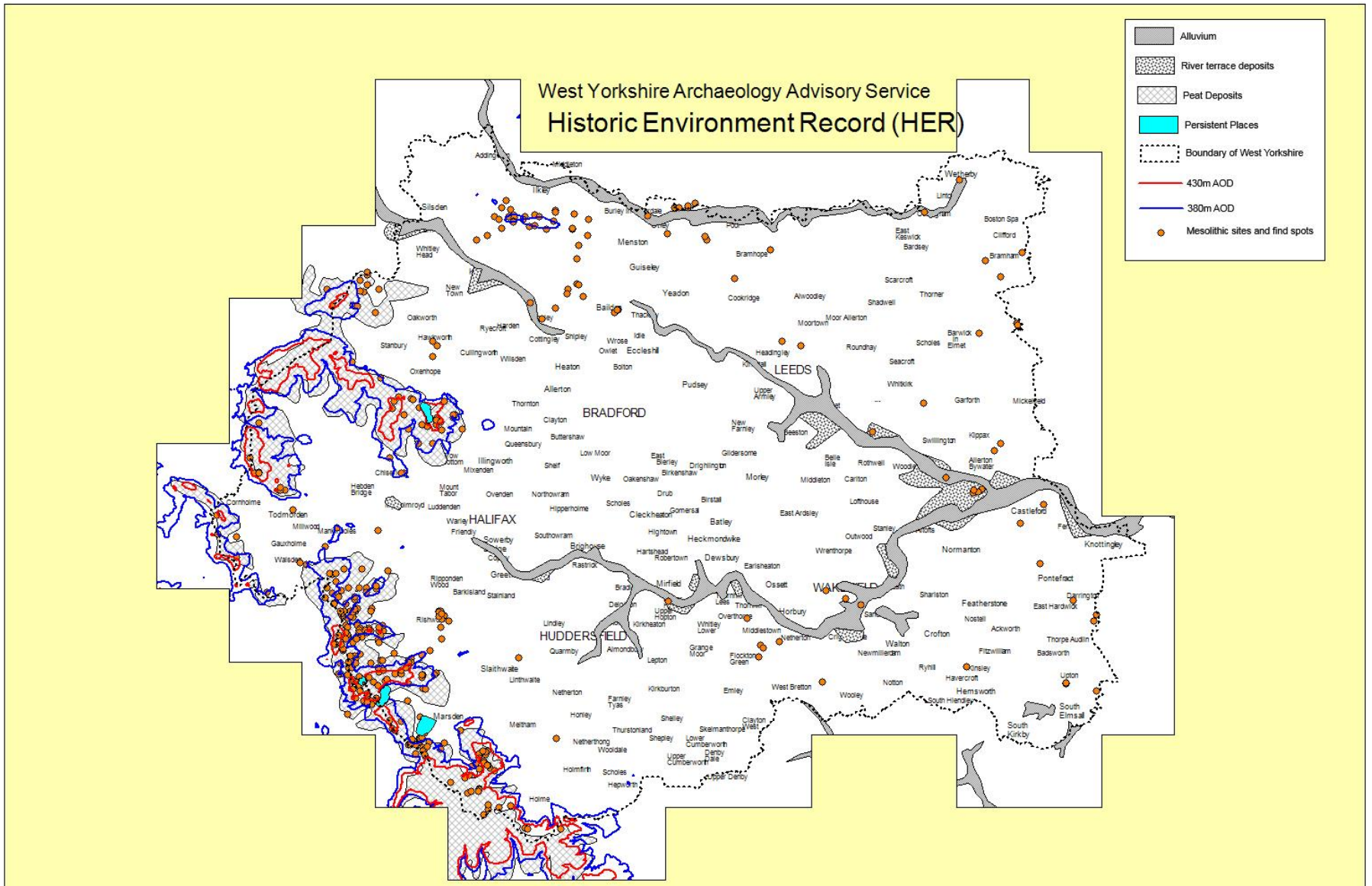


Figure 18. Areas of potential survival of Mesolithic remains

Plates

Plate 1. Natural piece of Gritstone discovered by Samuel Crowther and recorded by him as a Palaeolithic hand axe (PRN 3811). Image © Bradford Museums & Galleries

Plate 2. Early Palaeolithic hand axe discovered by ASWYAS during the Bramham to Wetherby excavations (Leeds Museum Service accession number LEEDM.D.2010.0012.005.025; PRN 14435) Image © ASWYAS, scale 1:1.

