THE RECOGNITION AND INVESTIGATION OF LITHIC SCATTER SITES IN SCOTLAND

A SHORT GUIDE

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HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

CAROLINE WICKHAM-JONES – IN MEMORIAM

Image © Guille Lopez.

A day out exploring a northern landscape with Caroline.

Caroline's passion was for the Later Palaeolithic to Neolithic periods across Scotland and beyond. Initially she was a flint and other stone artefact specialist and fieldworker, an expertise she never abandoned. Over the decades she developed a much deeper understanding of Mesolithic lifeways, while sharing her increasing knowledge of heritage management, changing sea levels and climate change. All of these themes found their way into her numerous publications, lecturing and blogging. They are a fabulous record of her academic research and other interests.

For all her projects, including Rum, Orkney and Deeside, Caroline brought together a broad range of specialists, artists, authors, volunteers and friends. She enhanced hundreds of lives, while also greatly enhancing public and professional understanding of our hunter-gatherer past.

Sadly, this was one of Caroline's last pieces of work before her unexpected death in January 2022.

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1. INTRODUCTION

This guide is aimed at those who encounter potential lithic scatter sites in Scotland and who may wish to understand the issues around them and the approach to assessing and investigating them. These may be community groups undertaking archaeological fieldwork, those undertaking academic research projects, or anyone considering engaging with such a site for the first time. This document may also form a brief guide for those involved in development control of such sites. However, issues of significance, management and mitigation of potential impacts are not covered here; those interested in these topics should refer to the Historic Environment Policy for Scotland (2019), which directs decision-making in the historic environment. Guidance on specific topics are available from a number of sources, including Association of Local Government Archaeological Officers (ALGAO), and Historic Environment Scotland's Managing Change in the Historic Environment Series. In 2019, Historic England consulted on draft of guidance called 'Managing Lithic Scatters and Sites: Archaeological Guidance for planning authorities and developers'. At time of writing the final version is not yet published, but when it is it will provide a useful resource for considering these issues. Though it should be noted that it will have been written to reflect the planning and legislation context in England, which differs in many ways from that of Scotland.

Lithic scatter sites are inherently vulnerable. Modern agricultural methods, development and natural erosion processes can all threaten these sites, and they should be regarded as a diminishing resource. However, they are also one of the most important windows we have into our prehistoric past, particularly for the Palaeolithic and Early Neolithic periods. They have been recognised since the earliest days of archaeology in Scotland and are a key archaeological resource. The scatters on the surface often indicate the potential for complex surviving remains. They are a highly variable site type which can be complicated to assess and understand.

This guide provides advice on the wide variety of techniques that can be applied to understanding lithic scatter sites, and how they can be applied. Each site is different, and the approach will always be site specific.

Those undertaking archaeological investigations should be aware of any designations or other legal requirements on site they are working on and gain the appropriate consents or permissions before considering any works on site.

Figure 1 Lithic scatter site at Howburn, South Lanarkshire: possibly Scotland's oldest prehistoric settlement (12,700–12,000 BC).

2. AN INTRODUCTION TO LITHIC SCATTER SITES

2.1 WHAT IS A LITHIC SCATTER?

Scatter sites are archaeological sites that comprise disturbed collections of archaeological artefacts on the surface of the ground in an area devoid of other upstanding archaeological features. They may comprise various types of artefact; pottery, stone tools etc. This report is concerned with scatters of flaked stone, henceforth referred to as lithic scatters.

In general, lithic scatter sites do not incorporate archaeological features (eg pits; mounds; etc) on the ground surface, though other upstanding sites may lie in close proximity to the site. It is also the case that the material to be observed on the surface of the scatter site is only a small portion of the site assemblage; most of the lithics will remain below the surface in the ploughzone or other disturbed material. Below this, many scatter sites include surviving archaeological features which will contain in situ artefacts. Such in-situ archaeological sites could include knapping floors, domestic spreads, or simply stray lithics from a single event in the past that have layed largely undisturbed since they were dropped. Thus a surface scatter is often just the tip of the archaeological material, whether it survives in the ploughzone or below, and any work on a scatter site should be aware of this.

This document deals exclusively with disturbed scatter sites, that through natural or man-made disturbance have been brough to the surface and are no longer in situ. These will often be an indicator of nearby undisturbed remains but by their very nature different approaches will be required to understand such as a site as opposed to one which remains in situ. Although some of the guidance here may be useful in both cases those excavating sites should look to other guidance (as referenced above) about the excavation of in-situ deposits.

It is worth noting that while lithic scatter sites most commonly contain artefacts made of flint, many other stones may also

Figure 2 Daer reservoir in South Lanarkshire. Lithic scatter sites were revealed by low water levels.

be represented. Quartz, chert, rhyolite, carnelian, tuff, bloodstone and a range of other stone types were all made use of in prehistory and have been found on lithic scatter sites. In situ deposits of flint in a primary Cretaceous geological context are lacking in Scotland, so the predominant contents of a lithic scatter site will often reflect a diverse local geology. Quartz tools are particularly common in the north and west, chert is more common in the Borders, while an assemblage of carnelian has recently been reported from Perth and Kinross.

Scatter sites vary in size. Some contain high densities of lithics per metre square, others might have only a few pieces across a whole field. Given the likelihood that the surface finds indicate archaeological material below, even a small scatter should be regarded as potentially significant. It is important to devise techniques of investigation and management that take the potential of the whole site into account.

2.2 WHY ARE THEY SIGNIFICANT AND HOW CAN THIS BE ASSESSED?

Lithic scatters occur across Scotland and are often the first indication of archaeological material in a location. Stone tools, and the debris from their manufacture (knapping), provide important evidence of human activity in the past including information on periods of occupation, domestic tasks, hunting practices, mobility and raw material collection. Scatter sites often provide evidence for prehistoric activity in areas where no upstanding remains survive. In many cases, they signal the existence of a site that has been partially destroyed, or where surviving features are buried below the surface of the ground. In other cases, they represent sites relating to periods where other lasting features would not have survived in the archaeological record.

