ARCHAEOLOGICAL SERVICES WYAS

Enhancing the Palaeolithic and Mesolithic Records of the South Yorkshire SMR

Report no. 2583

September 2014

Client: English Heritage

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Summary

The aim of this study was to enhance the Palaeolithic and Mesolithic period record within the South Yorkshire SMR and to further the development of appropriate mitigation strategies within the planning process. This was achieved through a reassessment and enhancement of existing records, the creation of new records with information gathered from published and unpublished sources and from repositories such as regional museums and libraries. Data from the Portable Antiquities Scheme were also interrogated. As a result, the number of recorded early prehistoric sites or findspots in South Yorkshire has more than doubled.

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Report Information

Client:	English Heritage
Address:	37 Tanner Row, York, YO1 6WP
Location:	South Yorkshire
County:	South Yorkshire
Period(s) of activity represented:	Palaeolithic and Mesolithic
Report Number:	2583
Project Number:	4040
Site Code:	NHP
Date of report:	September 2014
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Authorisation for distribution: ----------

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Acknowledgements

ASWYAS would like to thank the following museum staff for their help and assistance during this project: Natalie Murray (Experience Barnsley), Peter Robinson (Doncaster Museum), Helen Harman and Lucy Creighton (Museums Sheffield), Karl Noble (Rotherham Museum), Grant Scanlon, Chris Yates and Katina Bell (Kirklees Museum Service), Pam Judkins (Wakefield Museum Service), Gavin Edwards (Bradford Museum Service), Ian Wall (Creswell Craggs), Bryan Sitch (Manchester Museum), Ros Westward (Buxton Museum), Samantha Glasswell (Bassetlaw Museum), and Spencer Bailey (Derby Museum).

ASWYAS would also like to acknowledge Dr Ed Blinkhorn and Dr Paul Preston for their provision of data collected as part of their recently completed PhDs, and Tim Cockrell who provided data gathered for his ongoing PhD.

ASWYAS would also like to thank Jason Dodds and Ian Sanderson from the West Yorkshire Archaeology Advisory Service for providing comparative data that have assisted in the analysis overview.

1 Introduction

By Alexandra Grassam

Archaeological Services WYAS (ASWYAS) was commissioned by English Heritage to enhance the information held by the South Yorkshire Sites and Monuments Record (SMR) relating to the known and potential Palaeolithic and Mesolithic archaeological resource within the county (Fig. 1). The project was undertaken as part of the English Heritage National Heritage Protection Plan (NHPP) Activity 4G1.401. The purpose of this report is to provide a summary of the results of the project and to highlight potential approaches to mitigation strategies.

The project was undertaken in three stages:

- Stage 1: Data checking and collation;
- Stage 2: Updating of SMR records;
- Stage 3: Assessment and analysis of the final dataset

At the beginning of the project, the SMR held 229 Palaeolithic and Mesolithic records, and by the end of the project this has been increased by an additional 238 records (Figs 2 and 3).

The study area: geology, topography and land use

South Yorkshire lies on the east side of the Pennines and shares county borders with Derbyshire, West Yorkshire, North Yorkshire, the East Riding of Yorkshire, Lincolnshire and Nottinghamshire. The county is split in to four Districts, these being Sheffield, Barnsley, Rotherham and Doncaster (Fig. 1). Much of the western half of Sheffield District falls within the bounds of the Peak District National Park. The central part of the county occupies the carboniferous geology of the Yorkshire Coal Measures, which have produced a rolling landscape with hills, escarpments and broad valleys. To the west of the Coal Measures, the solid geology consists of the Millstone Grit Group whilst to the east of the Coal Measures there is a thin band of mixed Permian and Zechstein Rocks (Magnesian limestone). The easternmost part of the county overlies the Triassic Sandstone (Fig. 4).

Superficial geology consists of upland blanket peat over much of the Millstone Grit to the west; there are alluvial clays in the river valleys of the Coal Measures as well as small patches of till, peat and glacial sand and gravel. Humberhead Levels deposits consisting of till, river terrace, blown sand, lowland peat, alluvium and lacustrine deposits cap much of the Zechstein, Permian and Triassic rocks to the east (Fig. 5).

The land in South Yorkshire falls generally from west to east, starting at a high point of 548m AOD at High Stones in the Peak District National Park. The undulating topography of the Coal Measures varies between approximately 300-340m AOD to the west of Sheffield, in the foothills of the Peak District National Park, and lies at approximately 50m AOD in the river valley bottoms. To the east, in the District of Doncaster, the landscape becomes gradually flatter from approximately 100m AOD on the limestone to the west to below 10m AOD in

the east of the district (Fig. 6), although there are some more elevated areas along the limestone belt.

South Yorkshire contains four highly populated conurbations of which Sheffield is the largest. The Sheffield urban area is the ninth most populated conurbation in the UK, and dominates the western half of South Yorkshire containing over half of the county's 1.4M people (2011 Census - Built-up areas ONS Retrieved 24th January 2014) (Fig. 7). The urban areas of South Yorkshire have largely grown up around the mining and steel industries. Mining of the coal measures has resulted in substantial areas of disturbance across the landscape, which will have involved the destruction of many archaeological sites. Limestone quarrying, mineral extraction and peat cutting have also had an extensive impact on the landscape in the eastern half of the county, e.g. peat removal from the raised mires on Hatfield and Thorne Moors. Peat loss through erosion has intensified in the uplands since the onset of the industrial revolution and the introduction of large populations of sheep through out the Pennines. Much of the remaining landscape comprises enclosed land that is either under cultivation or set aside as pasture, whilst the western margins of South Yorkshire includes the unenclosed and unimproved uplands of the Peak District National Park.

2 Archaeological Background

By Phil Weston

Palaeolithic South Yorkshire

Evidence of Lower Palaeolithic activity in South Yorkshire is restricted to finds of Acheulian bifaces. Such items have been found in Back Field, Cantley (SMR ref. 5243), during gravel extraction at Hatfield (SMR ref. 4327) and at Rossington (SMR ref. 967) also during mineral extraction. It is very unlikely that the bifaces were recovered from their original contexts due to disturbance by ice action (either during the Last Glacial Maximum, around 20,000 years ago, or during the more recent Older and Younger Dryas stadials).

Upper Palaeolithic sites and finds are more common in the county. These represent human communities repopulating northern Britain as the Devensian ice sheet retreated northwards at the end of the Last Glacial Maximum. Most of the known Upper Palaeolithic sites in South Yorkshire have been found in caves and rock shelters of the limestone gorges and represent northern outliers of the Creswell Caves and rock shelter site group (Manby 2003). Upper Palaeolithic rock shelter/cave sites are known at Stone Green near Maltby (Jenkinson 1978), Dead Man's Cave and Anston Stones, Anston (Jenkinson and Wayne-Griffiths 1986; Dolby 1973), Edlington Wood (Dolby 1973, Mellars 1973) and Lob Wells Wood (Creswell Heritage Trust 2001). Upper Palaeolithic findspots are also known from Butler's Farm, Finningley (Magilton 1977, 40), Eastfield Farm, Tickhill (Wymer and Bonsall 1977, 405), on Lindholme Island (Friend 2001, 111) and the Coal Measures to the west of the limestone, though out of their original context.

Mesolithic South Yorkshire

The Mesolithic of northern England has long been the subject of study. Earlier publications relevant to South Yorkshire include Radley (1967, 1968), Radley and Marshall (1963, 1965), Radley and Mellars (1964), Radley, Tallis and Switsur (1974) and Raistrick (1934, 1964). The majority of sites detailed in these publications are restricted to the uplands of the Pennines, although the Early Mesolithic Type Site at Deepcar is an exception, being located on a small crag overlooking the confluence of the rivers Porter and Don (Radley and Mellars 1964). The Early Mesolithic flint assemblage from Deepcar is characterised by obliquely blunted points, and long and slender, partially backed points. As an industry, it has a fairly even distribution across southern and northern England and Wales (Butler 2005, 99-98). The Deepcar industry has also been found in upland settings by Francis Buckley to the north at Warcock Hill, Lominot and Windy Hill near Marsden (Radley and Mellars 1964, 13-18). Another Early Mesolithic site worthy of note, and in a lowland setting, is that identified at Sutton Common on a small knoll just to the north-west of the Early Iron Age enclosure (Parker Pearson and Sydes 1997, 230-233).

Later Mesolithic sites are characterised by flint assemblages that contain tool types already seen in the Early Mesolithic, but also include geometric microliths and rods (Butler 2005, 92). Microliths found on Pennine Late Mesolithic sites are amongst the smallest lithic artefacts in the world, many finely made pieces only a few millimetres long. Late Mesolithic sites are found in both lowland and upland locations with upland examples found at Dunford sites A and B (Radley *et al.* 1974, 2-9) and March Hill in West Yorkshire (Spikins 2002, 28-31) and lowland sites identified at Norton Common Farm, Reedholme Common and Johnny Moor Long, Thorne during the Humberhead Levels survey (Van de Noort and Ellis 1997, 241-259). Possible *in situ* Late Mesolithic flintwork was also recovered at Sutton Common (Parker Pearson and Sydes 1997, 234).

Many upland Mesolithic sites have been found to have extraordinary integrity despite their reputation as being disturbed by erosion. March Hill in West Yorkshire, for example, has the highest recorded integrity of any Palaeolithic or Mesolithic sites with finds moving only millimetres from their original locations (as measured by interpolated ground surfaces and GIS statistical techniques, Spikins *et al*. 2002) and similar sites are likely to exist in South Yorkshire.

The significance of these sites, coupled with the difficulty of identifying them with typical prospection techniques and threats from erosion and development, provide a particular challenge to management and protection.

Detection of the early prehistoric archaeological resource

The enhancement of the SMR and analysis of the PAS data with regard to the Palaeolithic and Mesolithic periods has primarily been undertaken in order to gain a better understanding of the implications of any proposed development site with respect to its potential impact on the Palaeolithic and Mesolithic archaeological resource. Moreover, the review offers

archaeological mitigation strategies that may be adopted as part of the planning process. The early prehistoric period is particularly difficult to manage with regard to development planning for the following reasons.

Primarily, it is the ephemeral nature of the archaeological remains left behind by transitory early prehistoric people that has led to the period being so underrepresented in the SMR. Early prehistoric communities comprised small groups of hunter-gatherers who would have travelled through the landscape, likely on a seasonal round, moving to a particular location when seasonally available resources were to be found. Early prehistoric hunter-gatherers did not practice monumentality in a way that would still be visible today, nor did they divide the landscape with boundary ditches as was the case in the Neolithic and Bronze Age. Archaeologically, hunter-gatherer subsistence regimes left very little trace that can be identified today. Stone tools and debitage are now the only signifiers regularly found, whilst potential evidence for forest clearance in the pollen records remains debated. Subsurface features rarely amount to more than shallow hollows or pits, stake-holes, post-holes and lithic scatters. Only very occasionally has evidence of more long-term occupation been identified, such as that at Deepcar, South Yorkshire (Radley and Mellars 1964), Creswell Crags, Derbyshire/Nottinghamshire (Jenkinson 1984), Star Carr, North Yorkshire (Clark 1954) and Howick, Northumbria (Waddington 2007).

Site resolution can also be a factor and understanding what constitutes a ‘site’. If, for example, a SMR entry records a Mesolithic arrowhead findspot in a ploughed field, it is debatable as to whether it can be regarded as a singular lost artefact or potentially part of a larger scatter representing a hunting camp or flint working floor. It is possible that the more distinctive arrowhead was spotted by an untrained eye and that smaller microliths and debitage remained unrecognised. Consequently, writing off the find as residual could belie the existence of a genuine archaeological site. Furthermore, whilst operating within the developer funded framework, it may be difficult to justify investing scarce resources in the recovery of unstratified finds even though they may be derived from more intact deposits below.

Mitigation strategies currently employed within the planning process are insufficient and only offer a low probability of detecting early prehistoric sites. Often, evidence of an early prehistoric site may exist only in the ploughzone and as such is likely to be lost during mechanical removal of topsoil and subsoil. Even where more stringent mitigation strategies are employed prior to machine excavation, such as fieldwalking or testpitting, the size of flints mean they can be easily missed. For example the average size of artefacts at March Hill, an internationally significant site, was under 10mm, with finds of black chert being the same colour as the surrounding peat. Furthermore, the tight concentration of flint scatters, such as that recorded at March Hill, West Yorkshire, which covered an area only 2m by 2m (Spikins 2002, 39), could result in them being overlooked by a test pit survey conducted at 10m or even 5m intervals.

The study area: potential

South Yorkshire contains a number of distinct landscape types. There is potential for the survival of Palaeolithic and Mesolithic remains in all of these, but it is particularly high in the low lying areas on the eastern side of the county and within the upland areas on the county's western margins, especially within the Peak District National Park.

There are extensive low lying, seasonally waterlogged areas in the eastern part of the county, particularly around Doncaster. These include Potteric Carr, Loversall Carr and Wadworth Carr, which contain a number of palaeochannels. Where deeper sequences survive in these channels, waterlogged deposits could contain preserved evidence from the Late Devensian glaciation and early Holocene period. As such, these deposits may be considered to have high potential for Palaeolithic and Mesolithic evidence. Unfortunately, such waterlogged deposits are at risk from drainage regimes and a variety of development pressures (Head 1997, 270).

Thorne and Hatfield Moors in Doncaster, which have previously seen extensive peat extraction, are also significant areas where Palaeolithic and Mesolithic material could potentially survive, and indeed, a Palaeolithic burin has been recovered from Lindholme Island, on Hatfield Moors (Friend 2001, 111). Although peat extraction is no longer carried out, mitigation strategies may need to be employed to inform any future restoration and management work being undertaken by Natural England as part of the development of this area as a National Nature Reserve.

Work undertaken as part of the Humberhead Levels Project by the University of Hull reported early Mesolithic findspots along the Hampole Beck and the river Idle, the old course of which forms the eastern boundary of South Yorkshire. Later Mesolithic activity was found along all the river systems studied, but the river Idle appears to have been the most widely exploited with material from this area accounting for 64% of the overall lithic assemblage (Head 1997, 395). This information, which until now, had not been fully integrated into the South Yorkshire SMR, suggests that there is potential for the survival of early prehistoric evidence along all of the river systems of South Yorkshire.

Recent excavation work at a number of development sites has also revealed evidence for Mesolithic activity. At Finningley Quarry on the South Yorkshire-Nottinghamshire border, a number of shallow pits were identified. One of these produced material which has been radiocarbon dated to 8005+/-35 years BP (6000 cal BC) (MAP 2010, 17). Early and Late Mesolithic material has also been recovered during excavations at Pastures Road, Mexborough, where eleven flints were recovered from a small pit and several more unstratified flints were found across the site, all indicating that there had been activity within the immediate area of the development (Plates 1 and 2; Weston and Williams 2008, 23; Weston 2012).

The Peak District National Park on the western side of the county, has high potential for the survival of Palaeolithic and Mesolithic evidence, based on a comparison of work undertaken in the Pennines in West Yorkshire (Spikins 2002). The potential for information to be

recovered from this upland area, which accounts for 11% of South Yorkshire, has recently been demonstrated by the recovery of Mesolithic flints, indicative of a working floor, from erosion scars on Broomhead Moor (Ullathorne 2005, 52). The integration of the PaMeLA data have also provided a significant number of additional findspots in this part of the region.

3 Aims and Objectives

By Alexandra Grassam

The principal aims of the project were to confirm the validity of existing data, enhance it with new unrecorded data, and inform a predictive approach to future planning, land management and conservation decisions within the county. It is expected that the enhanced SMR records will allow greater sensitivity in the mitigation strategies employed, towards better detection of Palaeolithic and/or Mesolithic sites.

The aims and objectives of the project were to;

- Enhance the quality and accuracy of existing SMR records by checking the records against the primary source and using newly identified data sets;
- Add to the number of SMR records by collation of information from other data sets or documentary sources;
- Determine where gaps in the SMR record reflect lack of investigation rather than the potential for survival, and where concentrations may represent collector bias;
- Highlight areas where there is high potential for the survival of Palaeolithic/ Mesolithic remains and the likely nature of such remains;
- Highlight areas where there is limited potential for the survival of Palaeolithic/ Mesolithic remains, or where potential cannot be known without further investigation;
- Produce GIS-based maps highlighting areas of potential with regard to geology, topography and land use, where appropriate;
- Produce a fully illustrated written report summarising the results of the project;
- Disseminate the methods used and the results obtained to other SMRs and Historic Environment Records (HER) to facilitate wider understanding of the project's findings and, in particular, possible mitigation strategies.

4 Methodology and Sources

By Alexandra Grassam

The SMR is managed and maintained by SYAS. Established in the 1970s, the records were originally held on index cards with the locations plotted on to paper maps. The records have

since been converted into a digital format and are now hosted on an exeGesIS database with MapInfo GIS mapping.

Many of the early records held in the SMR derive from those originally compiled by the Ordnance Survey Archaeology Division, established in the 1920s and disbanded in 1983, after which its duties were transferred to the Royal Commission on Ancient and Historical Monuments established in England, Wales and Scotland (Cleere 1984, 60). The early records also incorporate information on finds donated to the county's museums.

Following the introduction of PPG16 in the early 1990s there was a dramatic increase in the number of developer-funded archaeological investigations, the results of which were disseminated to the county SMR as 'grey literature' reports. Information from these was then added to the SMR database. The database also contains information about nationally designated sites (Scheduled Monuments and Listed Buildings), as well as cropmarks.

Stage 1: data checking and collation

The existing SMR records relating to the Palaeolithic and Mesolithic periods in South Yorkshire were provided to ASWYAS by SYAS. The information held in each SMR record was then checked for accuracy against the referenced sources, which included checking the location, the quality of the evidence and the dating evidence for each site.

Searches were undertaken of all relevant repositories for records of early prehistoric sites. These records included published sources and unpublished information in grey literature and university theses. These sources were interrogated for information on existing SMR records and for evidence of sites previously not recorded in the SMR.