Plate 3. An example of the notebook entries shown in Francis Buckley's notebooks (notebook 1)

Plate 4. An example of the detail of Francis Buckleys' drawing books (Buckley's anvil site at March Hill, Marsden PRN 13636; drawing book 9)

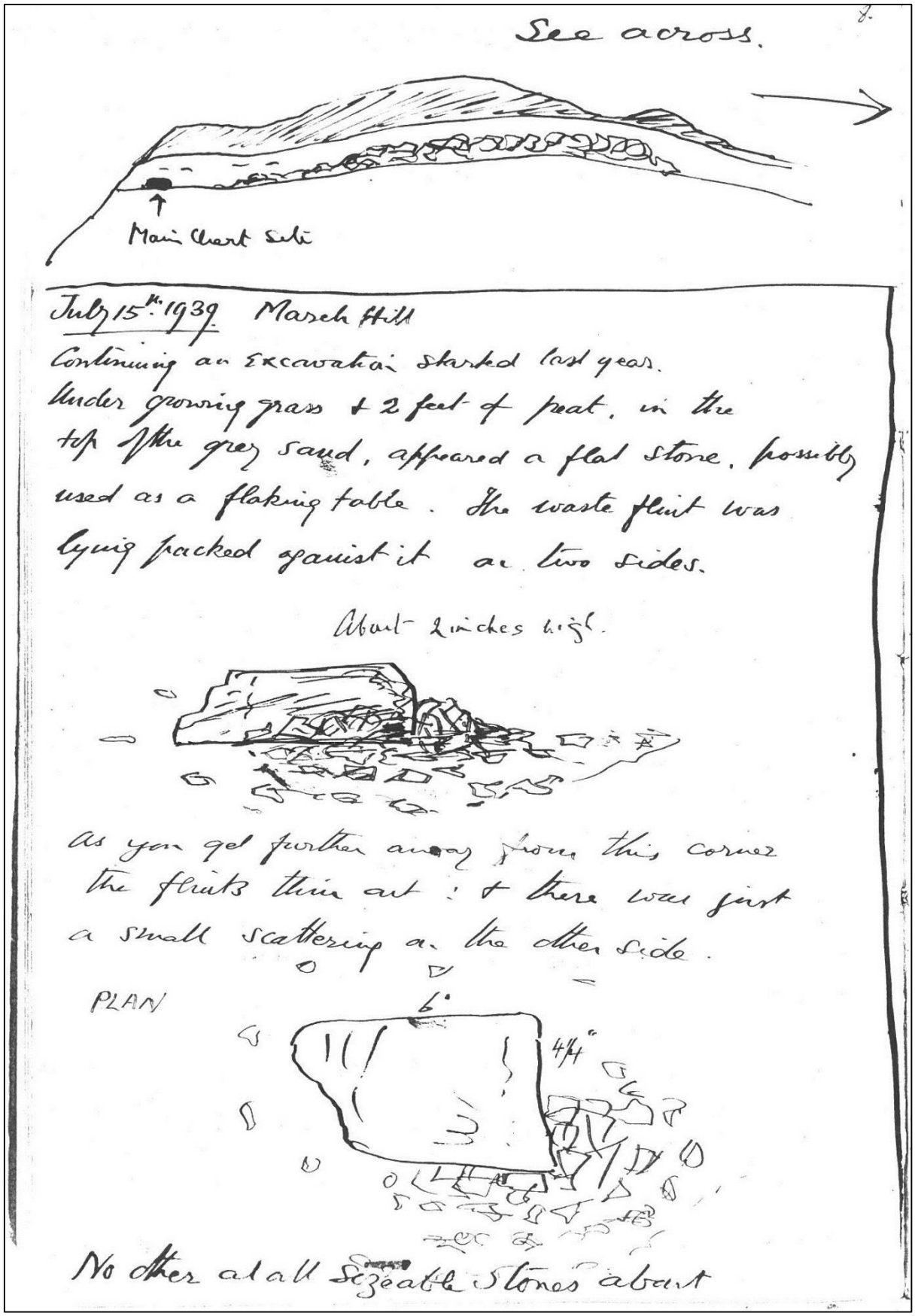


Plate 5. An example of J L Turner's notebook listings (notebook 1)