Scatter sites are of particular significance for the earliest periods of human settlement in Scotland. The archaeological record of Palaeolithic and Mesolithic Scotland is particularly ephemeral. For

this reason, even one or two Palaeolithic lithics are always of high significance. Mesolithic sites are often (but not always) characterised by high densities of stone artefacts. Though only a small proportion of pieces might be tools per se, the comparative rarity of Mesolithic sites also means that any Mesolithic scatter is likely to be significant.

Many lithic scatters include artefacts from several periods of occupation. As such, they provide important evidence for the recurring significance of a location over time. Analysis of the assemblage helps to shed light on separate activities at different periods of time.

Scatter sites can also provide important evidence relating to more complex deposition practices in any period. While in situ pits and their contents may be preserved in sub-surface features, the topsoil is likely to include material from other practices such middening or from house structures.

2.3 HOW DO THEY FORM AND WHERE ARE THEY FOUND?

A lithic scatter site is formed when an archaeological site is subject to disturbance sufficient to destroy the original context of the finds. The artefacts then move into the generalised sediment matrix surrounding the site. This matrix usually comprises soil, in particular ploughsoil, but it may also comprise other materials such as sands or gravels. Once within this matrix, items of flaked stone will move vertically and horizontally and may appear on the surface. Movement within the soil is an ongoing process that results in further material appearing on the ground surface, even after it has been picked clean by collectors. Some original archaeological features such as pits and post holes – both complete and truncated- may survive within the subsoil below the lithic scatter.

The destructive processes that lead to the present condition of a lithic scatter site are complex. Worm action, burrowing animals, water movement through the soil, wind and other erosive processes can all result in disturbance to the integrity of archaeological layers. While much human activity results in the destruction of archaeological sites, it is agriculture that is predominantly responsible. Agriculture can range from small-scale subsistence farming to large-scale forestry cultivation. In practice, the formation of a single site is usually due to a combination of processes. The long history of farming in the UK means that many sites have been subject to the cumulative impact of a complex history of cultivation activities. Agriculture can also extend to less agrarian areas where industries such as forestry, biofuels, or the planting of deep-rooted grasses for conservation also contribute to the disturbance of archaeological stratigraphies. Different mechanisms of disturbance can present very different windows into the underlying deposits.

Lithic scatter sites occur in both uplands and lowlands, and along the coast as well as in the interior of the country. The majority of lithic scatter sites in Scotland have been found on cultivated land. In these areas they are, however, only visible in fields that have been recently ploughed or disturbed in some way. The growth of grass or turf obscures the ground surface and hides most flaked stone.

Scatter spreads are also common in areas subject to broad sweeps of erosion, such as deflated sand dunes or the gravels of a loch or reservoir where the water level has recently dropped. Smaller areas of disturbance or erosion patches may reveal lithics indicative of a larger scatter, for example along footpaths, at the edge of ditches, or in the upturned ridges of forestry cultivation. Lithics may also be observed on land immediately after harvesting; from forestry felling to the

Figure 3 Artist's impression of day-to-day activity during the Mesolithic.

grain harvest, any activity that disturbs the land surface may reveal a scatter site. Even in pasture, the small-scale impacts of molehills or sheep scrapes can provide useful information.

2.4 WHAT SIZE ARE THEY, AND HOW ARE THEY BOUNDED?

Although some lithic scatters are dense and cover a large area, this is not always the case. A scatter represents only the surface manifestation of the body of material which lies below the ground surface. The amount of material in a scatter is related both to the size of the original archaeological site and to factors such as the depth and frequency of ploughing or other disturbance activities. It is possible to remove most of the lithic artefacts from a ploughed field, only to find that more pieces have appeared on the surface a few months later. It is, therefore, difficult to give precise limitations regarding scatter size.

Given that lithic scatter sites are manifestations of below-ground archaeology, it is difficult to correlate the edges of the surface scatter with the boundaries of the site. Many scatters correspond with stratified archaeology in the form of features surviving in the subsoil below the surface, but the spatial relationship between preserved features and the surface scatter varies from site to site.

Excavation may reveal features surviving directly below the densest areas of lithics. Research indicates that lithics within the

ploughsoil do not usually move great horizontal distances on level ground, and it can be possible to discern 'ghost features' indicated by accumulations of stone tools within the ploughsoil. On some sites, however, features have been found to survive away from the main concentrations of lithics. In areas of fluvial action, or on slope, for example's it is possible for lithic artefacts to have been moved away from the original archaeological remains.

Investigation of the geomorphological history of the location and accumulation of surface sediments, together with spatial analysis of the finds, is necessary to understand the formation and present structure of any site. The boundary of any lithic scatter cannot be assumed to coincide with the boundary of the original archaeological site, and it is always necessary to explore outwith the area of the scatter in order to check whether archaeological remains exist across a wider area.

2.5 HOW ARE THEY DISCOVERED?

To date, most lithic scatter sites have been discovered by chance. Traditional farming methods, and other activities involving closer inspection of the ground resulted in more frequent accidental discoveries, as people walked the fields and observed changes in the soil. Today, many scatter sites are revealed by people out in rural areas for walking and other forms of recreation. In recent years, the rise of community groups who devote time to archaeological fieldwalking across farmland and elsewhere has led to an increase in the number of lithic scatter sites and an improvement in the information gathered about them.