Relevant data held in repositories outside South Yorkshire were also included. The following sources of information and repositories were consulted:

Databases

The following list of databases were highlighted in the project design (Appendix 1) as being of potential use for the SMR enhancement:

- English Heritage's PastScape
- National Trust SMR records
- Natural England SHINE records
- Portable Antiquities Scheme
- The Colonisation of Britain by Modern Humans Project (PaMeLA) database records for South Yorkshire
- The Environmental Archaeology Database (EAB)

The PaMeLA project recently completed by Wessex Archaeology updated the previous survey of the Upper Palaeolithic and Mesolithic of England by Dr Roger Jacobi. Information from the project had been disseminated to SMRs and Historic Environment Records (HER).

An assessment of the National Trust SMR records found them to be compiled from both the South Yorkshire SMR and English Heritage's PastScape records, whilst Natural England's SHINE record was found to be compiled from existing SMR records. Consequently, neither dataset was analysed in detail.

Permission to gain higher level access to the Portable Antiquities Scheme database (PAS) was allowed for the purposes of research. The data obtained have been integrated into this report where appropriate, but they have not been integrated into the SMR at this time due to time constraints.

An assessment of the Environmental Archaeology Database (EAB) found no new records to add to those already included on the SMR. Recent and reliable palaeoenvironmental evidence remains are rather lacking in South Yorkshire, with much of the focus on palaeoenvironmental research in this period being in the North York Moors (Innes *et al.* 2004) or at best in the Pennines north of south Yorkshire (Ryan and Blackford 2010). This means that though broad generalisations can be made about changing vegetation patterns, such as that from open tundra to pioneer open forest to more closed forest environments through the Late Glacial and into the Holocene, evidence for specific local and region patterns remain unavailable. The highly mosaic nature of late Pleistocene and early Holocene vegetation makes it unwise to extrapolate from a few isolated pollen cores especially where these are not recently dated (see Whitehouse and Smith 2010). A small number of recently excavated sites have yielded important palaeoenvironmental evidence, such as Sutton Common providing evidence from 8260–7960 cal. BC onwards (Geary 2007) however, these are relatively isolated. Detailed specialist analysis of available palaeoenvironmental evidence from pollen and other sources may provide some further evidence but would need to be addressed with appropriate caution as to whether any particular location is representative of a wider region. Regional palaeoenvironmental reconstruction is likely to depend on further reliably dated samples.

A database created by Dr Paul Preston for his PhD thesis on Mesolithic lithics from the Central Pennine region (Preston 2013) was identified as a potential source of data for the SMR. Interrogation of these data, however, revealed the majority of the records relating to South Yorkshire had been sourced from the Wymer and Bonsall (1977) gazetteer which had already been incorporated (see below).

Libraries and Archives

The following libraries and archives were suggested as a source of further information:

- Paper records and grey literature reports held in South Yorkshire SMR
- Yorkshire Archaeological Society (journals, local publications etc.)
- Sheffield Central Library

A number of useful sources were identified including Wymer and Bonsall's Gazetteer of Mesolithic and Palaeolithic Sites (Wymer and Bonsall 1977), *The Wetland Heritage of the*

Humberhead Levels (Van de Noort and Ellis 1997) and the Creswell Crags Limestone Heritage Area Management Action Plan (Davis *et al.* 2004), which identified numerous potential rock shelter/cave sites as well as fissures that may contain valuable environmental data.

An assessment of PPG16 derived evidence for Late Pleistocene/Mesolithic evidence for England has been undertaken by Dr Ed Blinkhorn (Blinkhorn 2012) and a review of the grey literature held in the South Yorkshire SMR was carried out at that time (Blinkhorn 2013). The reports highlighted were reviewed for this project and where new information had been identified it was integrated into the SMR. In addition, SYAS identified a number of reports relating to sites where Palaeolithic and Mesolithic remains had been found. A rapid survey of the remaining grey literature was undertaken, focusing on the parishes/areas where there was considered to be greatest potential. A more formal appraisal of the grey literature library held by SYAS was not possible, as a result of time constraints.

Museums and Collections

The following museums and collections were identified as potentially holding information relevant to this project:

- Bassetlaw Museum, Retford
- Bracken Hall Museum, Bradford
- Buxton Museum
- Clifton Park Museum, Rotherham
- Creswell Crags Museum
- Doncaster Museum
- Experience Barnsley
- Manchester Museum
- Manor House Museum, Ilkley
- Pontefract Museum
- Tolson Museum, Huddersfield
- Wakefield Museum
- Museums Sheffield
- Derby Museum

The potential difficulties of liaising with museums about their Palaeolithic and Mesolithic material, given recent staff and funding cuts was highlighted at the outset of the project. This has often resulted in a hiatus in the upkeep of the databases (most use MODES), which detail

the collections, while staff cuts have resulted in a loss of knowledge about what each museum holds.

Following a liaison meeting between SYAS and representatives from the South Yorkshire museums it was decided to pose the following two questions:

- What information on Palaeolithic and Mesolithic material from South Yorkshire do you have on MODES (or equivalent)?
- What other information on Palaeolithic and Mesolithic material from South Yorkshire do you hold that you know or think is important?

A letter explaining the background to the project and asking these two questions was sent to each of the museums listed above. The only museum not to respond was Bracken Hall Museum. Bradford Council had recently withdrawn all funding from this museum and it was in the process of being set up as a community-led facility.

While the staff at the remaining museums were extremely helpful, the amount of new information they were able provide was limited. Their databases tended to lack sufficient information to inform SMR enhancement in their own right, and time and resources prevented a thorough search of the museums' holdings. Nevertheless, it is clear from an assessment of the museums' holdings (and discussions with the staff) that there are large quantities of flint held by these establishments that have never been analysed or dated.

Stage 2: updating SMR records

All information collated in Stage 1 was input directly into the South Yorkshire SMR database and GIS system in a MIDAS-compliant form.

The accuracy of all existing SMR records was checked against the Stage 1 data, with existing records updated as necessary, and new SMR records produced.

The records used the MIDAS Heritage Framework for the creation of historic environment records, ensuring that a common format has been used for the dissemination of information. The fields used in the database followed the standards laid down in the MIDAS Heritage Dictionary of Units of Information and INSCRIPTION (Forum on Information Standards in Heritage).

The descriptive and interpretative details for each record followed the standardised terminology listed in English Heritage Online Thesaurus.

Although Stages 1 and 2 were planned as separate exercises, it became apparent that the two stages needed to be undertaken simultaneously to improve efficiency. This allowed each entry from a database, such as PaMeLA, to be assessed and (if possible) matched to an existing SMR record. Where a satisfactory match was made, the existing SMR record was then updated to include the data held by PaMeLA. In cases where no match could be made, a new SMR record was created. Any level of doubt about the potential for a duplicate record was clearly outlined in the SMR record text.

Stage 3: assessment and analysis

The locations of the enhanced records were plotted on an Ordnance Survey base map of appropriate scale, using MapInfo GIS software to identify known concentrations of recorded Palaeolithic and Mesolithic sites. Locations have been plotted against geology, topography and land use, as appropriate, with the aim of identifying areas of archaeological potential.

It was originally intended to utilise the BGS's Online Borehole Record Viewer (http://www.bgs.ac.uk/data/boreholescans/home.html) specifically to test for any association between apparent occupation sites and peat formation. An assessment of this resource, however, found it to be inappropriate for this purpose given the size of the study area, although its use has greater potential for informing assessments of smaller sites.

The data were analysed to identify the following:

- Areas where there is known high potential for Palaeolithic/Mesolithic evidence and the form that evidence might take (e.g. sites of activity at the point of incipient peat formation - see Spikins *et al*. 2002, 19);
- Areas where higher concentrations can be seen to be caused by collection biases (e.g. repeated visits from collectors);
- Areas where there are clear gaps in the record due to the lack of investigation, or lack of disturbance of the artefact levels by, for example, erosion, but where there is potential for surviving evidence;
- Areas where there is limited potential for Palaeolithic/Mesolithic evidence.

This analysis also considered data held in the West Yorkshire Historic Environment Record (HER). This allowed for a comparison of the data sets based on similar areas of geology, topography and land use over the two counties. The PAS data for both counties have also been compared.

Information on the solid and superficial geology was taken from data collected by the British Geological Survey (http://www.bgs.ac.uk/opengeoscience). Topographic data and contours were obtained from the Ordnance Survey Open Data (http://www.ordnancesurvey.co.uk/opendata/). Where the depositional contexts of finds were recorded, the data was also added to the SMR. Data were also provided by SYAS from the South Yorkshire Historic Environment Characterisation project.

5 Results from Stages 1 and 2: Data Checking and Collation and Update of SMR Records

By Alexandra Grassam

Enhancing the existing SMR records

At the outset of the project there were 229 Palaeolithic and Mesolithic records in the South Yorkshire SMR, although this did include a number of records of broadly prehistoric date (500,000 BC to AD 42). A further 30 Palaeolithic and Mesolithic SMR records were identified during the clarification and enhancement stage of the project (a mistake in the way these records had originally been created meant they had not been identified in the initial search). In addition, there were 579 'undated' records, which comprised a mixture of those recorded as undated on the database, and those where no date had been input. A rapid survey of these undated records identified 112 records related to collections of worked flint, which could potentially contain Palaeolithic or Mesolithic material. Of these, 20 had been dated to the Mesolithic by PaMeLA.

All identified records were checked against the original sources to establish the accuracy of the existing record. For the majority of records, the original index card was recorded as the source, so each card needed to be examined to see if any other source was cited. Eighteen SMR records had no sources recorded on either the Historic Buildings, Sites and Monuments Record (HBSMR) or the original index card and so could not be enhanced. Forty records were identified as being 'duplicate records'; often those where a range of finds had been found and each one allocated a discrete SMR identifier, rather than just being grouped under a single reference number.

In many cases, particularly for the early records, the original source was either a museum or an Ordnance Survey record. A significant proportion of these records could be enhanced using either the PastScape or PaMeLA databases, with the former often providing a more detailed description of the original Ordnance Survey record, such as the finder's name and the circumstances of the find.

In total, some 140 existing SMR records were enhanced during the project. The vast majority of these were 'findspots', relating to the discovery of isolated discoveries or small groups of worked flint. These records were improved with the provision of information about the circumstances of the find and when it was found. Where possible details of the flint type and their quantities were added to the appropriate part of the database.

New SMR records

A total of 238 new records were created by the project. These were mostly 'findspot' records, with very few meeting the necessary criteria to be recorded as 'monuments' (an archaeological feature). Seventy-one were recorded as 'Environment (non-archaeological site)' and represent sites identified as having potential for Palaeolithic remains (e.g. Davis *et al*. 2004; ARCUS 2005). By far the best source for creating new records was the PaMeLA database, which alone provided 80 new records. The Wymer and Bonsall Gazetteer (1977)

provided evidence for 37 new records, although these records were all referenced in either PastScape or the PaMeLA databases.

Kirklees Museum (Tolson) was the only one from outside of South Yorkshire that confirmed they had any material collected from the county. Experience Barnsley were unable to provide any information at the time of the project as they had only recently opened. Prior to this, their collections had been held by Museum Sheffield and Doncaster Museum. Experience Barnsley was in the process of reviewing and digitising all the paper records from these institutions. Museum Sheffield, Doncaster Museum and Rotherham Museum all confirmed that they have relevant finds as part of their collections, but much of the flint that they hold has not been properly dated and often lacks a definitive provenance. Despite this, however, the museums collectively provided details that allowed for 17 new records to be created.

The Humberhead Levels survey (Van de Noort and Ellis 1997) was identified as a potential source of new SMR records. A review of this publication, however, found that a number of the sites were located outside of South Yorkshire. In total, this publication resulted in the creation of 11 new SMR records, all of Mesolithic date, notably in areas where no evidence for activity of this date had previously been recorded.

6 Results from Stage 3: Data Assessment and Analysis

By Phil Weston

Biases in distribution and problems of visibility

The distribution of early prehistoric sites and findspots in South Yorkshire is biased primarily by site visibility. Visibility is also affected by preservation. The dark grey areas on Figure 8 show the heavily built-up urban areas of South Yorkshire and those areas affected by extractive industries. These areas have less potential for *in situ* early prehistoric archaeological remains. The medium grey areas indicate superficial deposits of peat in the uplands of the Peak District National Park to the west and deposits of alluvium and peat in the lowlands to the east (Fig. 8). These superficial geological deposits have the potential to seal *in situ* remains and protect any potential sites from disturbance (except in areas of localised erosion and peat cutting). The lighter grey areas in Figure 8 denote enclosed land. In this case, however, no distinction has been made between land in arable production (and thereby under the plough), and land used for pasture.

Further bias is introduced to the SMR record distribution by the actions of flint collectors and certain concentrations of findspots may reflect the activities of these individuals in relation to aspects of proximity, accessibility, visibility and historical knowledge of site clusters (Fig. 9). Notable concentrations reflecting the activities of specific collectors can be identified in West Yorkshire (Francis Buckley) and Northumberland (Young 1987) with the same biases likely to exist in South Yorkshire.

Figures 10 and 11 focus in on the Peak District National Park as a case study and demonstrate how several factors influence the location of findspots. Flint collection requires access and, as a National Park, the public are welcome. Public access to the Park is supported by an extensive network of footpaths and many findspots are located adjacent to these routes, possible as a consequence of erosion caused by the creation and use of the paths (Fig. 10). Similarly, many findspots are located close to water courses and the cloughs the flowing water creates. It seems likely that 'flinters' deliberately explore the cloughs searching for areas of erosion to investigate. Furthermore, once a site has been identified, it is likely to be revisited, if not by the original finder then by other individuals.

Many findspots within the Park are also clustered around the scarp edge and the lower limit of the upland peat beds at an elevation of 380-430m (Fig. 11). At this height, particularly on north-facing aspects, erosion is caused by frost action and subsequent gullying (Spikins 1999, 25), thus exposing finds. South-facing aspects, as often utilised by hunter-gather population in the ethnographic record due to direct sunlight and shelter from north winds (Spikins 2010), suffer less from frost damage but are much more likely to suffer erosion caused by sheep, which are attracted to south-facing slopes for much the same reasons as humans, including Mesolithic populations (Spikins 1999, 25).

Plates 3 and 4 show an excavation carried out by Joseph Radley and Fred Hepworth in 1963 south-west of Dunford Bridge in the District of Barnsley. The images clearly demonstrate how the site was located eroding out from the edge of the peat bed, in this case recorded as 1500 feet above sea level (approximately 457m). Radley was a keen and meticulous researcher and published widely on early prehistoric sites in the Pennines (Radley 1967, 1968; Radley and Marshall 1963, 1965; Radley and Mellars 1964), but even so, the locations of his sites were only located to within 100m.

The recorded evidence

Overall the project was successful in more than doubling the number of records held in the SMR for the Palaeolithic and Mesolithic periods, although the increase was far more significant for the Mesolithic records.

Palaeolithic

Prior to enhancement, the South Yorkshire SMR held eleven Palaeolithic records (Fig. 2). These consisted of one potential rock shelter, eight findspots or small assemblages of Upper Palaeolithic flint (associated with limestone caves or rock shelters) and two Lower Palaeolithic Acheulian bifaces recovered during mineral extraction at Hatfield and Rossington. Flint of the Mousterian and Aurignacian industries has also been found at Rossington but as residual finds in late features.

The enhancement of the SMR has created seven new records for this period based on flint scatters or findspots and 70 potential rock shelter sites (Fig. 3). Fifty-eight of the potential rock shelters were identified by Glyn Davies for the Creswell Crags Limestone Heritage Area Management Action Plan (Davies *et al.* 2004), whilst the remaining 12 possible cave sites

were identified at Nearcliff Quarry, to the east of Conisbrough, during an archaeological survey by ARCUS (2005). Two PAS Palaeolithic finds were also noted during the enhancement process.

Mesolithic

The South Yorkshire SMR now holds 431 Mesolithic records, almost doubling the pre-enhancement total of 218. A further 59 PAS records were also noted during enhancement process, giving a total of 490 Mesolithic sites and findspots in South Yorkshire (Figs 2 and 3). Mesolithic sites were added to the South Yorkshire map, regardless of topography or geology, and also occupy some previously blank areas. This widespread distribution reflects the patterns of mobility practiced by hunter-gatherer communities over millennia. These patterns, or taskscapes (Ingold 2000, 189-208), were likely influenced by seasonally available recourses such as fruiting plants and trees and migrating birds, mammals and fish. Natural sources of flint or chert would have had to fall within a community's taskscape or, perhaps, a location where trade with another community may have facilitated the procurement of such raw materials. McFadyen (2007, 135-138), however, has raised concerns that adherence to a structured taskscape limits potential for change. A taskscape need not always relate to 'place' when it is a certain environment type that is required. As such, perhaps the widespread nature of Mesolithic sites and findspots across South Yorkshire reflects a higher degree of flexibility within systems of seasonal mobility than once assumed.

The newly identified sites and findspots, and indeed those known prior to enhancement, however, must be regarded with some caution for the following reasons.

First, many of the SMR records do not contain the total number of early prehistoric flints recovered. Furthermore, where early prehistoric material is present, within a larger multi-period assemblage the breakdown of the assemblage by period is not always recorded. Figure 12 demonstrates just how many of the SMR records do not contain this basic information, the small, dark 'unknown' symbols identifying such records.

Second, the reliability of site provenance supplied to the SMR can vary markedly in its accuracy. The largest symbols on Figure 13 indicates where the SMR has only been supplied with a four-digit map co-ordinate resulting in the site being located within a 1km square block of land. The middle-sized symbols are the result of six-digit co-ordinates giving an accuracy to within a 100m block, whilst the smallest symbols identify sites located with eight digit co-ordinates with an accuracy to within a 10m block.