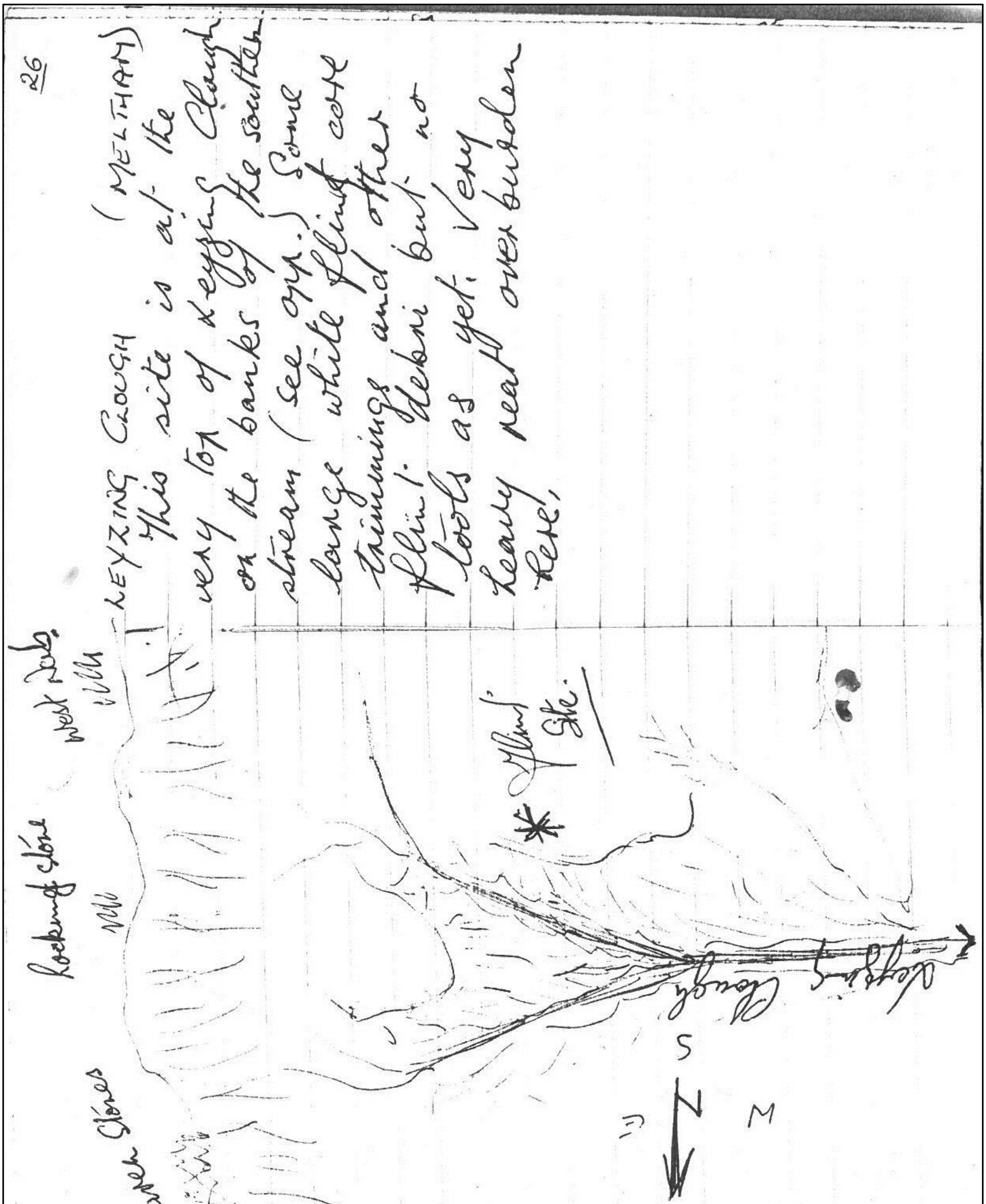


Plate 6. An example of J L Turner's annotated Ordnance Survey 1:25000 maps (sheet SD91).