Lithic scatters can be hard to locate in advance of development, especially where advance archaeological investigations focuses on desktop surveys and evidence from walkovers. As discussed, scatter sites are usually invisible without some ground disturbance, and they are always more easily found after weathering such as frost, rain or snowmelt. Scatters within grass or other surface vegetation may be revealed by test pitting, but this can be partial. Many traditional trial trenching techniques can fail to discover these sites if they are not combined with bulk sieving and processing of soils. For example, scatters comprising over 11,000 pieces in total were excavated during work on the Aberdeen Western Peripheral Route including a rare Late-Upper-Palaeolithic assemblage, but the main finds were not predicted by trial trenching.

2.6 ARE THEY UNDER THREAT?

Lithic scatters, and the locations where they may be investigated, should be regarded as a diminishing resource. Lithic sites are vulnerable to natural processes such as coastal erosion or pressure from animals as well as processes such as deep ploughing. Ironically, the processes that lead to the formation of a lithic scatter site can also contribute to its depletion. This will be a gradual process of attrition over decades, as with regular cereal cropping. In other cases, such as the full cycle of forestry work, construction of a ring road, or a change in ploughing depth a single event can result in the complete destruction of a site. Surface lithic scatters sites are therefore inherently under threat and may be a particularly vulnerable site type.

Their management can therefore be a complex and challenging issue. While this guide does not consider the management of such sites, detailed guidance has been issued by ALGAO – 'Management of Lithic Scatters in Scotland' – and this should be referred to as well as any other relevant policy, guidance, and procedures when considering management.

3 THE LITHIC SCATTER RESOURCE IN SCOTLAND

Lithic scatter sites occur across Scotland. New lithic scatter sites are still being discovered, but they have been recorded since the earliest days of archaeological fieldwork in the second half of the nineteenth century. One of the best ways to understand these sites, their value, and how to approach their study is considering their diversity and previous work. Therefore this section presents a brief discussion of the history of study of these sites, as well as making reference to a range of sites and projects for further reading.

Collection was particularly common in the days when farmers walked the land behind the plough, and when new lands were brought into cultivation, such as during the Second World War. Our understanding of these sites has also been influenced by the work of specific interested individuals, such as Hilda Paterson, who collected across the fields at Birkwood (Canmore 36665) on the south bank of the River Dee, Aberdeenshire, in the first half of the twentieth century. Initial recognition of the site at Morton, Fife (Canmore 33111), owes much to Reg Candow, a local antiquarian from Dundee, while archaeologist Tom Affleck recorded lithic scatters in the vicinity of his holiday home on Loch Doon, Ayrshire. Many of the new scatters found today are the result of fieldwork projects undertaken by community archaeology groups such as the Tarradale Through Time project (Highland), the Early Settlers Project (Tay Valley), Mesolithic Deeside (Aberdeenshire), and the Biggar Archaeology Group (Lanarkshire).

Lithic scatters include material from the earliest recorded human activity in Scotland up until the end of the Bronze Age, by which time stone tools were no longer a significant element of material culture. Palaeolithic assemblages are often small and may comprise only a few key pieces mixed within a larger assemblage of later date. There are, however, several caveats to this, not least the problems of recognising Palaeolithic stone tools. While classic Palaeolithic types are fairly easily picked out, for example tanged points or larger broader blades, much Palaeolithic material is hard to distinguish from later pieces. Palaeolithic knapping debris, in particular, blends into the general range of material generated in other periods. Notable Palaeolithic sites include Howburn in Lanarkshire (Canmore 216532) and Rubha Port an t-Seilich, Islay (Canmore 304907) and the Aberdeen Western Peripheral Route. Both sites were first recognised as lithic scatters, and only through excavation were the unusual characteristics of the assemblages recognised.

Mesolithic scatter sites are often notable for the density of pieces. Sites with over 100 pieces per square metre on the surface of a field are not uncommon. While small, discrete Mesolithic scatters are known, some sites cover considerable areas. The lithic scatter along the River Dee at Nethermills of Crathes (Canmore 36638) extends for 2 kilometres. In general Mesolithic sites contain a mix of worked tools (retouched and unretouched), including many microliths, as well as much debitage, some of which is very small. Neolithic scatters are usually less dense than Mesolithic scatters and may be more discrete. The same is true of Bronze Age scatters. Both Neolithic and Bronze Age scatters are likely to contain worked tools alongside knapping debris. Iron Age assemblages do occur, but usually as a smaller element of other sites. As human activity has often occurred on the same spot over the millennia, even if not continuously, many lithic scatters are mixed, palimpsest sites that combine

Figure 4 Invernaver, Bettyhill, Sutherland. This Mesolithic site lies on gravel surface in the mouth of the River Naver. Much of the site survives under sand dunes, other areas are being eroded by wind and water.

elements from different periods.

Many sites occur along the fertile lands bordering major rivers, such as the River Dee (eg Nethermills Farm, East Park: Canmore 36644), the Tweed (eg Dryburgh Mains: Canmore 55693; Rink Farm: Canmore 54421), the Clyde (eg Weston Farm: Canmore 48896; Daer Reservoir: Canmore 195079), and the Tay (eg Broughty Ferry: Canmore 33395). Scatters may also occur further from the rivers (as at Morton south of the Tay: Canmore 33111) and along fossil coastlines and ancient riverbanks or loch shores. It is important to remember that the cultivated nature of the land today is a product of drainage and improvement. The world of prehistoric Scotland was very different and, though better drained land was undoubtedly preferred for occupation, it is not possible to understand the landcover of prehistory without specialised research.

Scatters exist along coastal farmlands as well (eg Kinloch, Rum: Canmore 365426), and they are also a common feature of sand dune systems where they may be found within erosion features such as the sandy blowouts between dunes or at the coastal edge. Scatters in these locations are very vulnerable to further erosion. Notable dune sites include the scatters at Luce Sands (Dumfries and Galloway: Canmore 61311), Sands of Forvie (Aberdeenshire: Canmore 20857), and Culbin Sands (Moray: Canmore 15912), while the scatters at Staffin (Skye: Canmore 355344) and Archerfield (East Lothian: Canmore 55028) occupy eroding coastal edges.