Finally, the dating of the flint from the recorded sites and findspots can vary greatly in its detail and reliability. Sites and finds represented by the paler symbols on Figure 14 indicate flints that have only been given a wide date range such as '?Palaeolithic' (blue), 'Mesolithic to Bronze Age' or 'prehistoric' (pink). The medium-shaded symbols indicate sites or findspots that have been given a Palaeolithic or Mesolithic date whilst the darker symbols indicate where an assemblage or find have been given a tighter date range. Well-dated

material will have been attributed to a particular period such as Upper Palaeolithic, Early or Late Mesolithic and/or be associated with a radiocarbon date range.

Distribution

Comparison of the pre-enhancement and post-enhancement SMR distributions (Figs 2 and 3) indicates that, whilst findspots have increased in the areas where flint has previously been discovered, finds have also been recorded for parts of South Yorkshire that had previously had no findspots.

The majority of the Palaeolithic findspots in South Yorkshire prior to enhancement were located on the limestone in the south-eastern part of the county, indicating how important the rock shelters afforded by this geology were to Palaeolithic communities. Post-enhancement, findspots are now known in the eastern part of the county, identified during sand and gravel extraction, and more are known from the Coal Measures to the west of the limestone. The majority of the sites, when attributed, date to the Upper Palaeolithic. There are, however, three Lower/Middle Palaeolithic Acheulian hand bifaces, which are amongst the flints recovered from the sand and gravels in the eastern part of the county. These are thought to have been re-deposited by Devensian ice-action.

Additionally Mesolithic findspots supplement the previously known concentrations in the peat uplands in the western part of the county, in and around Canklow Woods to the south of Rotherham, along the limestone gorges in the southern part of the county, and those from ploughed land adjacent to the river Don between Mexborough and Sprotborough. These SMR records can be largely attributed to the activities of researchers/flint collectors, however, and the ease of access to known areas of Mesolithic material. In particular the activities of individuals such as Rayner, Radley, Hepworth, Reeves and Butcher have increased the number of findspots in the peat uplands of the Peak District National Park and Barnsley District in comparison with other areas of the county. Copley and Peace have done likewise for Canklow Woods and the river Don valley respectively.

It is to be expected, therefore, that the enhanced SMR will reflect the activities of flint collectors in areas where public access is facilitated and where local conditions such as upland peat erosion and the ploughing of arable land improves visibility. Of particular note, however, following SMR enhancement and analysis of the PAS data, is the populating of previously blank areas of the distribution map through the identification of several new findspot concentrations.

One new concentration of findspots is in Rotherham District in the vicinity of the site of Roche Abbey and the limestone gorge through which Maltby Dike runs. Prior to the SMR enhancement just two Mesolithic findspots and one Palaeolithic rock shelter were recorded in this area. PAS data and the findings of the Creswell Crags Limestone Heritage Area Management Action Plan (CCAP) mean that the number of findspots and potential rock shelters has increased by 58 records. Of particular note is the large scatter of predominantly Mesolithic flint, with a small Palaeolithic element, found just to the north-west of the gorge

around Bullatree Farm. This gorge is now known to contain at least 12 potential rock shelters and has two SMR findspot records.

The CCAP field work also identified 42 potential rock shelters in Anston Stones Wood in Rotherham District. Records suggest only two caves/shelters had previously been recognised and been archaeologically investigated within this gorge with both producing Palaeolithic flint work and both returning radiocarbon dates of *c*. 8000 cal. BC obtained from animal bone. Not all the potential cave sites are thought likely to contain evidence of human activity, as some are little more than narrow fissures but these, whilst unoccupied, may nevertheless contain valuable faunal and environmental remains.

The remaining findspot concentrations are all located in the northern part of Doncaster District (Fig. 3). Notable Mesolithic flint assemblages have been identified during fieldwalking undertaken as part of the Humberhead Levels survey on land at Sutton Common, Norton Common Farm and Greenland Farm (Van de Noort and Ellis 1997, 233-259). All these assemblages were found within close proximity to various palaeochannels, indicating that the water courses and their associated resources were exploited by Mesolithic communities.

Data from PAS have identified a further concentration of findspots around Plaice Hills Farm and Marsh Hill Farm, to the east of Sykehouse, and on the northern boundary of Doncaster District between the sites at Sutton Common and Norton Common Farm.

Analysis of the origins of SMR records for early prehistoric sites demonstrates just how few are found through developer-funded archaeological investigations. Flint collection is by far the biggest contributor to the sum total of early prehistoric records, with research-driven investigations making a smaller but significant contribution. Developer-funded archaeological investigations have led to the creation of just 16 SMR records, four of them arising from one site at Loscar Farm.

Whilst this disparity can to some extent be explained by the fact that developer-funded investigations are not likely to take place within areas of known early prehistoric activity, such as the peat uplands and the limestone gorges, it may also reflect the shortcomings of the archaeological mitigation strategies that have been employed. Enhancement of the SMR has revealed that early prehistoric sites or findspots have a wide distribution across South Yorkshire, regardless of geology and topography, demonstrating the potential of almost any site to produce early prehistoric finds or features. Many potential sites, particularly in the lowlands, may only exist in the form of residual disturbed finds in the ploughzone. As such these are simply machined away as the topsoil is removed in the preliminary stages of most archaeological investigations. To compound this problem the importance of such ploughzone sites may be underestimated within professional archaeology, as early prehistoric lithics can all too easily be written off as unstratified finds and dealt with summarily in the reporting process. The paucity of developer-funded derived early prehistoric sites or findspots suggest

there is a need for a reappraisal of current mitigation strategies in order to maximise the potential of early prehistoric elements on archaeological sites.

Comparison with West Yorkshire

When the South Yorkshire SMR Palaeolithic records are compared with those of the West Yorkshire HER it is notable that, whilst the majority of West Yorkshire's sites/findspots are located in the uplands on the Millstone Grit, none of South Yorkshire's records have been found in that particular environment (Figs 15 and 16). Only further analysis of South Yorkshire's upland assemblages will prove if this present distinction is correct or a result of the misidentification of Palaeolithic material. Equally, it is conceivable that some 'Palaeolithic' material from West Yorkshire has been misidentified. There is some doubt over the attribution of a Palaeolithic date for the flints from Light Hazzles reservoir (Dodds pers. comm.) and this may be true of other assemblages. The possibility that rock shelter sites exist in the upland areas of South Yorkshire, perhaps at sites such as Burbage Edge and Higgor Tor, requires further investigation. Such potential is highlighted by the recent addition to the Sites and Monuments Record of a suspected rock shelter at Wyming Brook, Sheffield (SMR ref. 5386).

The distribution of Mesolithic sites and findspots across South and West Yorkshire are now much more comparable after enhancement of the South Yorkshire SMR. Mesolithic sites and findspots are now almost ubiquitous, regardless of geology and topography (Fig. 17).

7 Mitigation

By Phil Weston and Penny Spikins

The following mitigation strategies are based on those already proposed by Spikins (2010) in her Research Agenda for Palaeolithic and Mesolithic West Yorkshire. South and West Yorkshire share similar geologies and topography and have suffered similarly from the vagaries of urbanisation and extractive industries. Furthermore, following the enhancement of the South Yorkshire SMR, both counties seem to broadly share similar distributions of early prehistoric sites and findspots from the uplands to the west to the lowlands to the east.

The following mitigation strategies are proposed for known (or likely) early prehistoric sites·

Mitigation in upland areas

- Watching briefs are inappropriate for identifying early prehistoric sites.
- Geophysical techniques should be employed where there is known potential (and with certain caveats) as they may identify hearths, pits and post-holes (as demonstrated by Waddington 2007).
- For sites with known potential, it may be possible to define the limit of the site by large-bore auguring on a 1m grid. Wet sieving the resulting material through a 3mm mesh is then recommended, in order to identify micro-debitage.

- Large-scale samples should be taken over extensive areas and wet sieved in order to identify potential sites.

Mitigation when excavating

- On sites of high integrity (where finds have hardly moved from where they fell) all finds should be recorded in three dimensions. A covering tent to protect the site from the worst of the weather is recommended in order to ensure a high rate of finds retrieval.
- Finds from a low integrity site (where there has been some movement of finds) can be attributed to 500mm squares.
- All evidence of burning should be fully investigated and planned.
- Block sampling of hearths for excavation under laboratory conditions is recommended. Any phases of use should be identified and scientifically dated. Charcoal identification and lithic typology is essential.
- All potential structural elements should be fully investigated.
- Microwear analysis is recommended for all lithics as is analysis for refit patterns.
- A programme of intensive environmental sampling should be employed.

Mitigation in lowland areas

- Detailed prospection should be undertaken on any site located at the edge of a wetland environment such as on the bank of a palaeochannel or on the shores of the prehistoric water body such as Lake Humber. Such a location has the potential to contain high integrity sites and to produce well-preserved faunal and environmental remains. Prospection on a site with such potential should, in the first instance, consist of augering to locate and map bank or shore deposits. This will enable targeted test pitting (if the overburden is shallow enough) or trial trenching. All encountered deposits, including overlying deposits, should be sampled and sieved.
- On sites where gravel constitutes the superficial geological deposits (and as such is targeted by the mineral extraction industry), it may be worth seeking specialist advice on the geological age of the deposits and, thereby, their potential to contain archaeological deposits. Local archives should be consulted regarding any potential archaeological investigations close to such a site, and for records of flint and faunal finds. A watching brief should be maintained during extraction.

Mitigation in a ploughzone situation

- Prior to the excavation of evaluation trenches, fieldwalking should be undertaken at 5m transects. If crop scrub is present or the site is grassed, shovel pits or augering on a 5m grid should be undertaken.

- When a scatter is located great care should be taken to define its full extent and test-pitting should be employed in order to secure adequate retrieval and assess whether sub-surface features survive.

Mitigation in an urban situation

- There is potential for disturbed, unstratified finds. These should be collected and an accurate record of their location made.
- Early prehistoric sites have the potential to be buried by later deposits such as layers of alluvium and colluvium and, therefore, even if intact natural deposits are encountered the usual practice of hand cleaning the surface of such deposits would not necessarily identify a potential site. It may be beneficial in the first instance, therefore, to carry out a geomorphological assessment in order to identify any potential for stratified deposits dating to the early Holocene or earlier.
- If deposits with potential are identified, test pitting and/or auger samples should be taken and sieved for small finds down to a depth where such deposits may be disturbed by development.
- Sample resolution: as noted above (p. 4) an early prehistoric site of national importance might only cover an area of just 2m by 2m as in the case of March Hill, West Yorkshire. It is important, therefore, to be aware of the low probability of identifying any site or collection of artefacts given the typical size of sites and the sampling resolutions generally employed in commercial archaeology.

These mitigation strategies are skewed somewhat towards Mesolithic remains and, whilst they do have the potential to identify open air Palaeolithic sites, the more commonly identified cave sites are not considered here. Cave sites are less likely to be threatened by development as they are often located within protected environments. Deposits of alluvium and colluvium in the valley bottoms have the potential to mask unknown cave sites (Davies *et al.* 2004). In such an environment Davies *et al.* suggest that sites and/or potential buried land surfaces may be identified through coring, and this is recommended. Furthermore, should research investigations be pursued in or around existing cave or suspected cave sites, the CCAP project (Davis *et al.* 2004, 169-173) has highlighted several areas of potential for such investigations.

Dissemination

- Lithic assessment and analysis should be undertaken regardless of the overriding period of activity encountered (e.g. Mesolithic flints from a Roman period site).
- Lithic analysis should also include accurate attribution to period and within the phases of the Mesolithic.
- Any suspected Palaeolithic artefacts should be illustrated regardless of their provenance.

8 Potential for Further Analysis

The enhancement project has almost doubled the number of known records for the Palaeolithic and Mesolithic periods in South Yorkshire and has identified various avenues for further work.

Integration of the database

The structure of the SMR database allows for detailed searches to be undertaken, perhaps for a certain lithic type or particular collector. One such search is plotted in Figure 18, and shows the distribution of Mesolithic scraper and core finds (plotted here with the PAS data). Further interrogation of the database is possible.

Residual material

Many of the flint assemblages recorded in the SMR are of multi-period origin with Palaeolithic and Mesolithic material being considered residual and of little value. Analysis of the flint in such assemblages may isolate early prehistoric material and possibly assign it to a particular flint industry and so establish a tighter date range and perhaps a site function.

Where accurately located Palaeolithic and Mesolithic flint scatters have been identified in the ploughzone there may be the opportunity to further investigate such sites by field walking and test pitting. Such investigations may add to the quantity and diversity of the recovered lithic assemblage and might also lead to the identification of intact sub-surface archaeological remains.

Examination of flint from existing collections

Many SMR records have been omitted from the current study as the flint recorded was designated simply as ‘prehistoric’. There is scope, therefore, for the analysis of these assemblages, if they can be located, to identify further Palaeolithic and Mesolithic records for South Yorkshire.

There are still many collections of flint held by the museums and others in the hands of private collectors, which have never been analysed by a flint specialist. Unfortunately, some of these collections have no provenance at all and the collector may well have died so this information may not be retrievable. Where locations are recorded, however, analysis would lead to the identification of more early prehistoric sites. It should be noted, that some investigation of certain assemblages has recently taken place (Preston 2012; Cockrell forthcoming) confirming there is potential for further, detailed study.

Re-interpretation

There is also potential for comparative study of lowland and upland flint assemblages to assess whether differences between them reflect chronological separation or the utilisation of different industries in different environments.

On a larger scale, encompassing South and West Yorkshire, there is obviously potential for the reassessment of the upland flint assemblages. The lack of upland Palaeolithic sites in

South Yorkshire and the doubt cast over the validity of a Palaeolithic date for some of the West Yorkshire sites demonstrates the need for such further study. Nevertheless, it is likely that further Palaeolithic sites will be discovered in the future as public appreciation of their significance grows.

Community projects/public involvement

There is the potential to involve the public, but funding would be required. When funding is available, however, significant and valuable contributions can be made to early prehistoric studies. For example, the North East Yorkshire Mesolithic Project managed by Tees Archaeology in partnership with the North York Moor National Park and funded by English Heritage employed volunteer members of the public over four seasons of survey work consisting of test-pitting and fieldwalking. Details of the project and its results can be viewed here:

http://www.teesarchaeology.com/projects/Mesolithic/Mesolithic.html

Much of the project was focused on the upland peat of the North York Moors initially monitoring erosion spots for emerging lithics followed by test-pitting. There is an obvious parallel here with the upland areas of the Peak District National Park which fall within South Yorkshire. A similar project in this region would undoubtedly be of much archaeological and public value.

9 Conclusions

The enhancement of the South Yorkshire SMR has highlighted the potential that exists for all areas of the county that remain unaffected by urbanisation and extractive industries to contain early prehistoric remains. Moreover, where potential exists for early prehistoric deposits to have been sealed by alluvium or peat, well preserved, nationally significant sites may yet survive. Current mitigation strategies have been considered and a revised mitigation framework for the detection of early prehistoric sites, based on that suggested by Dr Spikins (2010), has been presented. Further areas of research into the existing records held by the SMR and flint collections held by museums and in private care are highlighted, as is the potential for public engagement. These would not only enhance the South Yorkshire SMR but also further our understanding of earlier prehistory within the South Yorkshire area.

Paper copies of this report were sent to the following SMRs and HERs:

- West Yorkshire
- North Yorkshire
- East Yorkshire
- North Lincolnshire
- Lincolnshire

- Nottinghamshire
- Derbyshire

Digital copies were also made available on request.

The findings of the project are to be presented to members of the archaeological community and public via an illustrated lecture at the South Yorkshire Archaeology Day in Sheffield on November 22nd 2014.

A report precise has also bee submitted to the Yorkshire Archaeological Journal and will hopefully appear in a forthcoming edition.