Plate 7. Listing from Francis Buckley's drawing book no. 6 for White Hill Rishworth (PRN 13614) and a photograph of part of the collection held by Wakefield Museum (accession number WAKGM:1921.6/2/8)

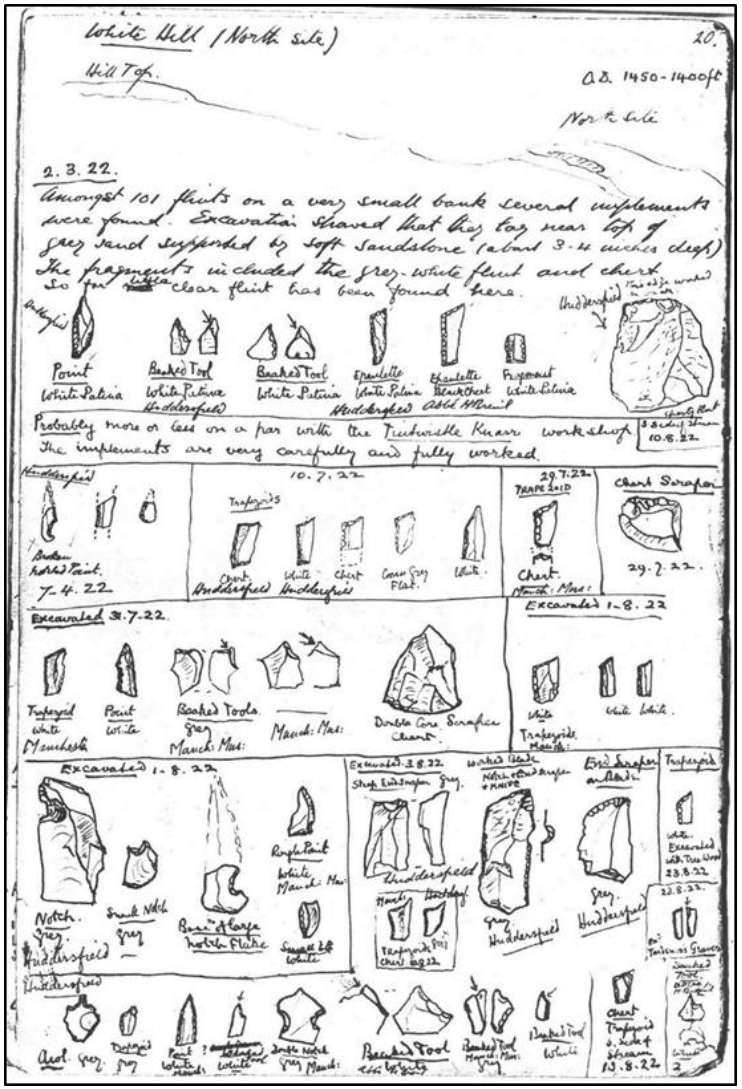


Plate 8. Listing from Francis Buckley's drawing book 3 for Lominot, Marsden (PRN 13730) and a photograph of part of the collection held by Wakefield Museum (accession number WAKGM: 1921.6/2/2)

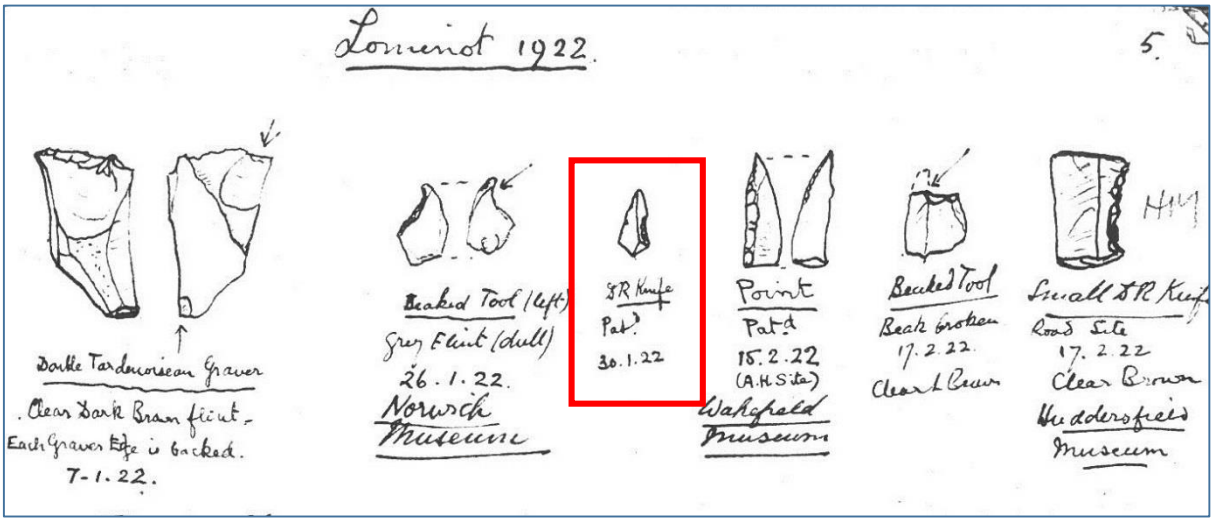


Plate 9. Listing from Francis Buckley's drawing book 2 for Pule Hill, Marsden (PRN 14322) and a photograph of part of the collection held by Wakefield Museum (accession number WAKGM:1921.6/2/4, 3)