While the majority of lithic scatters occur in the lowlands, upland sites do exist, eg Howburn (Lanarkshire: Canmore 216532) or Chest of Dee (Aberdeenshire: Canmore 267763) and the predominance of lowland sites is likely to reflect the generally lower

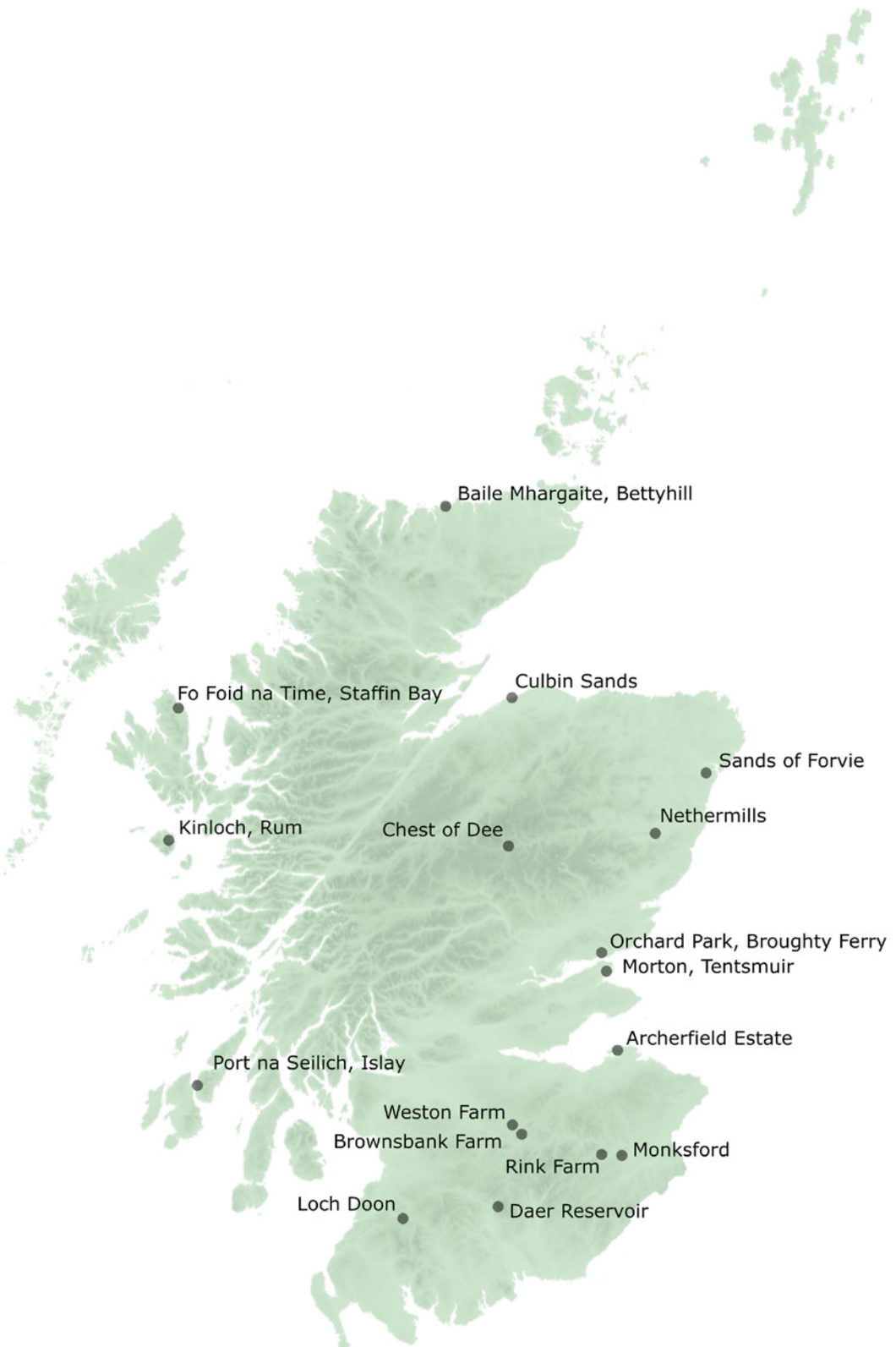

Figure 5 Map showing sites mentioned in the text.

Figure 6 Volunteers investigating a newly-found lithic scatter site. The site was discovered during maintenance on the Chest of Dee footpath by Braemar.

position of agricultural land as well as the relative ease of archaeological prospection in lower terrain. The Howburn site was discovered due to farm ploughing, though other sites in the area have been revealed during forestry activities. The site at Chest of Dee was found during footpath maintenance.

Scatter sites may also be recognised on the surface of gravels including loch edge gravels, as at Loch Doon (Ayrshire: Canmore 75495), or fluvio-glacial and raised beach terraces, eg at Bettyhill (Sutherland: Canmore 5791).

Figure 7 Lithics disturbed during forestry operations at Coom Rig, Daer Valley, South Lanarkshire.

4. THE ARCHAEOLOGICAL INVESTIGATION OF LITHIC SCATTERS

The archaeological investigation of lithic scatter sites can yield significant archaeological information pertinent to local and national prehistory. A lithic scatter site is always an important indicator that archaeological deposits exist at a specific location. Basic analysis of the lithics will usually provide an indication of the chronological period, or periods, of the site. This can also be used to tie the site into a local context, by comparing the raw materials with those in use on other sites in the locality. It can also provide information regarding possible wider networks of transport and communication through analysis of the likely sources from which material has been extracted and other locations where it was used in prehistory.