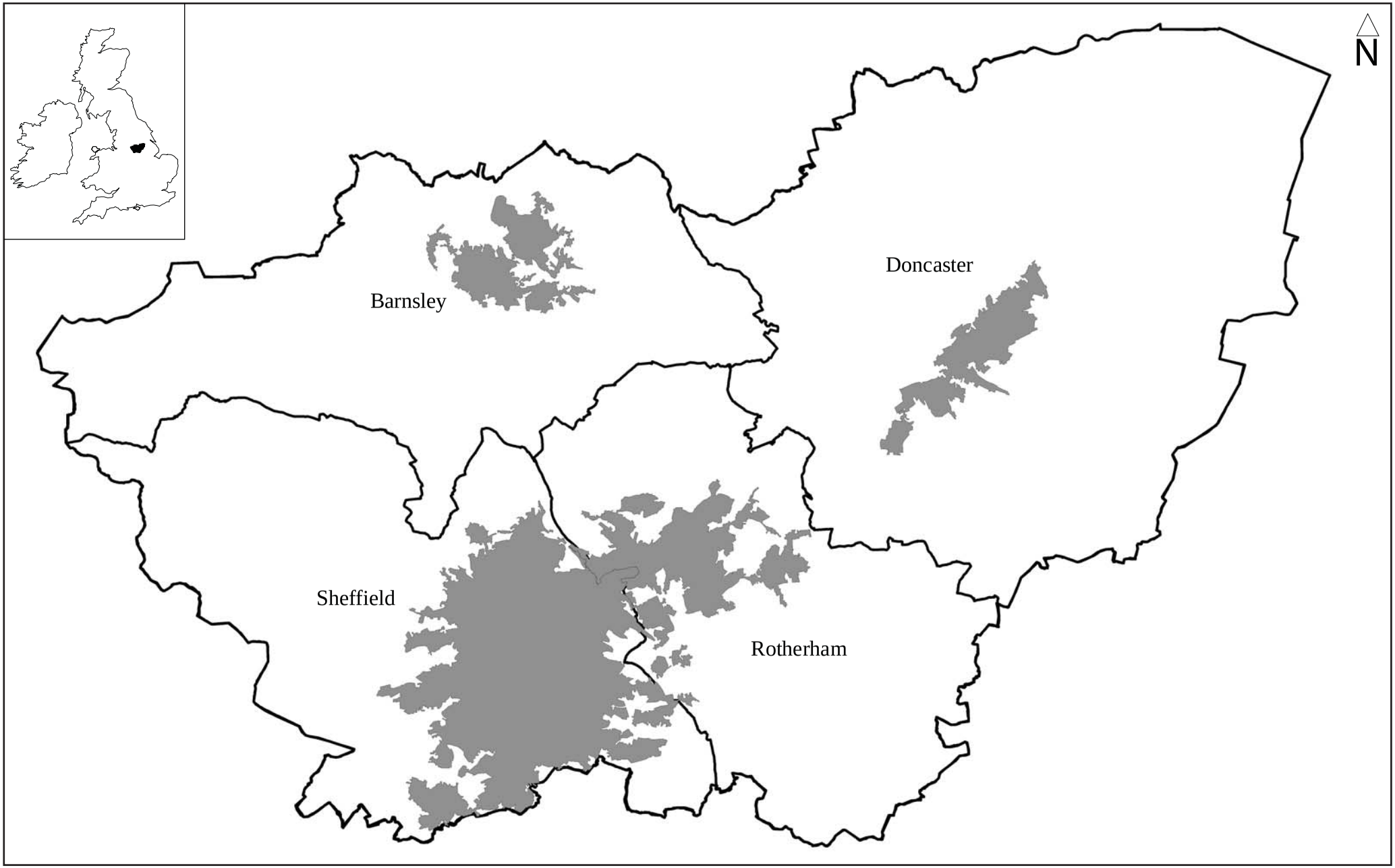

Fig. 1. The study area showing major settlements and district boundaries

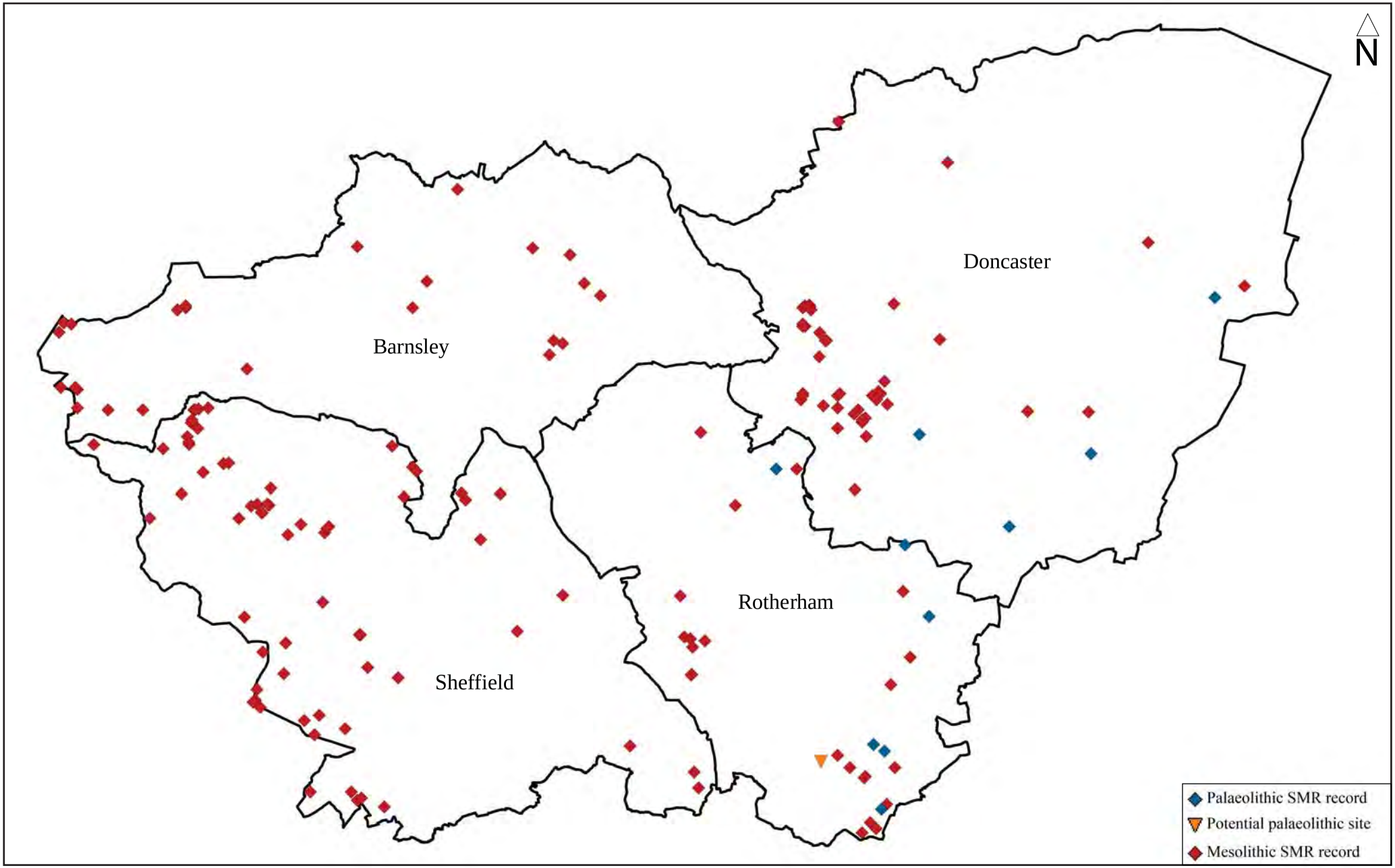

Fig. 2. The study area showing SMR records prior to enhancement

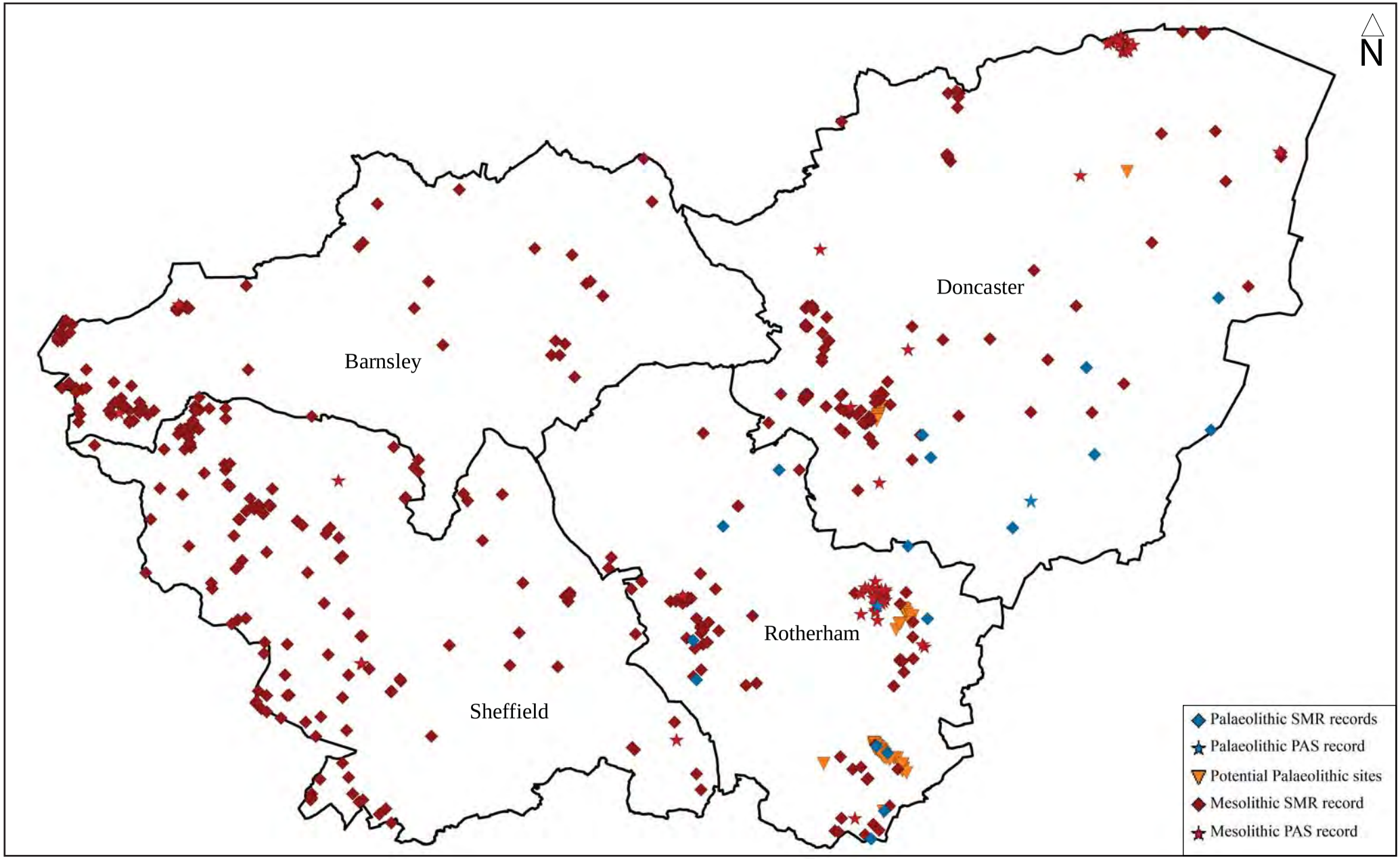

Fig. 3. The study area showing SMR and PAS records post-enhancement

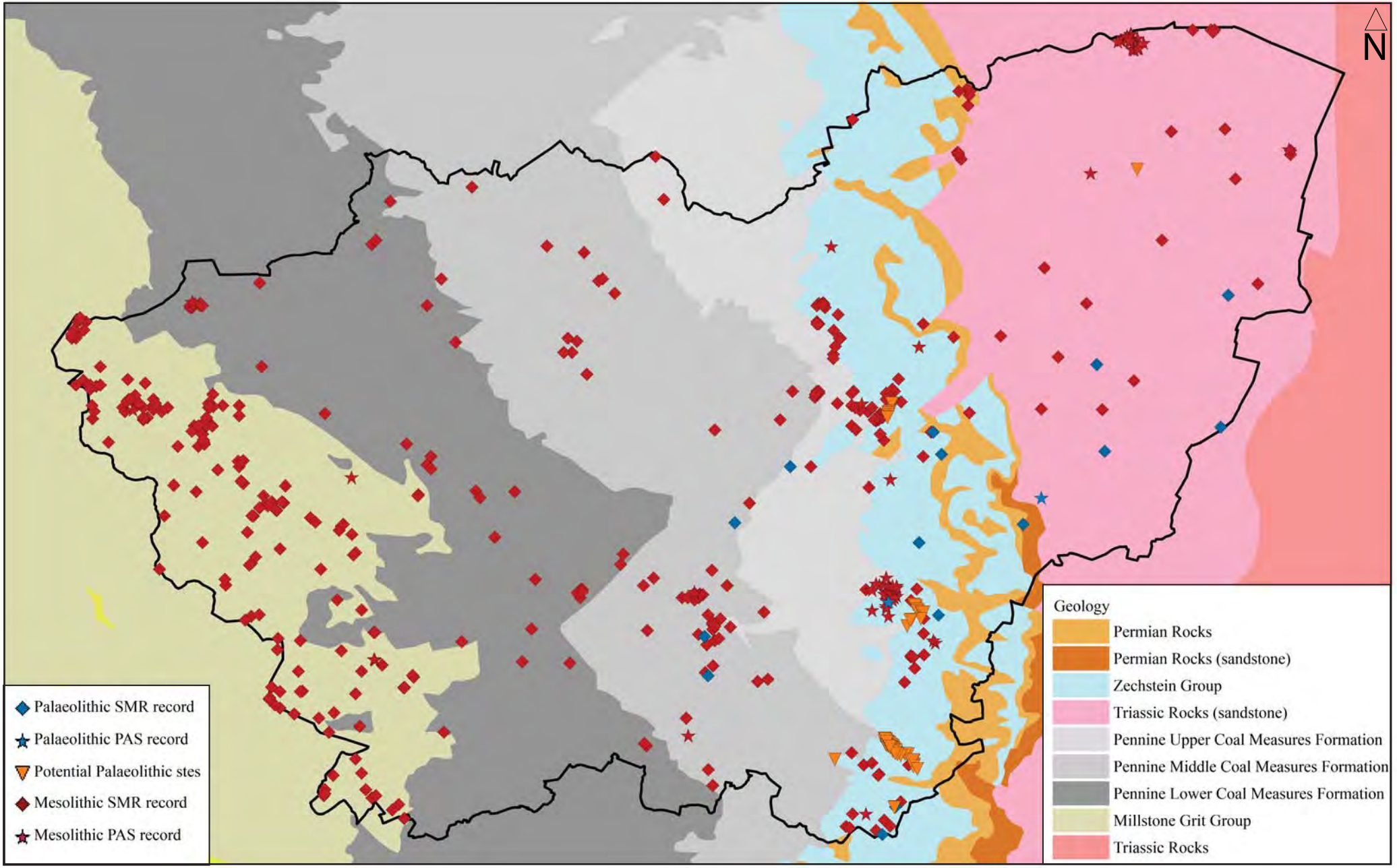

Fig. 4. The study area showing the solid geology and post-enhancement records

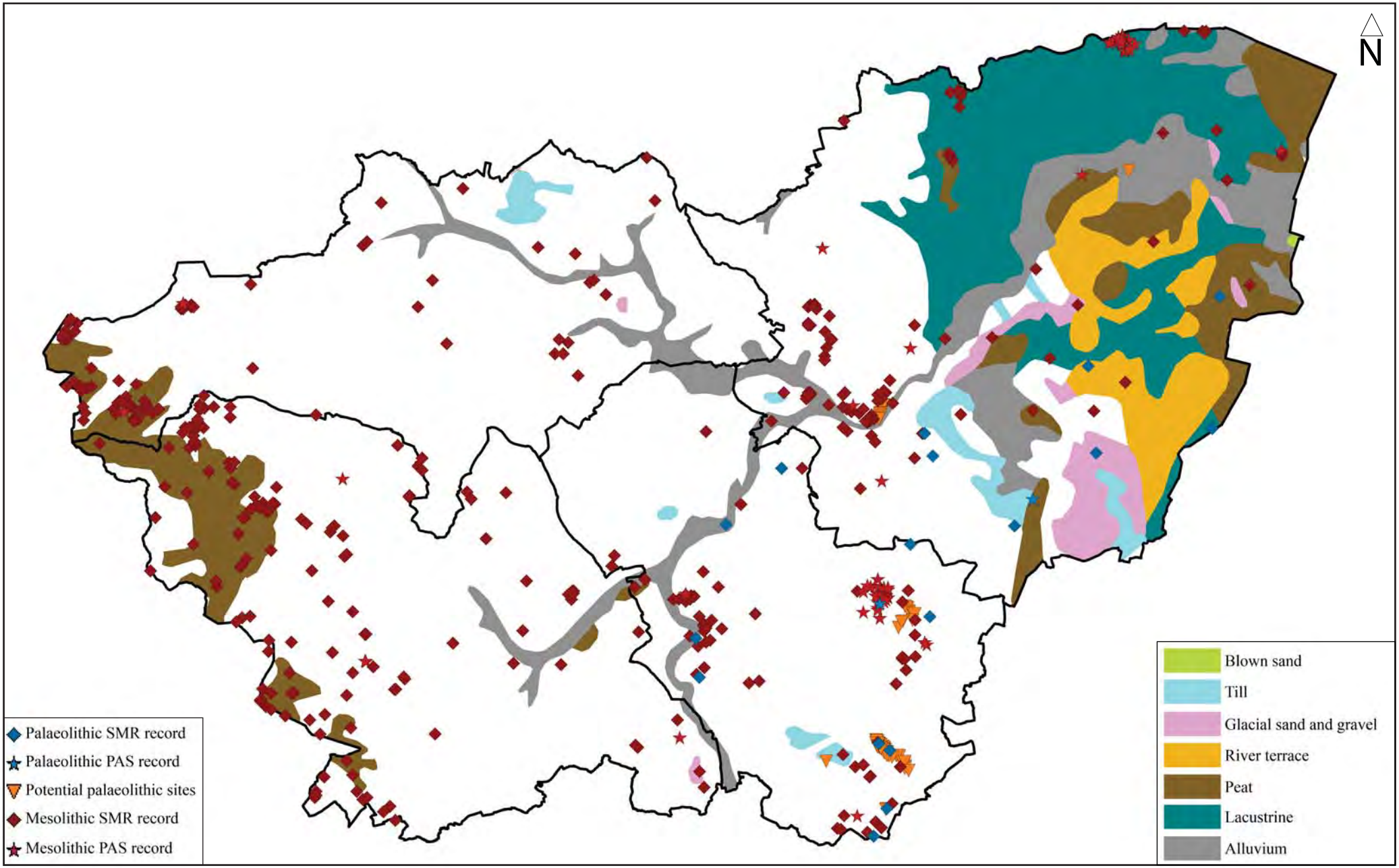

Fig. 5. The study area showing the superficial geology and post-enhancement records