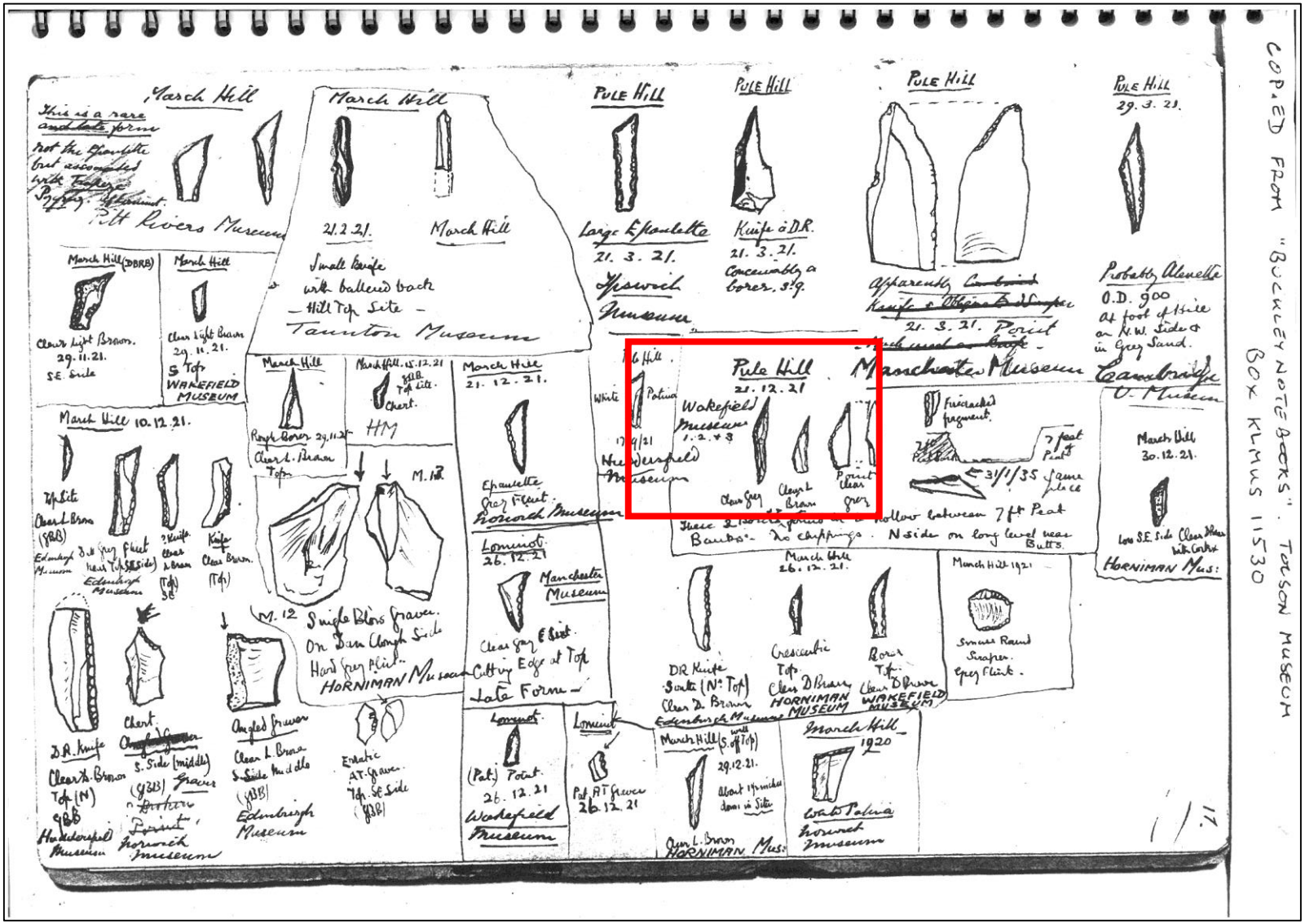


Plate 10. Listing from Francis Buckley's drawing book 5 for Cupwith Hill, Marsden (PRN 14343) and a photograph of part of the collection held by Wakefield Museum (accession number WAKGM: 1921.6/2/1)