Scatter sites provide important evidence of places that have attracted human communities on more than one occasion over considerable periods of time. They also help us to understand past uses of landscape. Consideration of artefact types and variety can be used to discuss possible activities represented on site.

There are, nevertheless, a number of limitations to the study of lithic scatter sites. The overarching one must lie in the fact that any lithic scatter site on the surface represents archaeology that is, by definition, disturbed to some degree. Where undisturbed sites also exist, prioritizing their examination should be considered. The key to gaining as much information as possible from these sites is in choosing appropriate approaches from a wide range of techniques. The relationship between a lithic scatter and the archaeology beneath remains unknown without deeper investigation; interpretation is complicated by the likely presence of material derived from multiple periods and multiple activities. Investigation can be divided into two stages; the initial assessment and detailed investigation. Detailed investigation is dependent on both the results of initial assessment and on the overall aims of

Outcome	Location	Size	Boundaries	Archaeological Context	Contents	Geological Context	Features
Technique							
Desktop Survey	✓			✓			
Walkover Survey	✓	✓	✓	✓		✓	✓
Fieldwalking		✓	✓	✓			
Test Pitting		✓	✓		✓	✓	✓
Rapid Lithic Assessment					✓		

Table 1 The investigation of lithic scatter sites: initial assessment.

the project and may be postponed or not take place at all depending on what the initial examination of the site reveals. Development-driven work on sites may require extensive excavation as part of mitigatio, and there is, therefore, high potential for such work to contribute our understanding of prehistory. The extent and nature of such mitigation, however, would be defined as part of the planning process, with reference to the Local Authority archaeological service, and is therefore not discussed in further detail here.

We can draw on a range of techniques to interpret the remains and summarise the role of the scatter in local, regional and national archaeology. All archaeological research should be underpinned by clear research questions and these should be tied to wider debate through the use of Scotland's Archaeological Research Framework (ScARF) and its developing Regional Research Frameworks. Assessment and interpretation lead to consideration of the significance of the site any may inform its future management, as well as future research potential.

Careful archiving of the digital and physical material and records resulting from the investigation of any scatter site is essential. This includes the finds which should be fully recorded and sealed into secure bags. Museums across the British Isles hold boxes containing finds from poorly recorded scatter sites. In many cases the bags have perished, or the recorded information is not adequate, putting the archaeological resource at risk.

Physical and digital archiving are subject to country-specific standards and guidance, such as those issued for preparing archive material by the National Record of the Historic Environment. In the case of work taking place in Scotland, the finds will be subject to the law of Bona Vacantia which is administered by Treasure Trove Scotland. You are obliged by law to report all finds through this process. Regulations, standards and guidance on the proper methodologies for undertaking all kinds of archaeological investigation – and the management and treatments of finds – are issued by the Chartered Institute for Archaeologists. In general, if you are unsure, it is worth speaking to the local authority archaeologist, or discussing the project with Historic Environment Scotland who may be able to advise.

Before beginning any works on site, it will be important to understand if the site has any designations, such as Scheduled Monument status. In which case appropriate consents need to be sought. In some cases, works to site, even non-invasive work without appropriate permissions can constitute a criminal offence. You can find out more about

Outcome	Contents	Geomorphological Context	Features
Geophysics		✓	✓
Sediment analysis		✓	✓
Geoarchaeological Deposit Modelling		✓	
Excavation	✓	✓	✓
Specialist finds analysis	✓		

Table 2 The Investigation of Lithic Scatter Sites: Detailed Investigation.

designations and consents by contacting Historic Environment Scotland. There may also be natural designations, and NatureScot can provide further advice. It can also be highly beneficial to engage with the Local Authority archaeologist as early as possible (the relevant contact details can be found on the ALGAO website). They will often be aware of other projects in the area and unpublished work, and can often advise of any local issues or concerns.

Techniques and methodologies for the assessment of lithic scatter sites are below. It should be noted each site should be approached individually and there may be scope for approaches and techniques not mentioned here.

4.1 ASSESSING A LITHIC SCATTER SITE

The aim of initial assessment is to produce enough information relating to the scatter site for a rapid decision to be made regarding the interpretation, significance, and vulnerability of the site and the appropriate management strategy.

Initial assessment should be rapid, simple and relatively cheap. Appropriate techniques include desktop survey, walkover survey, fieldwalking, test pitting and rapid lithic assessment. Consideration might also be given to geophysical survey at this stage, but it is usually part of a subsequent detailed analysis. You should refer to the Standards and Guidance for Archaeological Field Evaluation published by CIfA for more detailed information and advice about relevant professional standards.

4.1.1 DESK-BASED ASSESSMENT (DBA)

Desk-Based Assessment is a common and standard archaeological technique which involves consideration of all related archival material including documents, maps and photographs for previous indications of the site or reports of previous work. It would usually include examination of relevant Historic Environment Records (HER) and the NRHE, using its online portals Canmore and Pastmap. A DBA is necessary to obtain information on other archaeological material in the vicinity of the scatter site. It is important to consider a wide range of material related to the past investigation of an area. This may involve consultation in several different archives and local records. Related work, such as geological mapping or building surveys, may also contain references to archaeology. CIfA have published Standards and Guidance for Historic Environment Desk-Based Assessment.

4.1.2 WALKOVER SURVEY & FIELDWALKING

At least one visit to the site and its environs should be made to examine the area of the scatter. This may take the form of a walkover survey, which can be a relatively informal recce of the site for other archaeological material or features, active erosion, basic geomorphological context, visible site boundaries, and locational details. This can be used to inform the overall understanding of the site, assess conditions and constraints and inform future approaches. An overall understanding of the landscape, including its geology, topography, and landscape history, should be used to inform and target fieldwalking and other interventions.