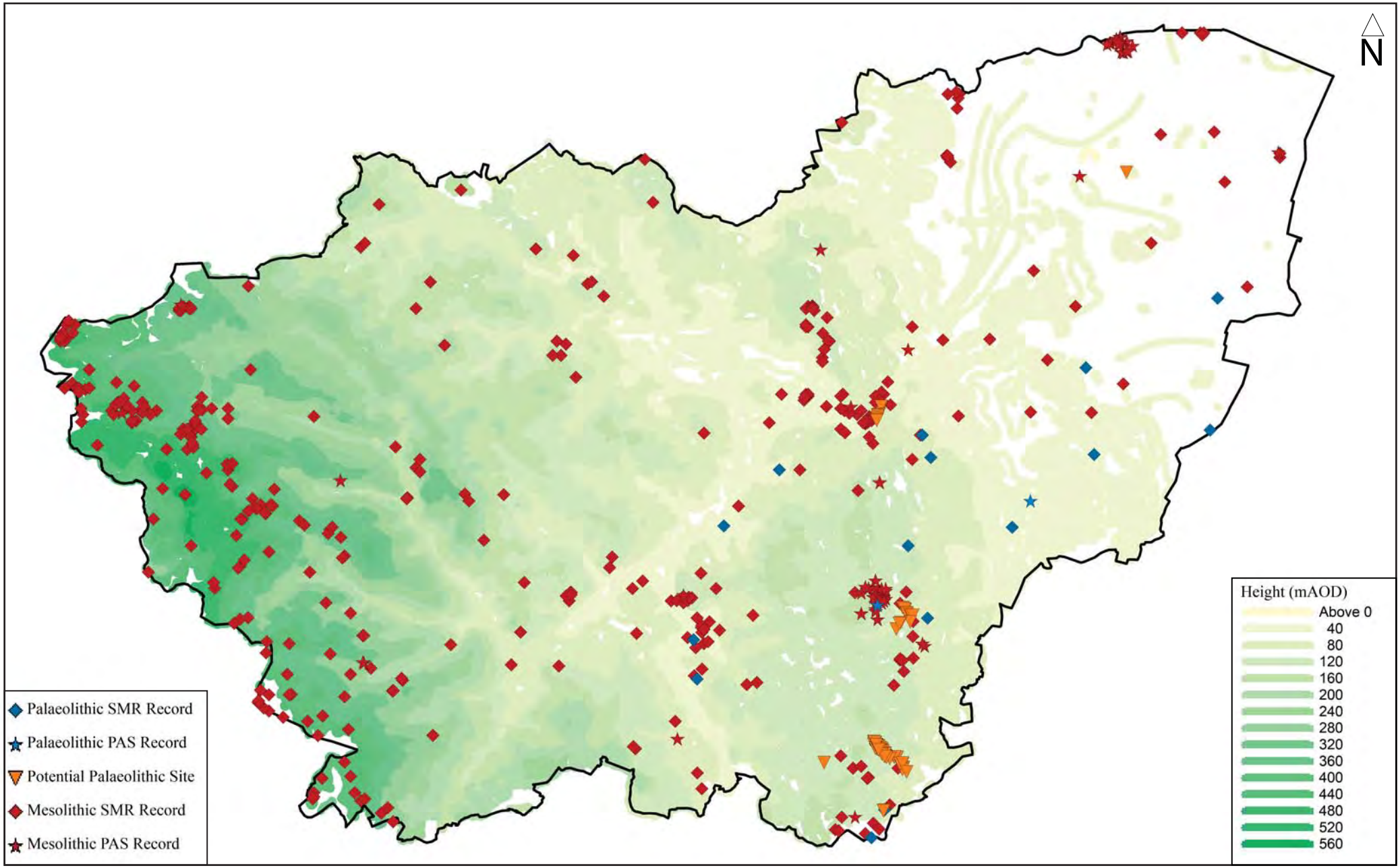

Fig. 6. The study area showing post-enhancement records plotted against relief

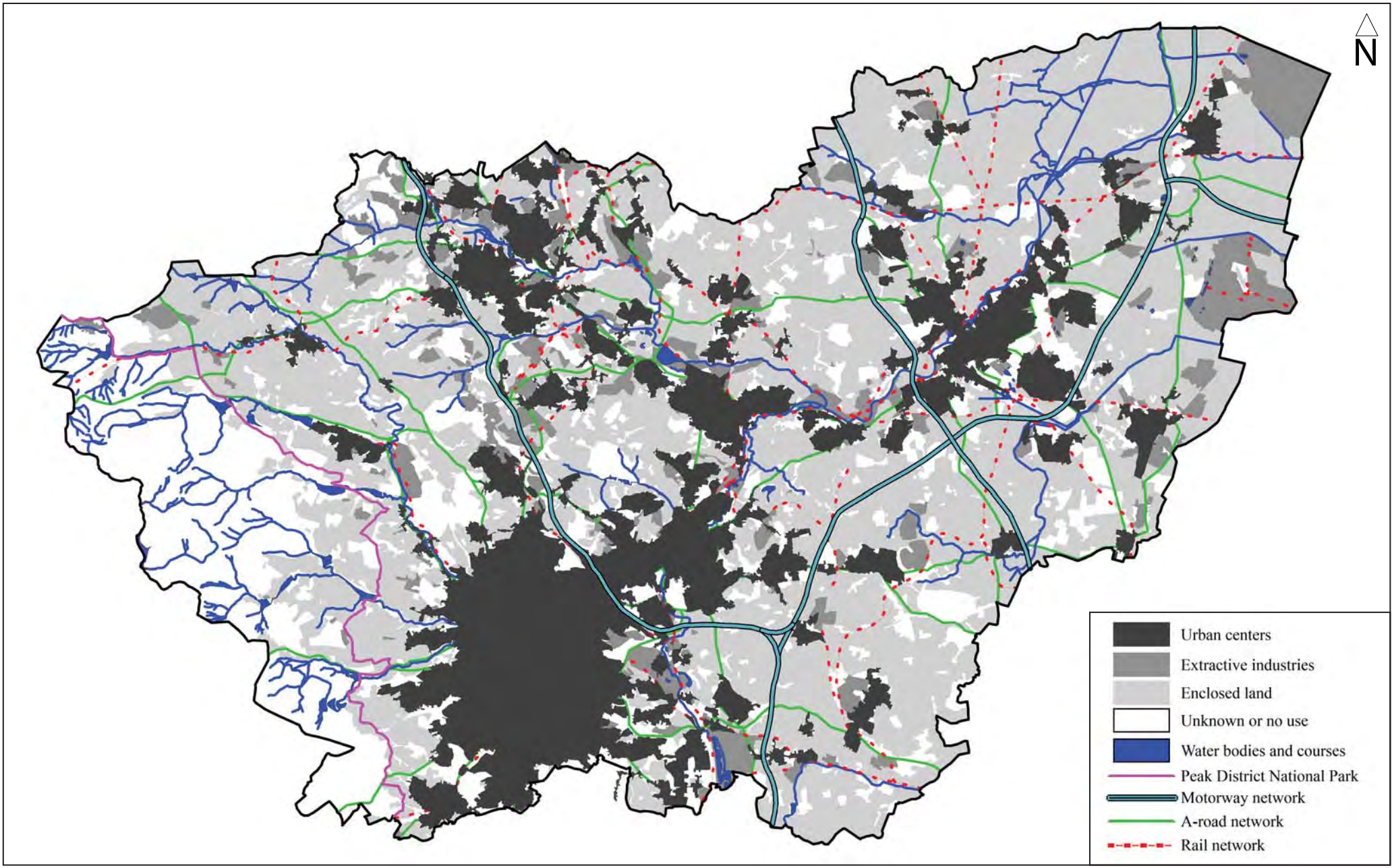

Fig. 7. The study area showing land use

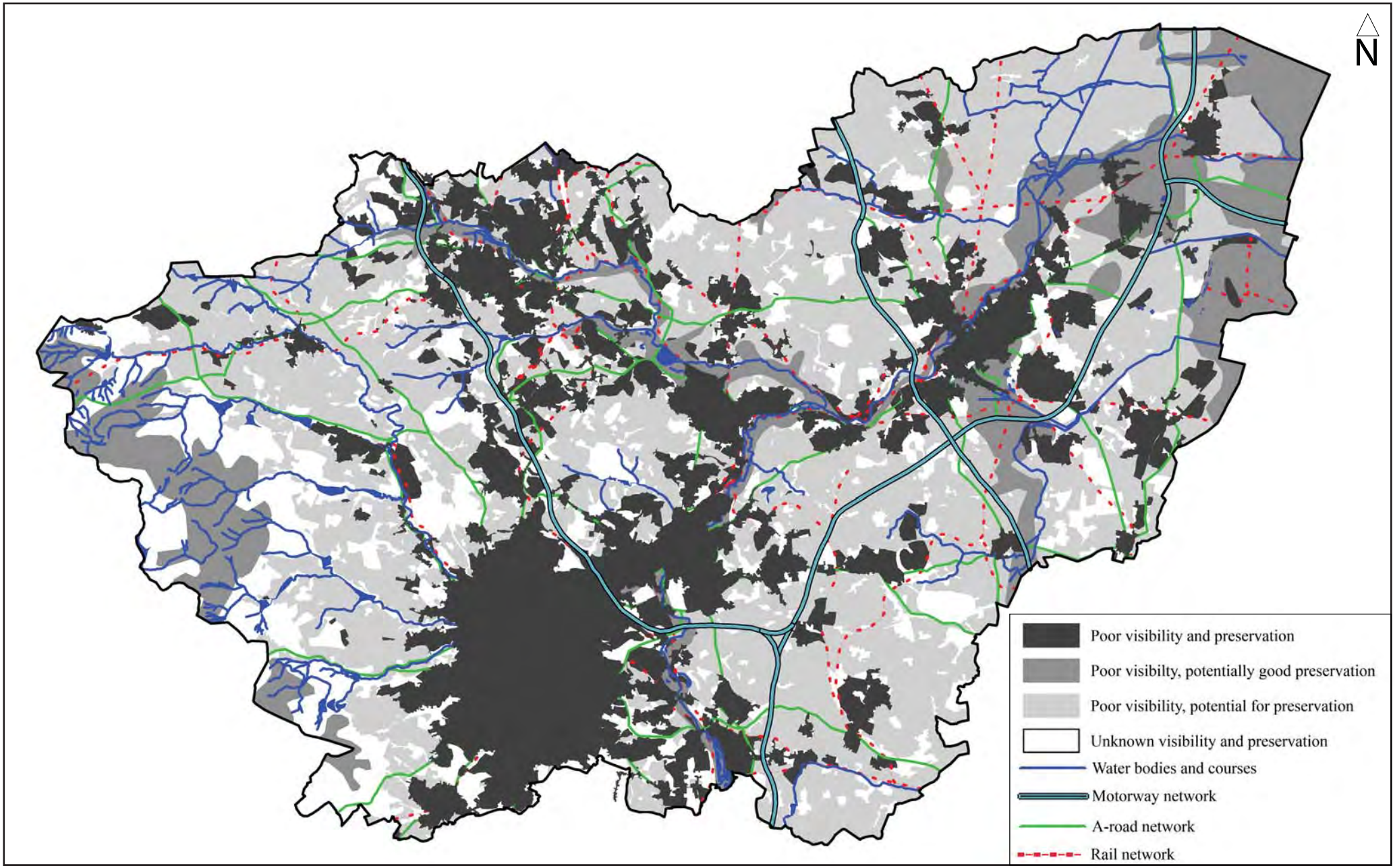

Fig. 8. The study area showing visibility and preservation

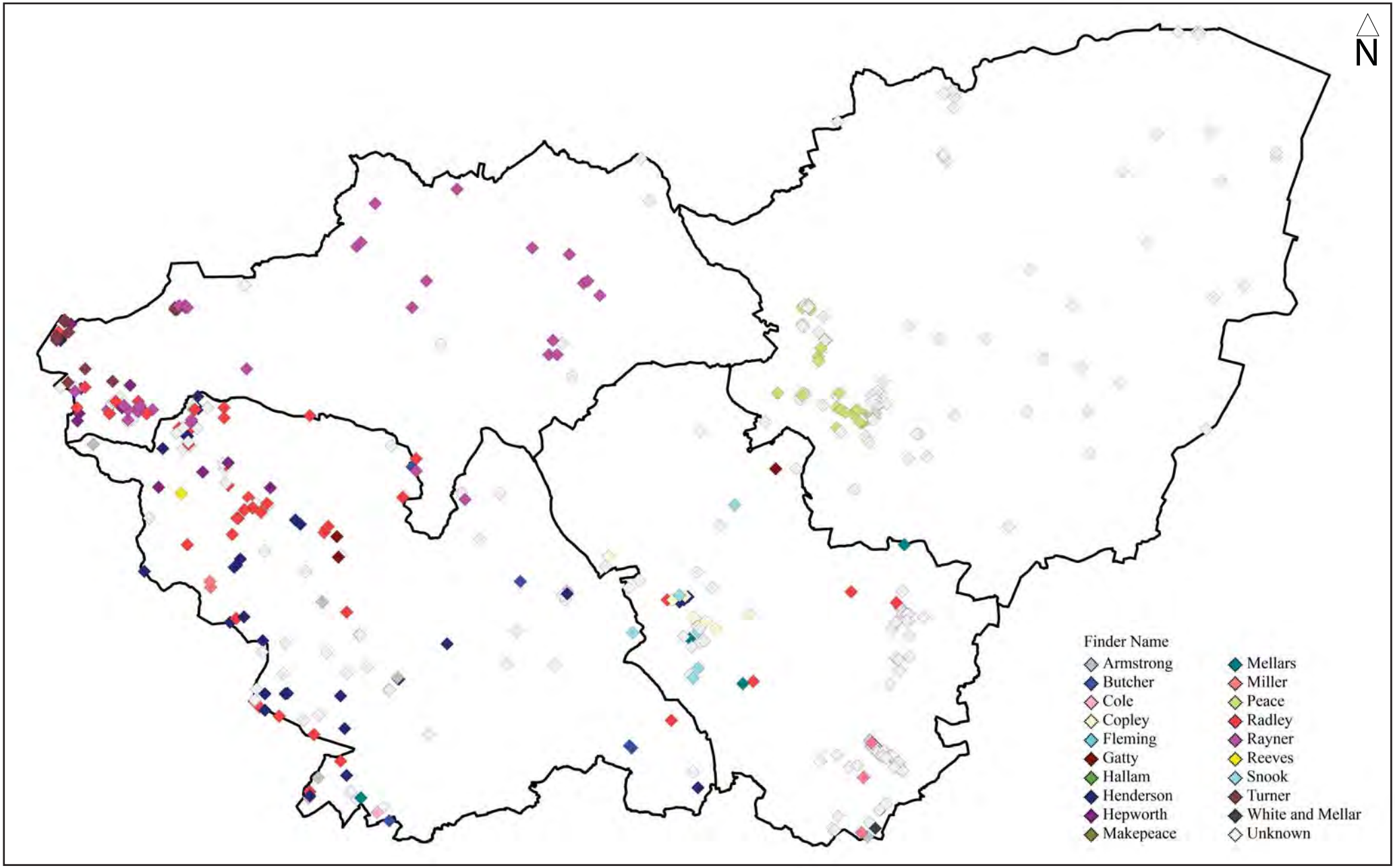

Fig. 9. The study area showing lithic findspots and scatters by finder/collector

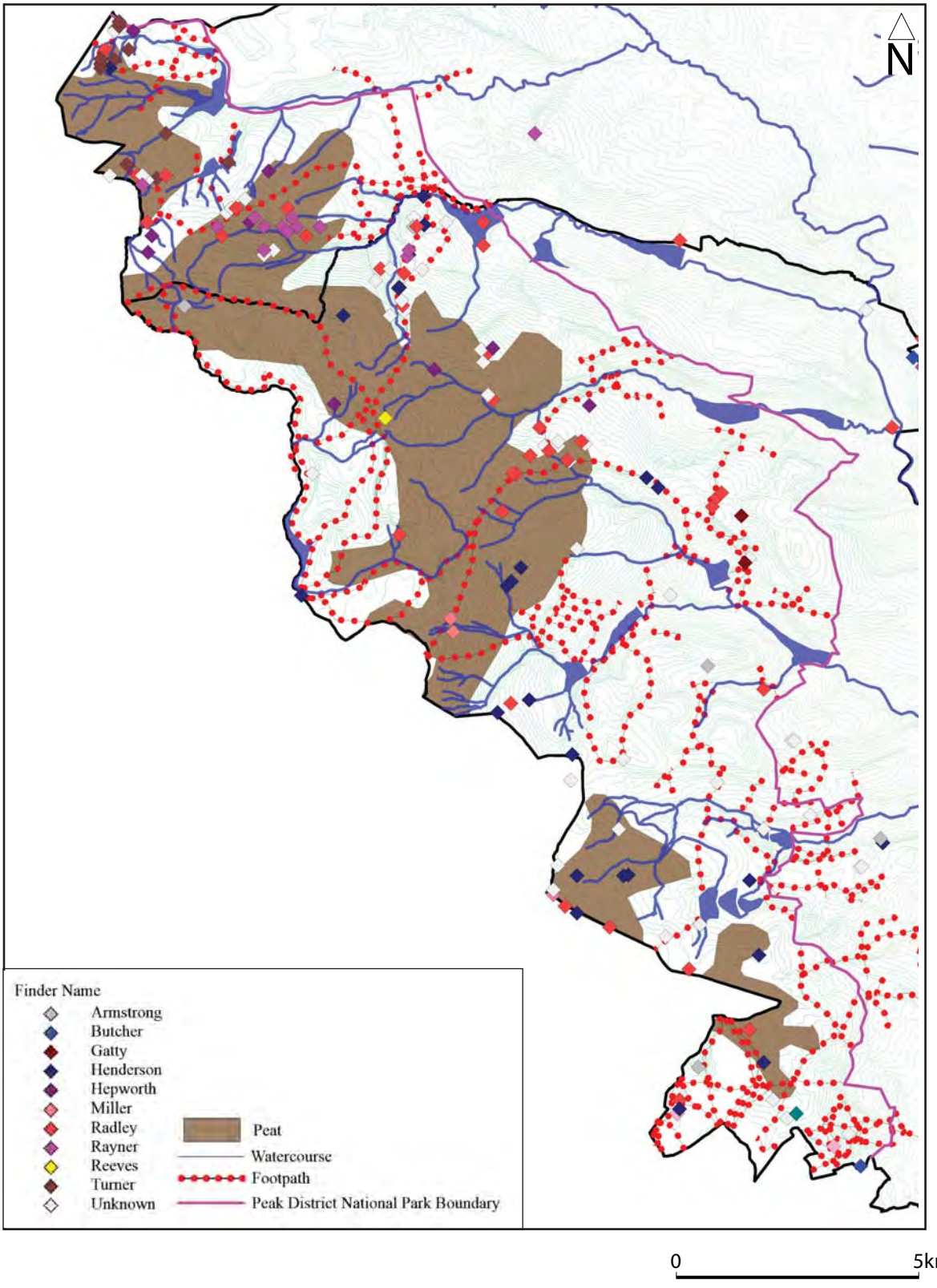

Fig. 10. The case study area showing aspects of bias in site distribution

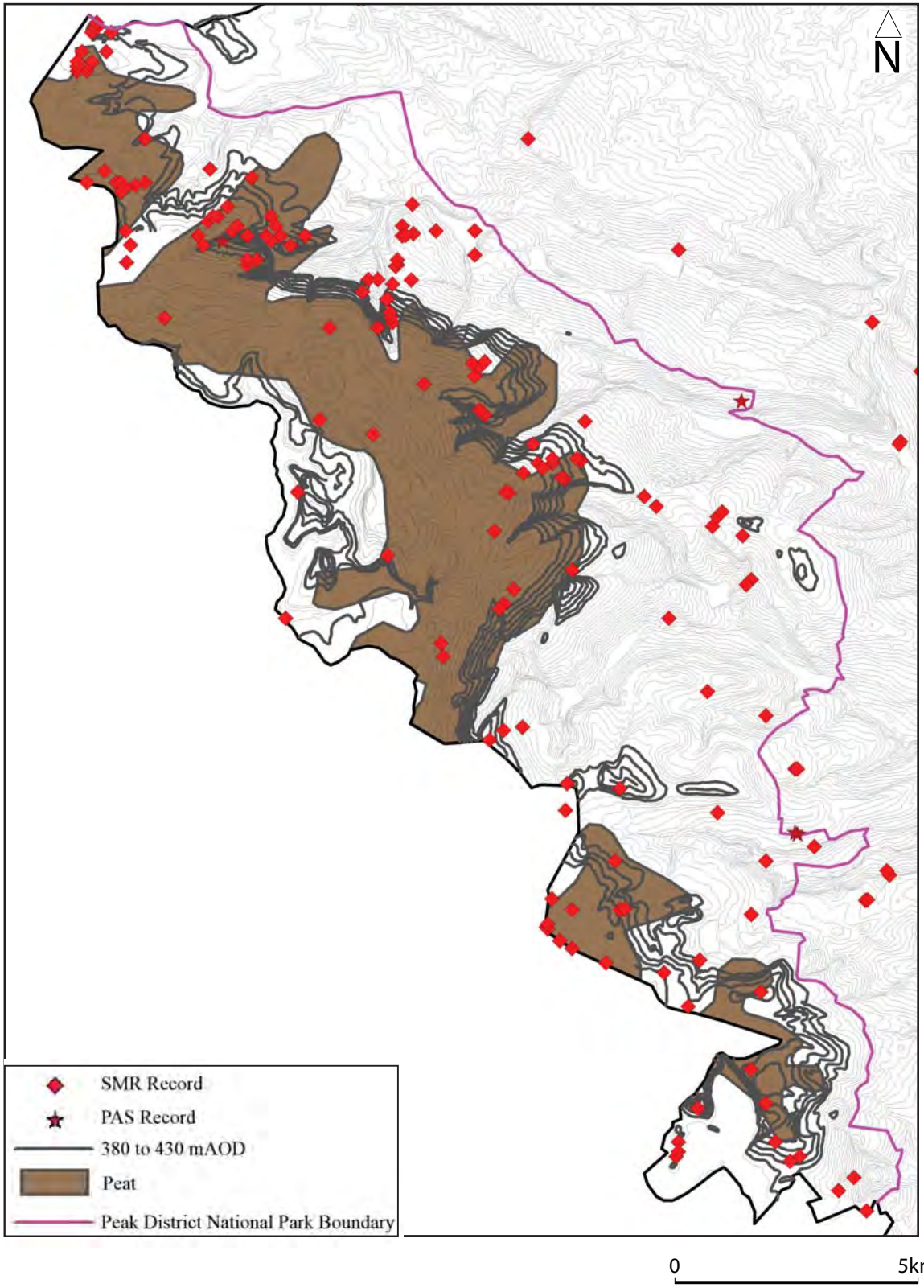