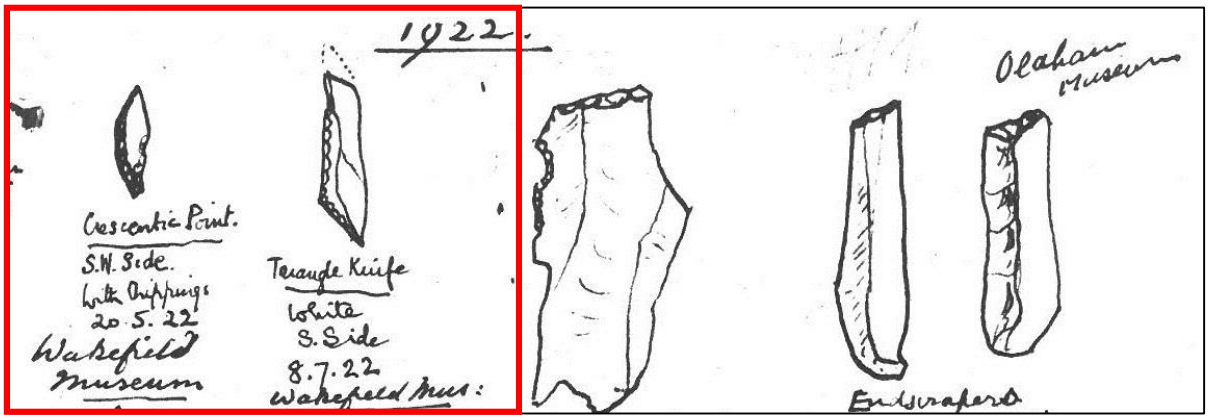
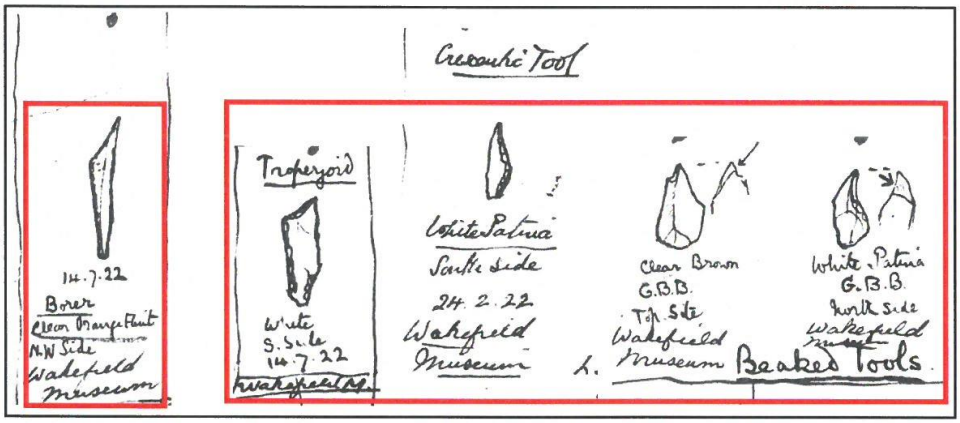


Plate 11. Listing from Francis Buckley's drawing book 3 for Warcock Hill Marsden (PRN 14384) and a photograph of part of the collection held by Wakefield Museum (accession number WAKGM:1921.6/2/6)