Fieldwalking comprises is a more formal and structured form of survey which is fundamental to assessing lithic scatter sites. It seeks to collect a representative sample of archaeological material from the surface of the site by walking transects across the ground and scanning the surface for finds which are then bagged and individually recorded according to position. The recording of the precise location of finds is important and easily achieved using differential GPS. In all cases, fieldwalking is best undertaken after preliminary disturbance such as ploughing and or harrowing. It can also be useful to wait until the newly exposed surface has been weathered, for example a couple of days after rain, in order to ensure that lithics are exposed.

Various walking strategies have been proposed for fieldwalking, from individuals walking contiguous strips (usually lines at a spacing of 2 metres) across a site to pairs of people walking at 20 metres intervals. Work undertaken by Mesolithic Deeside and other groups suggests that the information obtained from wider spaced transects is still useful for the basic assessment of the nature of a site. This has the advantage that the survey is completed more rapidly and results in fewer lithic artefacts for analysis. Nevertheless, the chosen fieldwalking strategy will also depend on other considerations such as weather, number of field-walkers, and the nature of the project. Rapid assessment may require widely spaced transects.

If possible, repeated visits to a site will ensure that a representative sample of material is collected. Research indicates that it is only possible to build a representative sample of material by collecting over a number of years. Even where a site has been walked for many years, more material will still come to the surface on new visits. A representative sample is rarely possible from a rapid assessment, but local museums may hold earlier collections that should be considered. This can often present an opportunity for engaging with communities - local groups are often able to engage more regularly with a site, and can be empowered to be part of the process.

It is important that those undertaking fieldwalking are familiar with all the different types of raw material from which tools were made at that site. Stone tools are not just of flint; chert, quartz, agate, bloodstone and a range of other local stones were often used. Flaked quartz can be particularly hard to spot, but working with a lithic specialist can help with recognition.

4.1.3 TEST PITTING

The excavation of small test pits down to the base of the plough soil may be undertaken relatively quickly, allowing a large number of pits to be dug in order to assess archaeological survival across a site. The size of individual pits is dependent on the project. Some chose to open squares

Figure 8 Community groups play an important role in assessing lithic scatter sites. Mesolithic Deeside walking a site by the River Dee, Aberdeenshire.

of 2m by 2m, others may be guided by the bucket of a small mechanical digger, elsewhere smaller pits may be judged adequate.

The spacing of pits will also vary from site to site and should be informed by other elements of the assessment. Most often, a stratified random sample is recommended as it provides even coverage across the site while avoiding the pitfalls of too regular a spacing. Very rigid or pre-determined spacings can introduce biasing factors or intervals that are uniformly too great or too small, particularly on sites where the remains may be very unevenly dispersed.

Topsoil may be removed by digger or by hand, but it is useful to sieve a regular amount (eg two buckets) from the topsoil in order to identify stray finds. Dry or wet sieving may be appropriate depending on the location and circumstances. Where a mechanical digger has been used, excavation is best undertaken by hand for the 10 cm spit immediately above the subsoil or natural.

Visible features within the subsoil should then be excavated traditionally and recorded with photographs and drawings. Small scale detailed excavation, eg of potential features, is useful to assess whether a feature is archaeological or natural and, hopefully, to determine the nature of in situ archaeological deposits. At least some test pits should also be dug well beyond the known area of the lithic scatter, away from the zones where lithics have been recovered. This makes test pitting a useful technique for assessing the possibility of surviving archaeology and the size of the site.