Fig. 11. The case study area showing contours 380 to 430m AOD

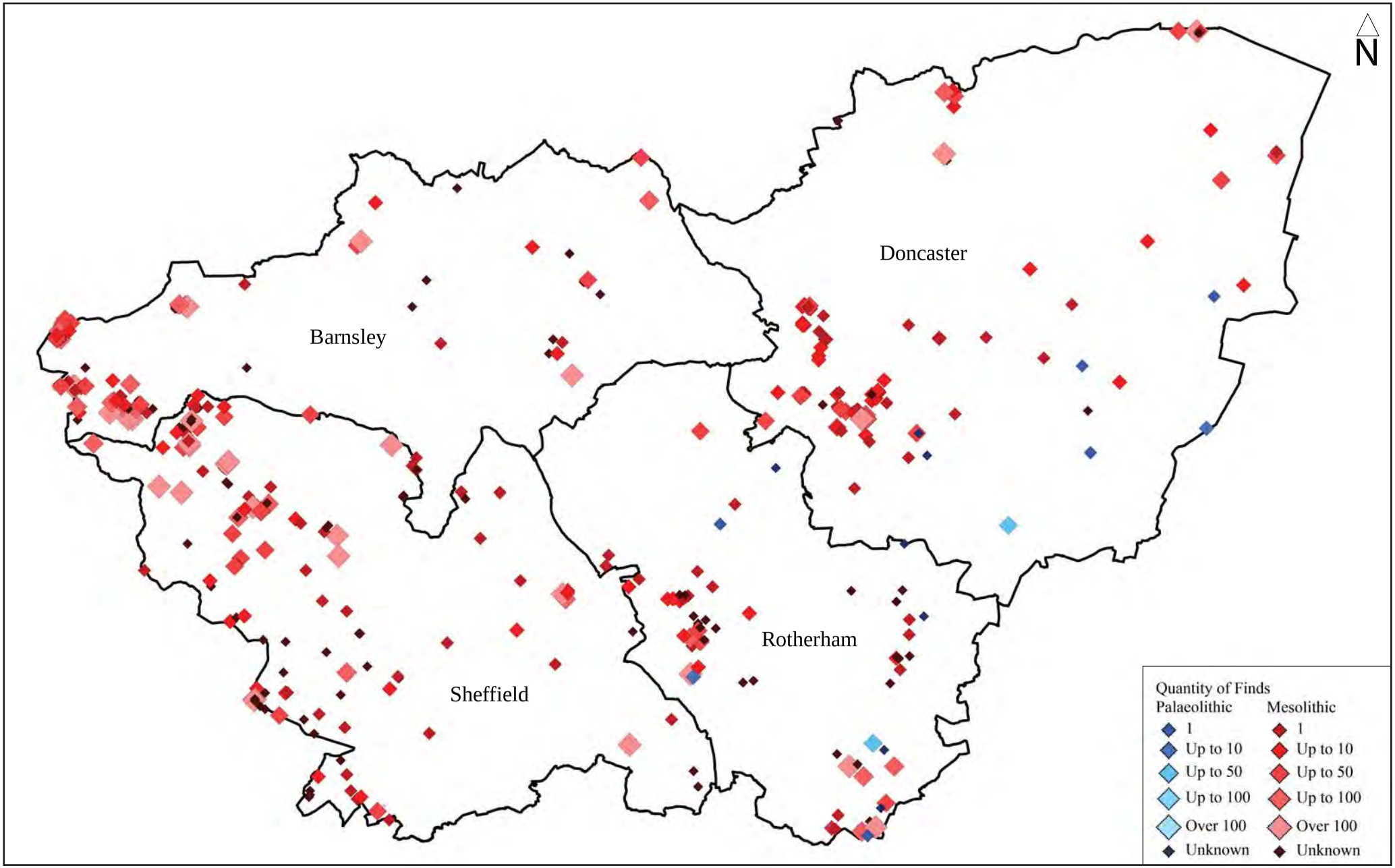

Fig. 12. The study area showing post-enhancement records by lithic assemblage size

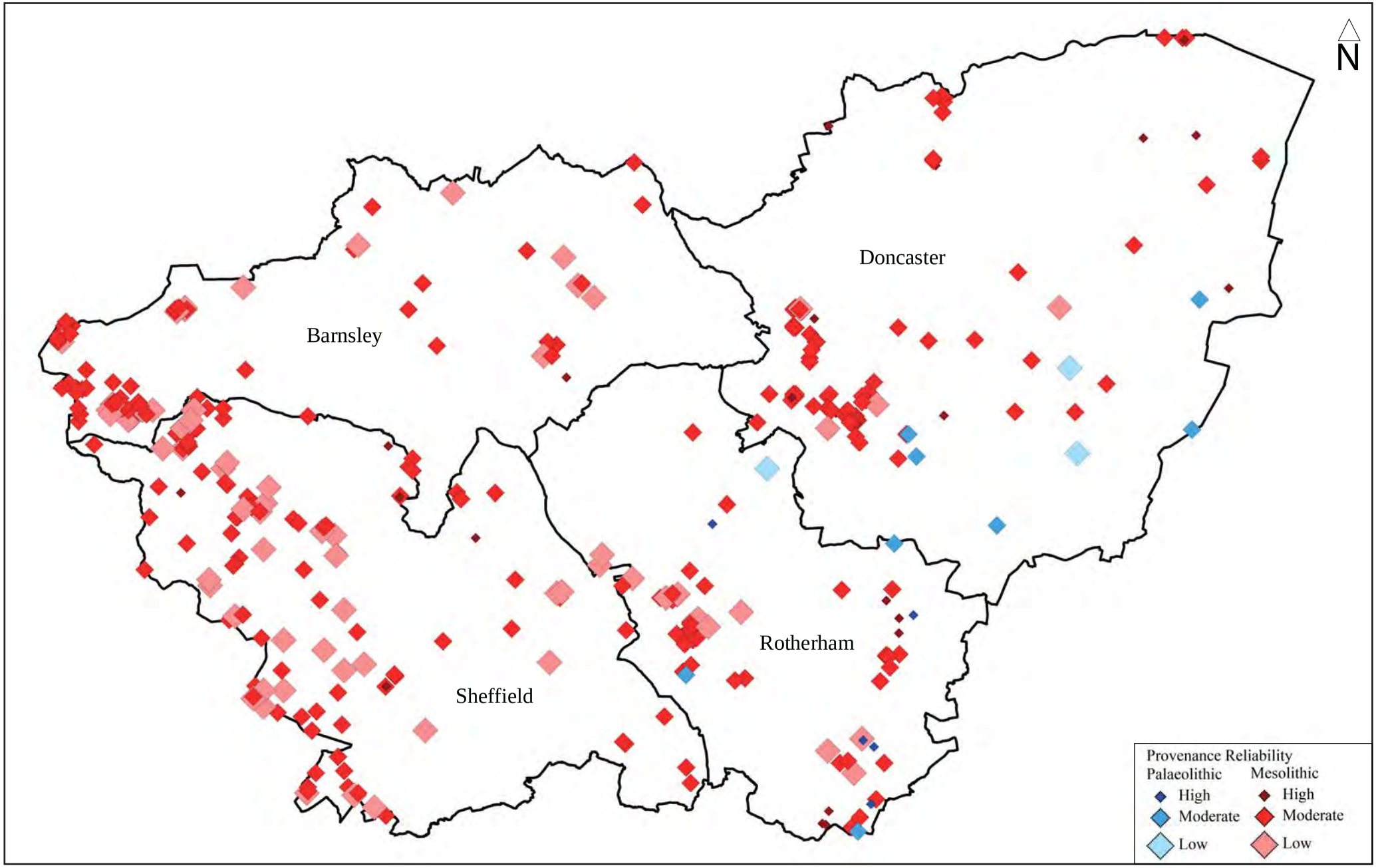

Fig. 13. The study area showing post-enhancement records by reliability of site provenance

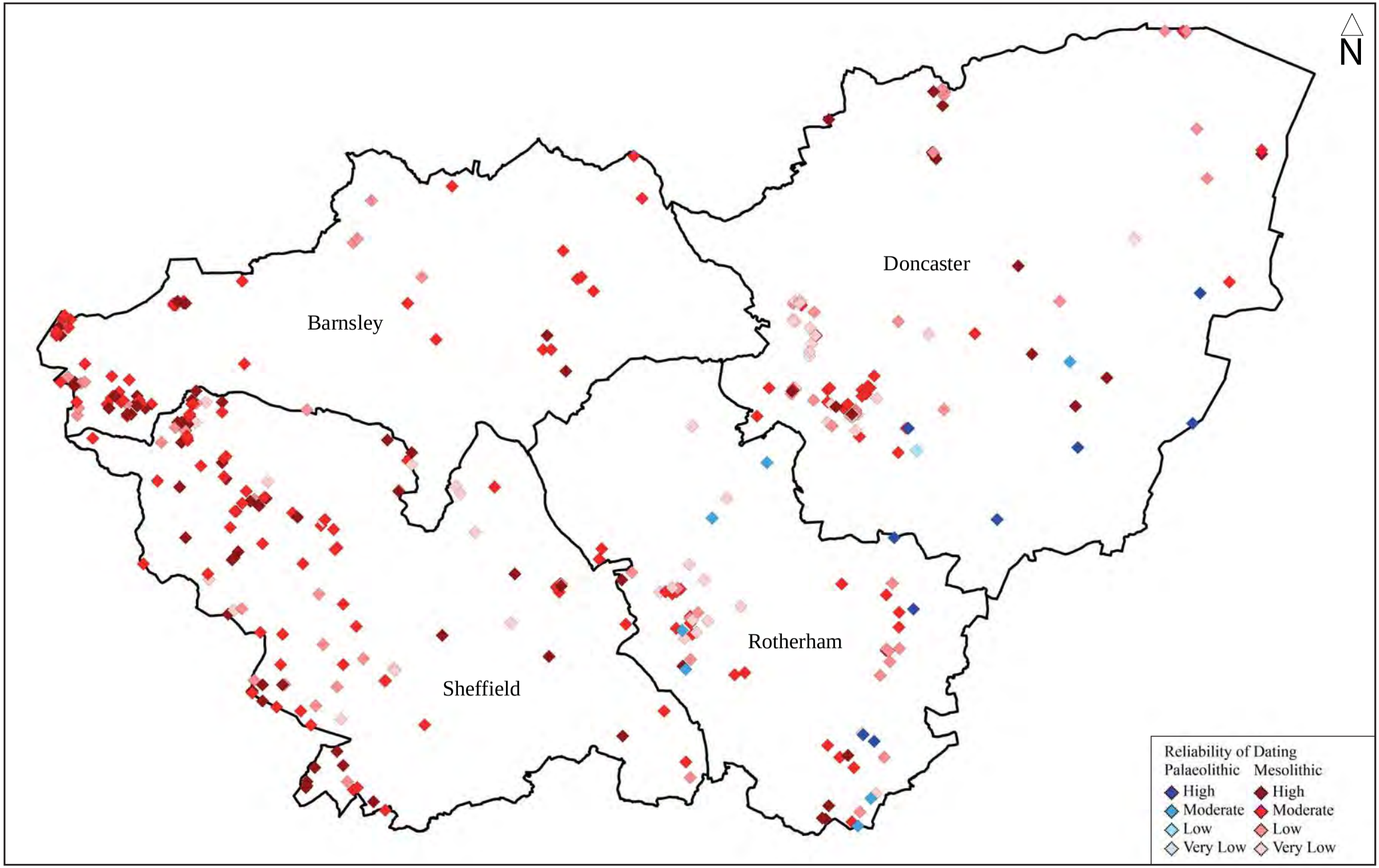

Fig. 14. The study area showing post-enhancement records by quality of dating

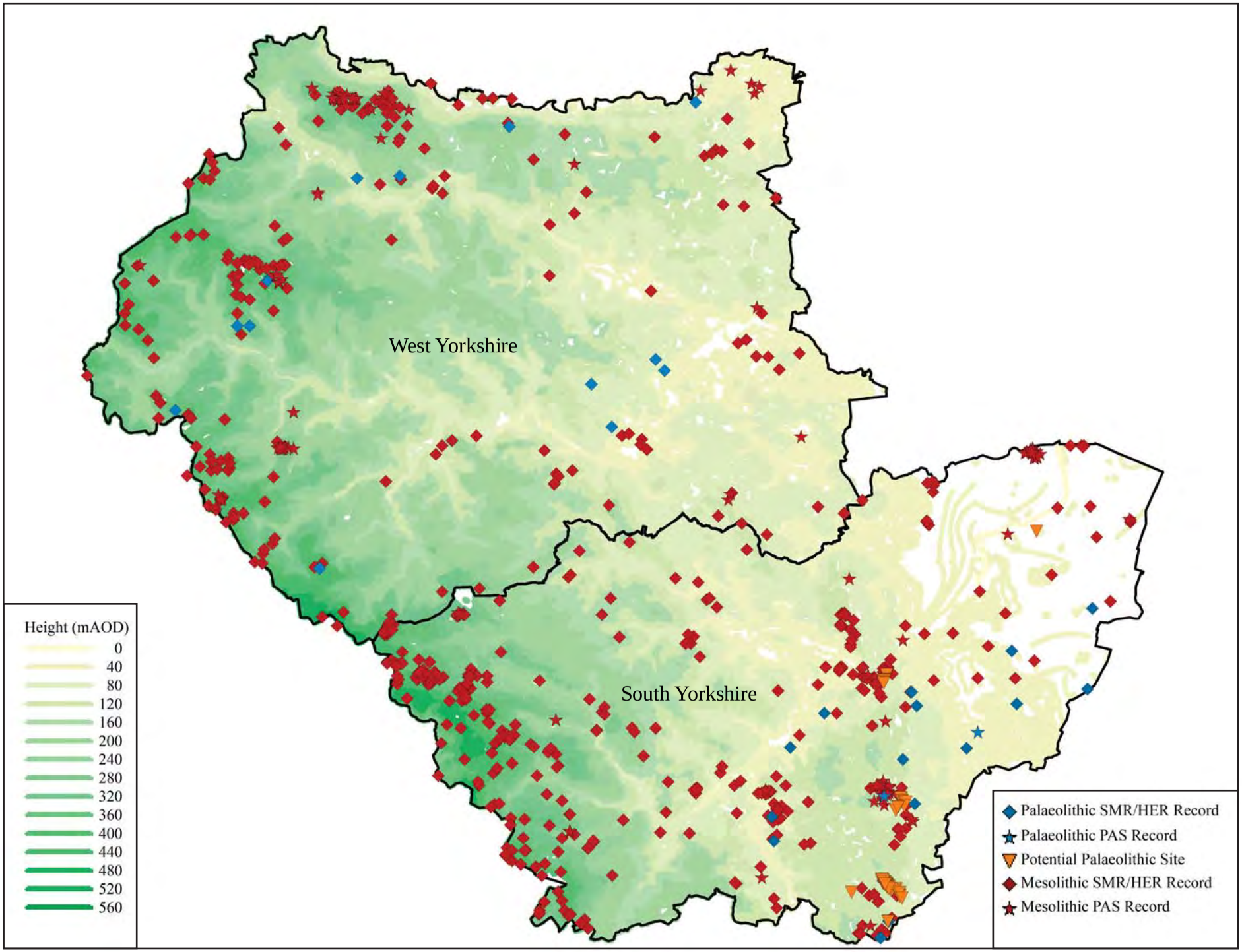

Fig. 15. South and West Yorkshire showing post-enhancement South Yorkshire records against relief