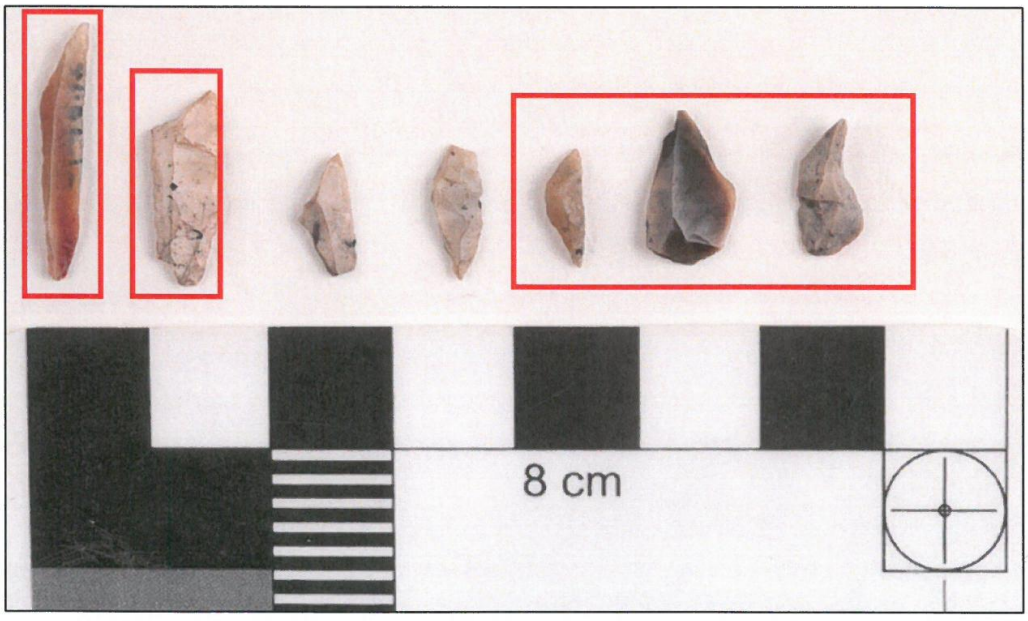


Plate 12. Mesolithic axe hammer (PRN 3817) on loan to Wakefield Museum from John Goodchild (ref. WAKGM:LI2012.10). Reconstructed shaft.

Plate 13. Mesolithic tranchet axe from Netherton, Wakefield (PRN 2054). The axe was originally held by Bradford Museum service and was either loaned or given to Kirklees Museum Service (The Tolson Memorial Museum, Huddersfield who accessioned it under accession number 47.1/64). The axe is now on loan at Wakefield Museum under ref. WAKG:Loan 70). Reconstructed handle.

Plate 14. 3 Early Mesolithic lithics (PRN 3812) originally recorded by Wakefield Museum (accession numbers WAKGM1979.48/2 and WAKGM1979.48) as Palaeolithic

Plate 15. Middle Palaeolithic Hand axe from Lee Moor, Lofthouse, Wakefield (PRN 3813) held by Wakefield Museum Service (accession number: WAKGM:1979.45)