4.1.4 RAPID LITHIC ASSESSMENT AND ILLUSTRATION

Rapid lithic assessment provides the tool

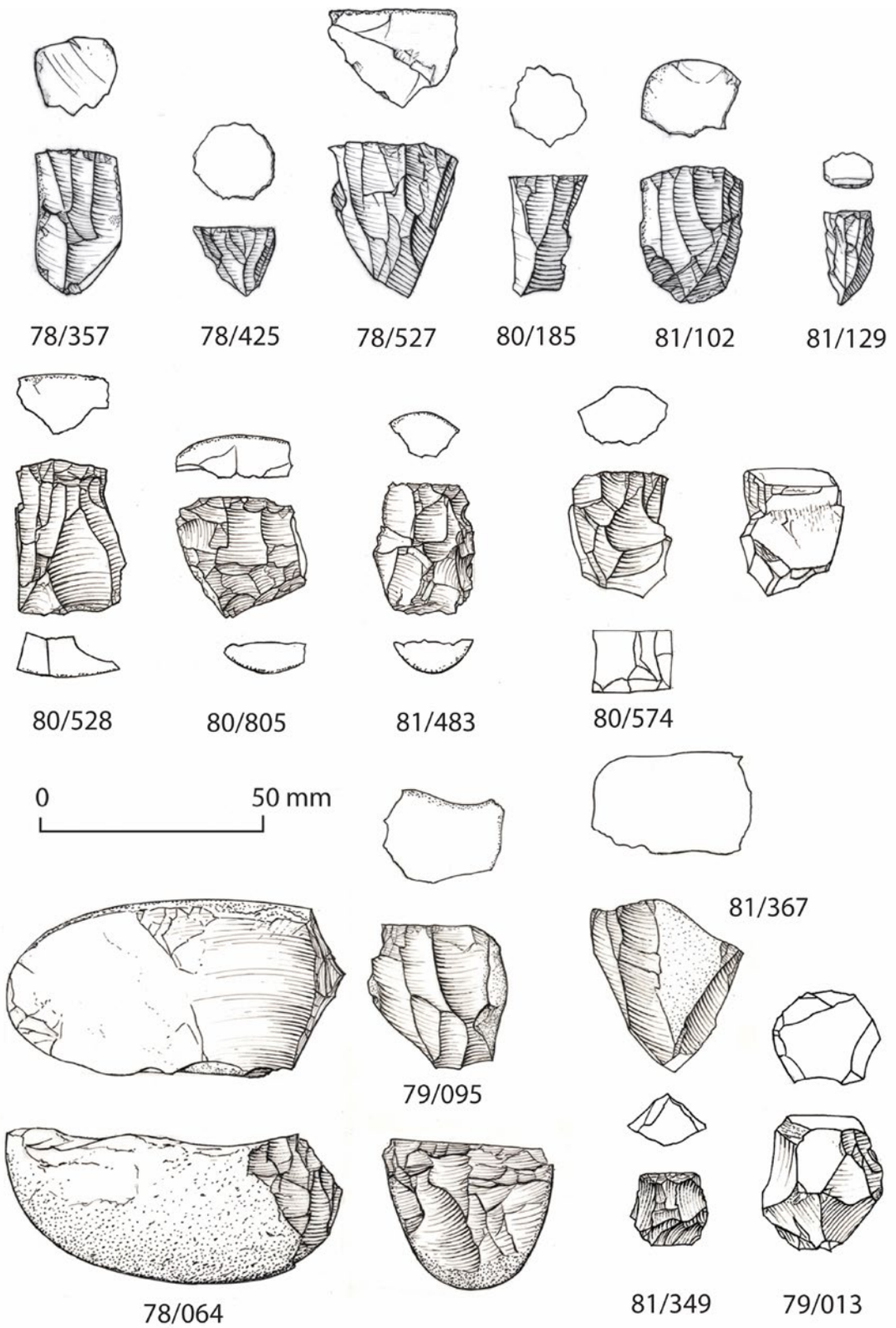

Figure 9 Flint cores from Nethermills Farm, Aberdeenshire. Drawings convey information such as size, manufacturing techniques and breakage patterns.

whereby a variety of basic information about a scatter site, such as date(s), assemblage size and composition can be assessed. This is vital to the success of any project.

It is important to prioritize lithic assessment in the immediate weeks following fieldwalking. While community archaeology groups can provide experienced fieldwalking teams, they do not usually have specialised lithic analysis skills and consideration should be given to employment of a lithic specialist for this stage. Longer term projects should consider an element of lithic training as part of their work, in order to transfer the skills of basic lithic analysis to more participants. More detailed lithic investigation may be undertaken as necessary.

Where large numbers of finds occur, analysis of the assemblage can be slow. In general, the pieces should be washed before they are passed to the lithic specialist because it is both expensive and time consuming for the lithic specialist to wash a collection. However, prior discussion of possible methods of analyses such as use-wear analysis, must be completed in advance in case washing is not advised before the lithic specialist looks at the assemblage.

While the precise fields to be recorded will depend on the aims of individual projects, the following information has been found to provide the basic information necessary for the assessment of a scatter site;

- Raw material
- Visible indications of burning
- Type
- Sub-type (eg type of core, type of retouched piece)

With this information it is possible to assess chronological and cultural associations of the material as well as a basic idea of overall function (knapping debris, specialist site, etc) and this may then be combined with the spatial information to identify different lithic concentrations across the site.

Clear illustration of key pieces from the scatter (cores, retouched pieces, a selection of blades and flakes) is vital. This provides information relating to the types of piece present as well as technological detail of knapping patterns. The illustration of lithic artefacts is a specialised technical process and should only be undertaken by qualified and experienced illustrators. The Association of Archaeological Illustrators and Surveyors has published a detailed guide to drawing stone tools and this should be consulted with regard to technique. Many people prefer drawings to photographs of lithic artefacts because of the lack of detail in a photograph, though financial restrictions sometimes mean that photographs are necessary for the initial investigation report, and drawings are only made use of in a detailed investigation. This is not ideal, but better than no illustration at all.

4.2 DETAILED INVESTIGATION OF LITHIC SCATTER SITES

The aims of detailed investigation are to answer specific questions about the site, or to clarify uncertainties relating to the site, its overall context, or surviving sub-surface archaeology. In some cases it may also be necessary to investigate a site as a way of preservation through record to mitigate its unavoidable loss or damage.

While detailed investigation may make use of a local or inexperienced workforce, it should always be led by a specialised team that includes all relevant technical

	Palaeolithic	Mesolithic	Neolithic	Bronze Age
Gradiometer	• Palaeochannels • Hearths	• Hearths • Pits & post holes • Middens	• Hearths • Middens • Pits and post holes • Ditches • Ring ditches	• Hearths • Kilns and furnaces • Middens • Pits and post holes • Ditches • Ring ditches
Resistance		• Cobbled surfaces	• Cobbled surfaces • Stone walls/structures • Cists	• Cobbled surfaces • Stone walls/structures • Cists
Ground Penetrating Radar	• Base of Peat • Palaeosurfaces • Palaeochannels	• Cobbled surfaces	• Cobbled surfaces • Stone walls • Cists • Large pits and ditches	• Cobbled surfaces • Stone walls • Cists • Large pits and ditches
Magnetic Susceptibility	• Occupation areas	• Occupation areas	• Occupation areas	• Occupation areas

Table 3 Rough guide to the application of geophysical survey techniques to lithic scatter sites.

knowledge and understanding of relevant standards, guidelines or legal implications and obligations. Geophysical survey, including remote sensing where appropriate, sediment sampling and analysis, excavation, and specialist finds analysis should all be considered for possible further work on a lithic scatter site. Given the expense of the individual techniques, they would usually only be undertaken where the significance of a site and research value of a project is judged to merit the investment of resources.

4.2.1 GEOPHYSICS

A number of geophysical techniques exist to investigate site features and formation. The efficacy of individual techniques is dependent on both the local conditions of the site and the information to be retrieved. It is important to consider the underlying soil type and geology. Gradiometer survey may, for example, be thrown off by certain types of underlying geology, while peat or sand may present problems for some techniques, only working under certain conditions or where the features themselves are likely to provide enough contrast.