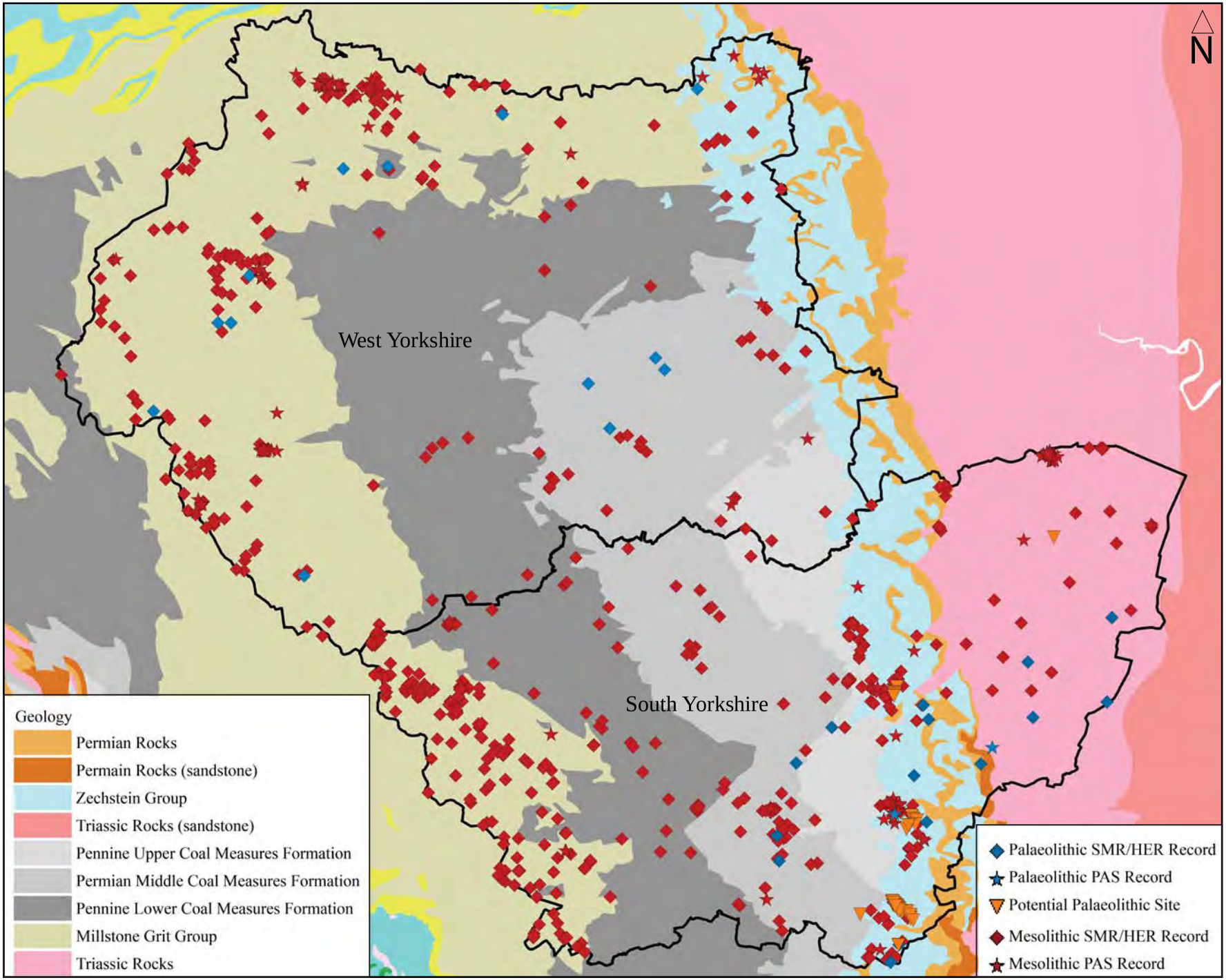

Fig. 16. South and West Yorkshire showing solid geology and post-enhancement South Yorkshire records

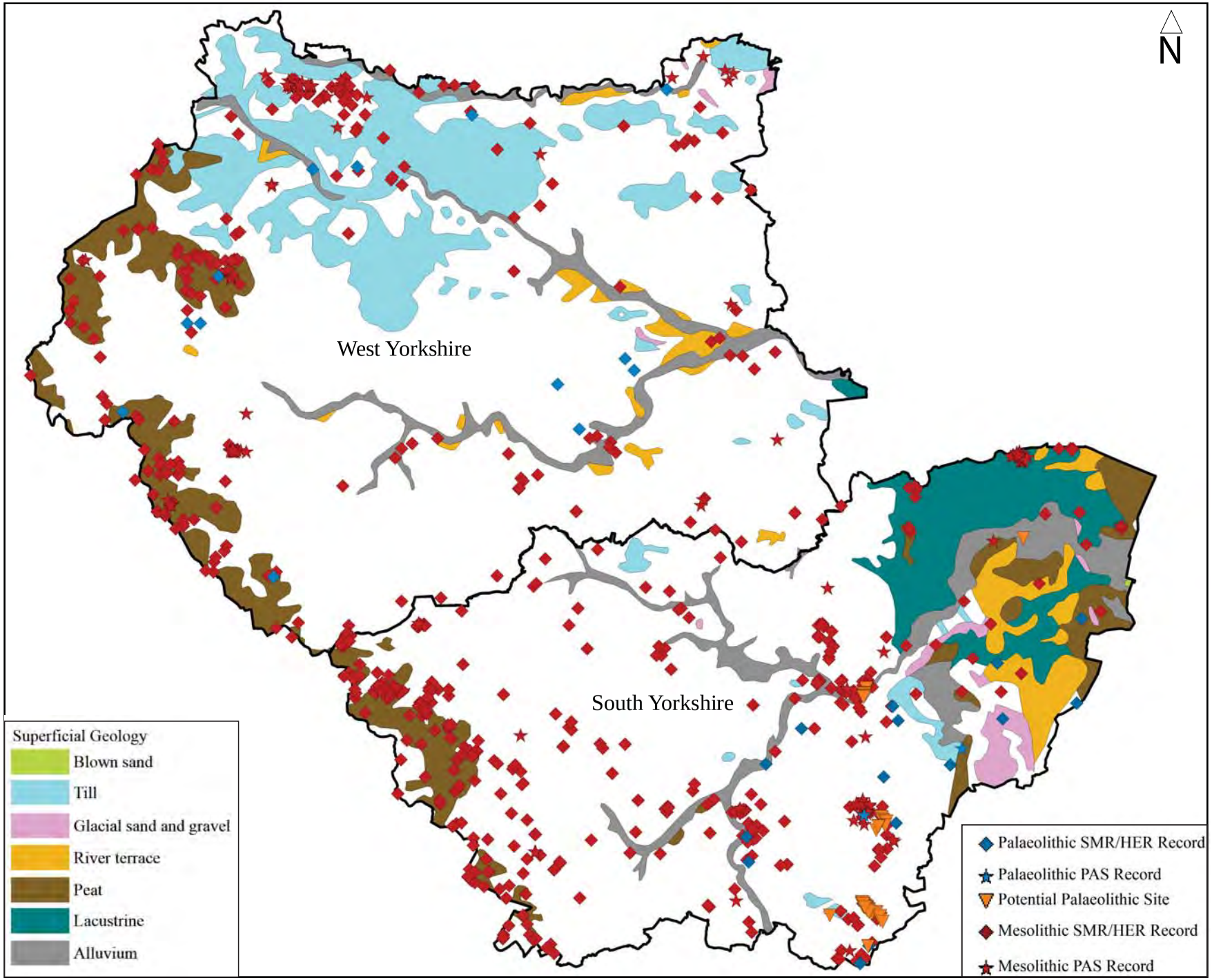

Fig. 17. South and West Yorkshire showing superficial geology and post-enhancement South Yorkshire records

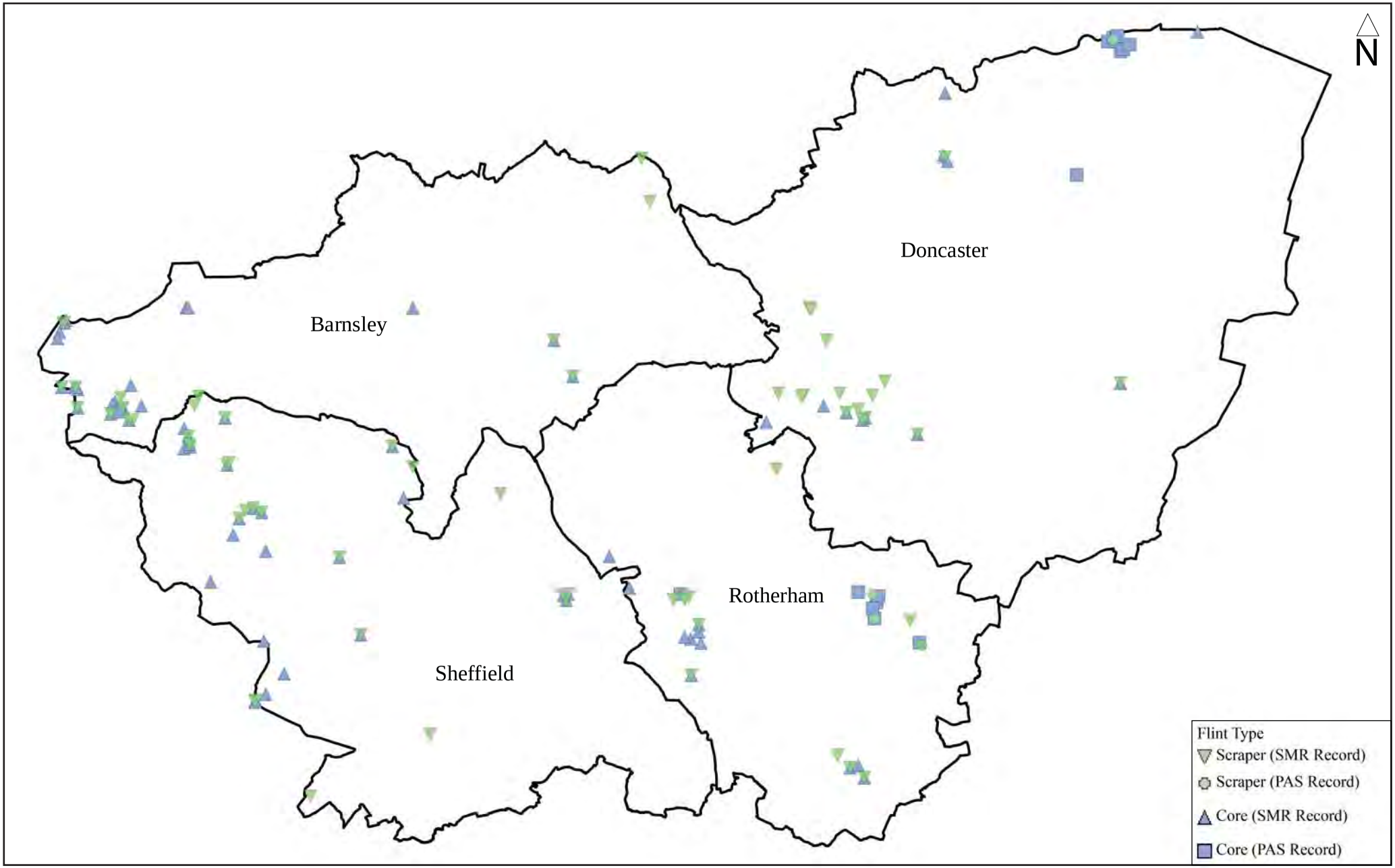

Fig. 18. The study area showing core and scraper locations

Plate 1. Mesolithic pit at Mexborough, South Yorkshire (ASWYAS)

Plate 2. Mesolithic flint and chert. Top row from Mexborough (L-R) backed rod microlith, notched bladelet, black chert bladelet, end scaper and core fragment
Bottom row from Rossington (L-R) backed bladelet microlith, broken obliquely blunted point microlith, broken obliquely blunted point microlith and core fagment (ASWYAS)

Plate 3. Radley's Dunford site A (Museums Sheffield, Radley collection, SHEFM 1995.118)

Plate 4. Radley's Dunford site A (Museums Sheffield, Radley collection, SHEFM 1995.118)

Appendix 1: Project Design

ARCHAEOLOGICAL SERVICES WYAS

Enhancing the Palaeolithic and Mesolithic Records of the South Yorkshire SMR

National Heritage Protection Plan - Palaeolithic and Mesolithic HER Enhancement (4G1.401)

Project Design

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February 2013

ISOQAR QUALITY ASSURED ISO 9001

REGISTERED ORGANISATION IfA

Document Control

Title:	Enhancing the Palaeolithic and Mesolithic Records of the South Yorkshire SMR
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Derivation:	Project Design
Origination date:	1st November 2012
Date of last revision:	17th January 2013
Version:	3.0
Status:	Draft Document
File name:	N:\3989 NPH\Project Design
Project no:	3989 NPH

Authorisation for distribution: ……

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Project name: 'Enhancing the Palaeolithic and Mesolithic Records of the South Yorkshire SMR'

Project Description

1. Summary Description

1.1. This Project Design details the background and methodology for undertaking a programme of enhancement of the information held by the South Yorkshire Sites and Monuments Record (SMR) relating to the known and potential Palaeolithic and Mesolithic archaeological resource within the county, as part of the English Heritage National Heritage Protection Plan (NHPP) Activity 4G1.401.

1.2. This document has been produced in consultation with South Yorkshire Archaeology Service (SYAS), the curators of the South Yorkshire SMR.

2. Background

2.1. South Yorkshire contains a number of distinct landscape types in which there is high potential for the survival of Palaeolithic and Mesolithic remains, primarily in the low lying areas on the eastern side of the county and within the upland areas on the county's western side, especially within the Peak District National Park (PDNP).

2.2. There are extensive low lying and seasonally waterlogged areas across the eastern side of the county, particularly around Doncaster, including Potteric Carr, Loversall Carr and Wentworth Carr, which include a number of river palaeo-channels. Where deeper sequences survive in these channels, such waterlogged deposits will contain evidence for accumulation from the late-glacial and early Holocene period. As such, these deposits can be considered to have high potential for Palaeolithic and Mesolithic evidence. Unfortunately, these waterlogged deposits can be considered to be at risk from continued drainage, as well as a variety of development pressures (Head et al. 1997, 270).

2.3. Thorne and Hatfield Moors in Doncaster, which have previously been used for peat extraction, are further significant areas where Palaeolithic and Mesolithic material could potentially survive, and indeed, a Palaeolithic burin has recently been recovered from Lindholme Island, on Hatfield Moors (Friend 2001, 111). Although peat extraction is no longer carried out, enhancement of the SMR records would be necessary to inform any future restoration and management work being undertaken by Natural England as part of the development of this area as a National Nature Reserve.

2.4. Work undertaken as part of the Humberhead Levels Project by the University of Hull identified the presence of early Mesolithic material along the Hampole Beck in Doncaster and along the River Idle, the old course of which forms the eastern boundary of South Yorkshire. Later Mesolithic activity was found along all six of the river systems studied, with the River Idle appearing to have been the most widely exploited. Material from this area comprises 64% of the overall lithic assemblage from the Humberhead Levels (Head 1997, 395). This information, which has not been fully

integrated into the South Yorkshire SMR, suggests potential for the survival of early prehistoric evidence across the river systems of South Yorkshire.

2.5. Recent excavation work at a number of development sites has also revealed evidence for Mesolithic activity. For example, at Finningley Quarry, Doncaster, a number of shallow pits were identified, from one of which a radiocarbon date was obtained of 8005+/-35BP (6000BC) (MAP 2010, 17). Late Mesolithic material has been recovered during excavations at Pastures Road, Mexborough, Doncaster, where unstratified Mesolithic flints were recovered from across the site indicating activity within the immediate area of the development (Williams and Weston 2008, 23).

2.6. On the western side of the county, South Yorkshire contains a substantial area of upland within the PDNP, an area which has high potential for the survival of Palaeolithic and Mesolithic evidence, based on comparison of work undertaken in the Pennines within West Yorkshire, to the immediate north (Spikins 2002). The potential for additional information to be recovered from this upland area, which accounts for 11% of the total area of South Yorkshire, has recently been confirmed by the recovery of Mesolithic flints, indicative of a working floor, from erosions scars on Broomhead Moor (Ullathorne 2005, 52).