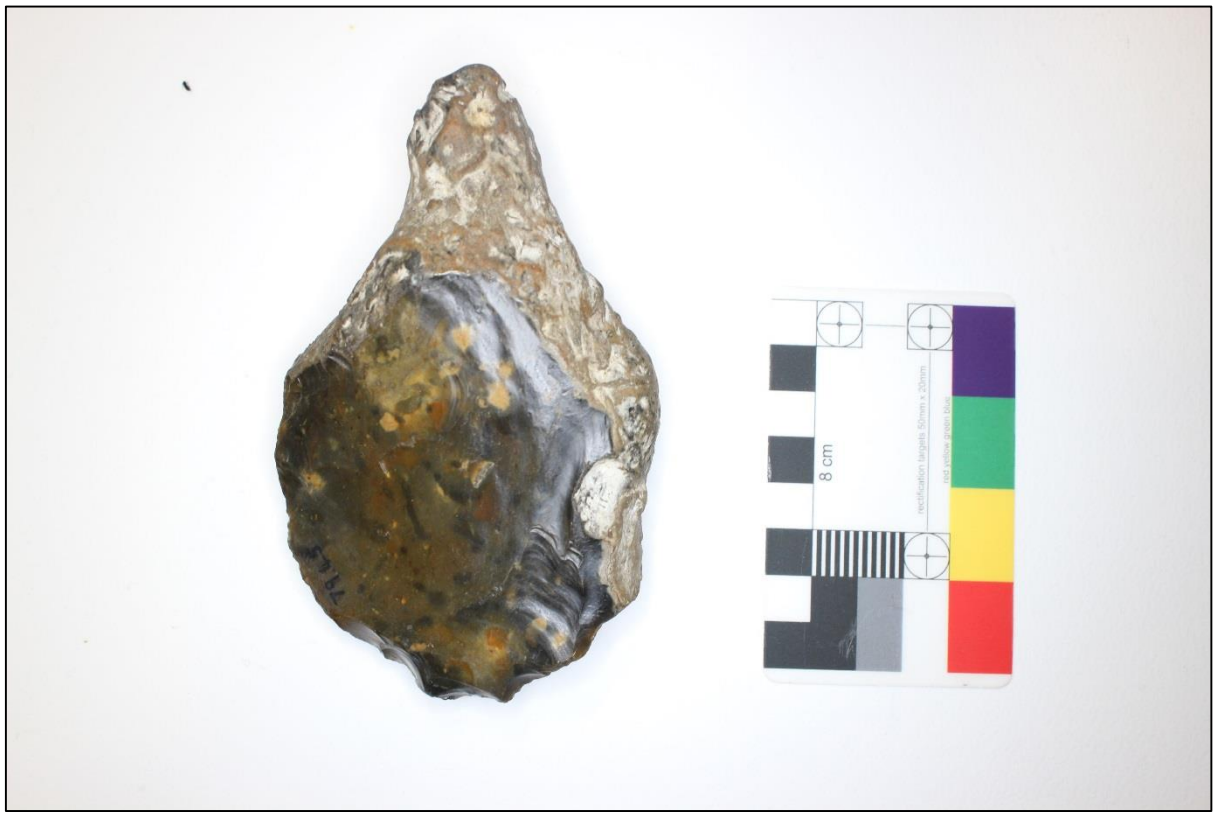


Plate 16. Middle Palaeolithic Hand axe from Lee Moor, Lofthouse, Wakefield (PRN 3813) held by Wakefield Museum Service (accession number: WAKGM:1979.46)

Plate 17. Palaeolithic hand axe from Lupset in J W Walker's 'History of Wakefield and its peoples' 1934, republished 1972 (PRN3814)

Plate 18. A sequence of Mesolithic microliths discovered in a line by Francis Buckley, suggested by him to represent a hafted projectile from which, the shaft, probably of wood had degraded (now held by The Manchester Museum (accession number 03784)

Below: Extract from Francis Buckley's drawing book no. 9 recording the discovery of a series of pygmy tools (Late Mesolithic microliths)

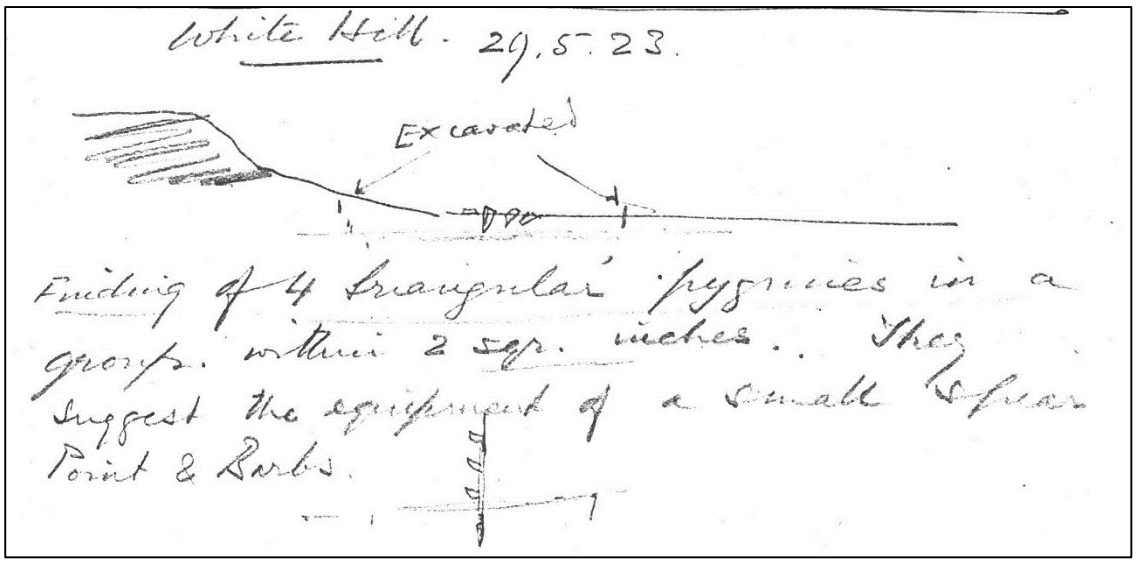


Plate 19. Lithic described as an Upper Palaeolithic convex backed blade (by Rawson 1993) actually an Early Mesolithic backed microlith, found by the Darbys' (held by Heptonstall Museum).