2.7. The Colonisation of Britain by Modern Humans Project (aka PaMeLA) has recently been completed by Wessex Archaeology, with English Heritage funding. The project updated the previous survey by Dr Roger Jacobi of the Upper Palaeolithic and Mesolithic of England. Information from the project has now been disseminated to SMRs and Historic Environment Records (HER) and comparison of these data with that recorded in the South Yorkshire SMR demonstrates that significant additional findspots from these periods are known for the upland moorland areas.

3. Research Aims and Objectives

3.1. The programme of SMR enhancement will aim to inform a predictive approach to future planning, land management and conservation decisions within the county. The enhanced SMR records will allow greater clarity in identifying areas where recorded Palaeolithic and Mesolithic sites suggest potential for the survival of further such evidence. The distribution of enhanced SMR records will also be compared with coverage of similar landscape types in the West Yorkshire HER to help determine models for potential survival. West Yorkshire HER has been chosen as a suitable comparison due to the number of relevant records it holds (see section 4.8), Penny Spikins' research in the county, and the presence of comparable landscape types. Extending the comparison beyond the two counties would exceed the proposed budget.

3.2. The principal aims and objectives of the project will, therefore, be to;

1. Enhance the quality and accuracy of existing SMR records
2. Add to the number of SMR records by collation of information from other data sets or documentary sources (e.g. the English Heritage Archive, published research, grey literature reports)

3. Determine where gaps in the SMR record reflect lack of investigation rather than the potential for survival
4. Highlight areas where there is high potential for the survival of Palaeolithic/Mesolithic evidence, and the potential form of this evidence
5. Highlight areas where there is limited potential for the survival of Palaeolithic/Mesolithic evidence, or where potential cannot be known without further work
6. Produce GIS-based maps highlighting areas of potential by date, in association with the geology, topography and land use, where appropriate
7. Produce a fully illustrated written report summarising the results of the project
8. Provide opportunities for widening community understanding and engagement with early prehistoric South Yorkshire via web site coverage, local newspaper articles, public talks (e.g. at *South Yorkshire Archaeology Day*) and community events
9. Disseminate the methods used, and the results obtained, to other HERs to facilitate wider understanding of the project's findings, in particular possible programmes of mitigation
10. Submit a brief outline of the project's results to a suitable journal (e.g. *Yorkshire Archaeological Journal*)

4. Business Case

Strategic fit and sector priorities

4.1. This NHPP project proposal for Palaeolithic and Mesolithic HER enhancement (4G1.4) will form part of a broader activity plan to assess, protect and manage very early prehistoric sites of human activity (4G1).

4.2. This project proposal will support NHPP Activity 5C1 Enhancing the Capabilities of Historic Environment Records.

4.3. The project also supports specific priorities of the Strategic Framework for Historic Environment Activities and Programmes in English Heritage (New Frontiers: The Remote Past: Sub-programme 11112.310, Research Programme A2, and Understanding Place: Assessing Historic Areas: Sub-programme 11111.150, Research Programme A1).

Public benefit

4.4. Developmental pressure throughout South Yorkshire will continue to be an increasing threat to potential Palaeolithic and Mesolithic sites in the county, and an accurate understanding of the known and potential archaeological resource is vital to inform planning and land management decisions and possible programmes of evaluation and mitigation.

4.5. There are major threats to known areas of Palaeolithic and Mesolithic potential from aggregate extraction across the county. Based on the Historic Environment Characterisation results, nearly 2% of the area of both the Doncaster and Barnsley Metropolitan Borough Councils are classified as 'active extractive', with Rotherham following closely with 1.5% of its area. Evaluation and mitigation strategies adopted for extensive extraction sites are often not suitable for the identification of remains of early prehistoric remains due to the lack of available information held on the SMR.

4.6. In areas such as Thorne and Hatfield Moors, where peat extraction has now ceased, it is necessary to provide accurate information on the potential for Palaeolithic and Mesolithic evidence to survive in order to inform any future restoration and management work being undertaken by Natural England as part of the development of these areas as a National Reserve.

4.7. There is a threat from large-scale commercial development on the eastern side of South Yorkshire, which is fuelled by the region's exceptional transport links, being crossed by the A1M, M18 and M180. This area, to the east of Doncaster, has no formal designation as Green Belt and is, as a result, under threat of increasing urban sprawl - including an increase in proposals for housing, storage and distribution developments (CPRE South Yorkshire n.d.). This includes the construction of sites such as the Rossington Inland Port, which will cover 397 hectares in low lying areas near to Potteric Carr, Loversall Carr and Wentworth Carr.

4.8. On the western side of the county, within the PDNP, there are also threats to the condition and survival of Palaeolithic and Mesolithic sites from extensive peat erosion which results from a range of issues including acid rain from the towns and factories to the west of the Peak District, overgrazing by sheep resulting in a degeneration of the heather and bilberry covering of the moorlands, and the sheer number of visitors coming to the area (Cressbrook Multimedia n.d.). Indeed, the most recently recorded Mesolithic material has been recovered from erosion scars. It is important that the information held on the SMR, is suitable to determine areas where both potential erosion and resulting management works may expose Palaeolithic or Mesolithic sites.

4.9. Despite the clear potential for the survival of Palaeolithic and Mesolithic sites in South Yorkshire, and the clear extent of threats to this resource, the holdings of the South Yorkshire SMR for these periods consists of just 193 records. The South Yorkshire SMR contains less than 40% of the number of records held by the West Yorkshire Historic Environment Record (HER) for Palaeolithic and Mesolithic finds, which covers a comparable area of similar landscape types. The Palaeolithic and Mesolithic periods are demonstrably underrepresented within the South Yorkshire SMR.

4.10. Evaluation and mitigation strategies for development and management schemes often do not take into account the possibility for the presence of Palaeolithic and Mesolithic remains from the earliest stage. The production of desk-based assessments and Environmental Statement chapters at an early planning stage is largely informed by the holdings of the SMR. Where SMR records do not exist for the Palaeolithic and Mesolithic periods, there is often a tendency to use this as evidence that such sites do not survive.

4.11. The existing SMR records are not detailed or extensive enough to provide accurate information on the potential Palaeolithic and Mesolithic resource of South Yorkshire. Extensive development pressure threatens this resource and enhanced SMR records, combined with an analysis of these records to identify areas of potential survival, are vital to allow SYAS to provide accurate advice to both local planners and developers, and to determine suitable evaluation and mitigation strategies to allow Palaeolithic and Mesolithic sites to be identified and protected, or suitably recorded. The enhancement of the existing records, undertaken together with the production of maps and information showing the potential of areas where records remain limited, would provide clarity to both users of the SMR and to SYAS staff. A standard methodological approach (or approaches) that could be used for areas identified as having high potential may be proposed, in close consultation with local curators.

5. Project Scope

5.1. The scope of the project includes the collation and assessment of all accessible documentary sources and records relating to known or potential Palaeolithic and Mesolithic activity within South Yorkshire.

5.2. The project will not include detailed specialist analysis of collections of lithic material that may be held in museums or private collections but that have not been previously catalogued and analysed.

6. Interfaces

6.1. The programme of SMR enhancement will interface with the Colonisation of Britain by Modern Humans Project (PaMeLA), a project that aimed to provide a comprehensive survey of the Upper Palaeolithic resource in England, with a pilot study of the Mesolithic in three counties. It will use the data collated during that project and further enhance the data currently available.

6.2. This project will also interface with the Mesolithic Research and Conservation Framework currently funded by English Heritage and hosted by the University of York.

7. Communications

7.1. The core project team will communicate via regular meetings and internal discussions, and will keep each other aware of external communication via email.

7.2. Meetings will be held between members of the project team and the staff of SYAS to monitor progress, as well as via email and telephone.

7.3. Information will be provided to the external specialist via email and where necessary through meetings. A minimum of four meetings with Penny Spikins are scheduled: at the initialisation stage (Section 11.1) and at each of the three R3 review points (Section 12).

7.4. Highlight reports, providing a brief overview of the progress of the project at each of the R3 review points, and any additional information, will be provided to the English Heritage Project Assurance Officer, Dave MacLeod via email on completion of key stages of the project.

8. Project Review

8.1. The R3 review points will follow the completion of each of the three main Stages of the project (1 to 3).

8.2. The reviews will include the submission of a highlight report, and discussion and consultation over the projects progress with the English Heritage Project Assurance Officer, the Project Manager, the Project Officer and staff of SYAS.

9. Health and Safety

9.1. All work will conform to the ASWYAS Health and Safety Policy (a copy of which can be supplied if requested), which makes particular reference to the FAME (Federation of Archaeological Managers and Employers) Health and Safety Manual and will be carried out according to the relevant Health and Safety Legislation. This includes, in particular, the following regulations:

- Health and Safety at Work 1974
- Construction (Design and Management) Regulations 2007
- The Management of Health and Safety at Work Regulations 1999
- Personal Protective Equipment at Work Regulations 1992
- Work Equipment Regulations 1992
- Manual Handling Operations Regulations 1992
- Workplace (Health, Safety and Welfare) Regulations 1992

9.2. In addition the project will undergo a 'Risk Assessment' that sets project specific Health and Safety requirements, which all members of staff are made aware of prior to work commencing.

9.3. Health and Safety will take priority over archaeological matters. Necessary precautions will be taken with regard to protecting ASWYAS staff and the public.

Resources and Programming

10. Project Team structure

10.1. The project will be run according to Management of Research Projects in the Historic Environment (MoRPHE). The team structure is defined according to MoRPHE's project roles and end of project products are clearly defined.

10.2. All data collation and data entry into the SYAS SMR will be undertaken by Experts at ASWYAS. Data collation will be undertaken with the advice of Dr Penny Spikins, Senior Lecturer at the University of York. Analysis of the data and final reporting will be undertaken by the Experts in close collaboration with Dr Spikins, Jane Richardson and staff at SYAS. The project will be managed on a day-to-day basis by Jane Richardson and Ian Roberts of ASWYAS.

11. Method Statement

Initialisation meeting

11.1. Prior to commencement of the project, an initialisation meeting will be held with all project staff from ASWYAS, SYAS and English Heritage, and Penny Spikins, in which any issues or queries regarding the project may be addressed.

Stage 1: Data Checking and Collation

11.2. The existing SMR records relating to the Palaeolithic and Mesolithic periods in South Yorkshire will be provided to ASWYAS by SYAS, with the information held on each record then being checked for accuracy against any referenced sources, include checking the location, evidence for, and date of the site recorded on the SMR.

11.3. Searches will be undertaken at all relevant repositories, libraries and museums for details of Palaeolithic or Mesolithic material, including published information and unpublished information in grey literature and university theses that may provide further information on existing SMR records or provide evidence for sites previously not recorded on the SMR.

11.4. The following sources of information and repositories will be consulted to both check the accuracy of existing records and provide additional information for their enhancement, as well as providing a source for the potential creation of new records. These will include repositories that may be located outside of South Yorkshire, but which may contain relevant information or collections:

Databases

- English Heritage's PastScape
- National Trust SMR records
- Natural England SHINE records
- Portable Antiquities Scheme
- The Colonisation of Britain by Modern Humans Project (PaMeLA) database records for South Yorkshire
- The Environmental Archaeology Database (EAB)

Libraries and Archives

- Paper records and grey literature reports held in South Yorkshire SMR
- Yorkshire Archaeological Society (journals, local publications etc.)
- Sheffield Central Library

Museums and Collections

- Bassetlaw Museum, Retford
- Bracken Hall Museum, Bradford
- Buxton Museum
- Clifton Park Museum, Rotherham
- Creswell Crags Museum
- Doncaster Museum
- Experience Barnsley

- Manchester Museum
- Manor House Museum, (Ilkley)
- Pontefract Museum
- Tolson Museum, Huddersfield (i.e. Francis Buckley and Patrick Stonehouse collections)
- Wakefield Museum
- Weston Park Museum, Sheffield
- Any other relevant museum identified during the project

Stage 2: Update SMR records

11.5. All information collated in Stage 1 will be input directly into the South Yorkshire SMR database/GIS system, and will be MIDAS compliant.

11.6. The accuracy of all existing SMR records will be checked against the Stage 1 data, with existing records updated as necessary and new SMR records produced based on this information.

11.7. All records will be updated or added to the SYAS SMR database directly at the SYAS offices in Sheffield.

11.8. The records will use the MIDAS Heritage framework for the creation of historic environment records, ensuring a common format is used for the dissemination of information, allowing for ease of retrieval of information, and providing consistency in the format of data. The fields used in the database will follow the standards laid down in the MIDAS Heritage Dictionary of Units of Information and INSCRIPTION (Forum on Information Standards in Heritage).

11.9. The descriptive and interpretative details for each record will follow the standardised terminology listed in English Heritage Online thesaurus.

Stage 3: Analysis and Assessment

11.10. The location of the enhanced records will plotted on a suitable scale Ordnance Survey base map (according to the accuracy of the data and the resulting medium) using MapInfo GIS software to identify known concentrations and areas of recorded Palaeolithic and Mesolithic sites. Locations will be plotted against geology, topography and/or land use as appropriate with the aim of identifying possible 'character areas'. BGS's Online Borehole Record Viewer will be used, in particular to test any association between occupation sites and peat formation.

11.11. The data set will be analysed to identify the following:

- Areas where there is known high potential for Palaeolithic/Mesolithic evidence and the form that evidence might take, e.g. occupation sites at the point of incipient peat formation (see Spikins *et al*. 2002)
- Areas where there are clear gaps in the record due to the lack of investigation, or lack of erosion, but where there is potential for surviving evidence
- Areas where there is limited potential for Palaeolithic/Mesolithic evidence

11.12. Areas where few records are identified will be examined to assess whether this is due to variable levels of archaeological investigation and/or development, or a lack of erosion with potential scatters effectively invisible, and whether the type of landscape in these areas (e.g. upland, low lying) are likely to have a high potential for the survival of unrecorded sites. This assessment will also be informed by contrasting the distribution of Palaeolithic and Mesolithic sites recorded on the West Yorkshire HER, using data obtained from the West Yorkshire HER. This will allow for a comparison of the data sets based on similar areas of geology, topography and landuse between the two counties, and help determine whether gaps in the record in South Yorkshire are due to lack of investigation, destruction of evidence or possible lack of activity in these areas during these archaeological periods.

Stage 4: Products

11.13. The project will result in the following products:

- enhanced SMR records for South Yorkshire for the Palaeolithic and Mesolithic periods
- an end of project report
- dissemination of key findings and possible mitigation strategies to other HERs
- wider engagement via a short note in a journal, submission of the end of project report and gazetteer to the ADS, a blog, and public presentations

11.14. The SMR enhancement will result in an expanded, accurate and up to date record of the known Palaeolithic and Mesolithic resource within South Yorkshire, held within the existing South Yorkshire SMR database.

11.15. An end of project report will be produced detailing the results of the project, predominantly by means of distribution plans, as well as proposing possible means of mitigation. This will include as a minimum the following elements:

Information

- Contents list
- List and key to illustrations and photographs
- Names of staff involved and parts played by each
- Acknowledgements
- Concise summary

Aims and Methodology

- A statement on the projects aims and findings
- Statement on the methodology, information sources consulted and software used

Description, Analysis and Interpretation

- Description of the study area, its natural topography, geology and land use
- Overview of the recorded evidence by period

- Analysis of the distribution of recorded sites by geology, topography and land use as appropriate
- Assessment of the potential for the survival of unrecorded early prehistoric remains

Plans and Illustrations

- Location maps of the survey area at a national and county level with, surrounding geographic detail, using Ordnance Survey base maps under licence from SYAS.
- Distribution plans marking all known Palaeolithic and Mesolithic sites within South Yorkshire against geology, topography and land use as appropriate
- Large scale detailed plans to highlight specific areas, as required
- Plans identifying areas of potential for the survival of unrecorded Palaeolithic and Mesolithic remains
- Plans identifying areas of low potential for the survival of unrecorded Palaeolithic and Mesolithic remains
- Copies of relevant historic drawings, cartographic sources and photographs

Other Information

- Bibliography

11.16. Hard copies of the final report will be submitted to English Heritage as required, and copies will be held by ASWYAS and in the South Yorkshire and West Yorkshire SMRs.

11.17. South Yorkshire SMR will also be provided with copies of the report in both PDF and Word formats and all survey data will be supplied in a suitable industry standard format including AutoCAD DWG/DXF formats, ArcGIS or MapInfo compatible files, CSV files or PDF files, as required. All digital data will be supplied on a CD attached to the report, together with the digital photographic record. Any databases produced for the project will also be provided in an Excel format to allow it to be easily imported into any industry standard GIS system.

11.18. A summary of the results will be disseminated to all relevant HERs to showcase the project's findings, but also to highlight possible programmes of mitigation. The link to the report and gazetteer held by the Archaeology Data Service (Section 11.21) will also be provided.

11.19. A note will be submitted to a relevant local journal, such as the *Yorkshire Archaeological Journal* or the *CBA Forum*.

11.20. The project will also be used as a platform from which to engage local community interest in the early prehistoric past of South Yorkshire, to encourage the use of the SMR, and to promote best practice in terms of locating, recording and preserving sites. This will include the following elements:

- Regular updates, or a 'blog', on the project housed on both the SYAS and ASWYAS websites. These will include, as a minimum, an initial 'blog' to

highlight the project and three further updates immediately following each of the three R3 review points

- Local newspaper coverage highlighting the SMR's role in recording and protecting prehistoric remains within the county
- Public talks on the results of the project, and its significance in terms of preserving the region's heritage – e.g. at South Yorkshire Archaeology Day

11.21. An OASIS form will be completed for the project on the Archaeology Data Service website (http://ads.ahds.ac.uk/project/oasis/) on completion of the project. In addition, a completed digital archive of the project (PDF of the report, plus the database, in an Excel format, of the enhanced and additional records) will be deposited with the ADS.

12. Ownership

12.1. All products of this project, including the database, report and all supporting documentation will be the copyright of South Yorkshire Archaeology Service. Copyright of the report will also reside with English Heritage, although ASWYAS will automatically be given rights to reproduce such material that has been generated by ASWYAS.

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