The sampling interval used may need to vary depending on conditions and suspected features, and may well yield different results. However, the table above gives a rough guide as to what techniques may be most useful on certain types of site. The Chartered Institute for Archaeologists has published Standards and Guidance for Archaeological Geophysical Survey. It is important to note that, as the response of features to survey methods and background geology is variable, the absence of features in geophysical survey results does not necessarily mean that archaeological features do not exist at a location.

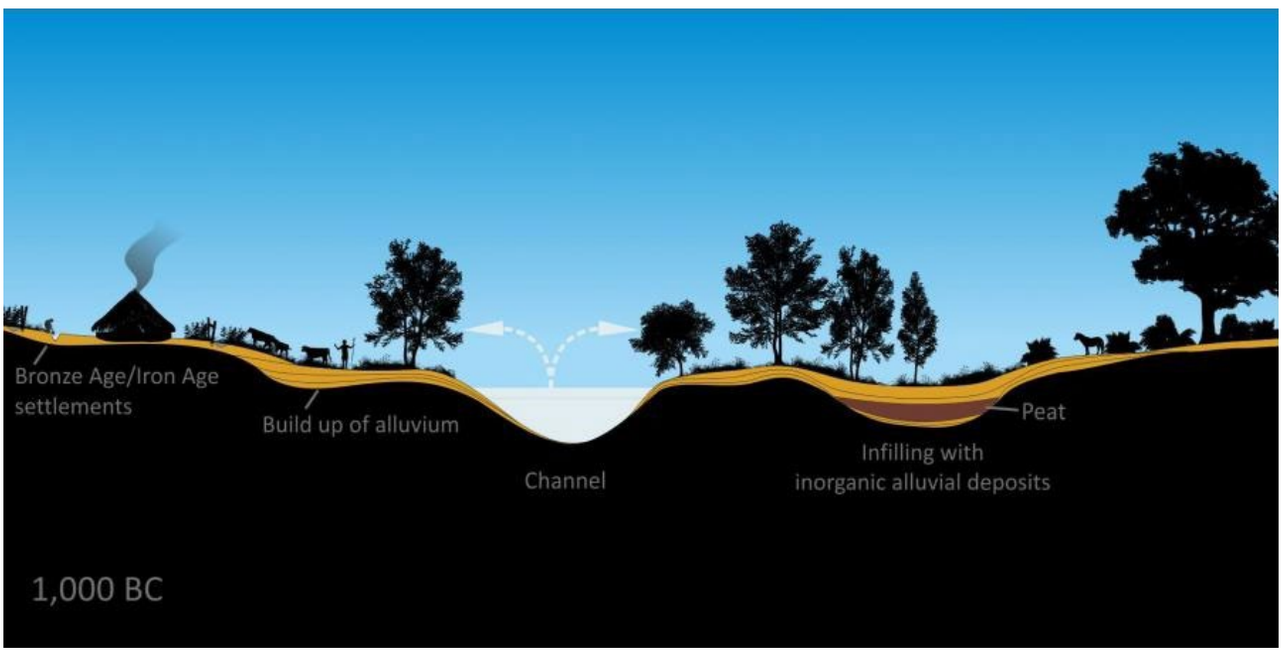

Figure 10 Illustration showing how different processes can contribute to site formation.

4.2.2 SEDIMENT SAMPLING AND GEOARCHAEOLOGICAL DEPOSIT MODELLING

Ancient soils and sediments offer an insight into the prehistoric context of a site and can help to show the natural processes that have impacted site formation.

Samples can be gathered via test-pits or coring, and individual sediments may be subsampled for pollen, ostracods, diatoms, insect remains, soil chemistry and ancient DNA. On sites where the buried sequence is shallow and the focus is on identifying the potential for Palaeolithic archaeology (through dating or finds recovery), it can be more effective to use test-pits rather than coring. Geophysical survey can prove very helpful in identifying suitable locations (which may be a little distance from the scatter site) from which to obtain samples.

The results of sediment coring can also be used to create deposit models that investigate the archaeological potential of buried land surfaces. These models provide a visual representation of the vertical and lateral distribution of buried sediments and are particularly useful in situations where archaeological deposits do not lie immediately below the modern ground surface. They are a useful tool to locate traces of prehistoric activity that are no longer visible can and help to direct excavations by identifying areas of high or low archaeological potential. They can also facilitate the reconstruction of past environments, which is particularly important for Palaeolithic archaeology where the old land surface may bear little relation to the present.

Deposit models are typically made by geoarchaeologists who will collaborate with project managers and end-users to ensure that the information can be easily understood and re-used in future investigations. The geoarchaeologist will then develop the model using data from a variety of sources including:

- existing borehole data and geotechnical logs stored in the BGS online repository
- previous archaeological records

- LIDAR surveys
- new data from sediment cores
- results of remote sensing programmes

Deposit models can be created and applied to any scale of investigation. However, it is important to remember that they only provide an indication of underlying deposits and are not a definitive record of the buried stratigraphy. They are only as good as the data used to create them and should be refined whenever additional data is collected.

4.2.3 EXCAVATION

Excavation is a specialised undertaking that requires a skilled team and adequate resources. It should never be undertaken without a research design to set out the overall aims of the project and the strategy by which they will be achieved. It is also important to remember that excavation incorporates two aspects; fieldwork and post-excavation and the latter may well take considerably longer and be more expensive than the former. No excavation should take place without adequate finance for full post-excavation and publication of the results.

The aims of project, together with the initial site assessment will determine whether excavation is necessary and where it should take place. Depending on the nature of these remains and aims of the project a range of possible excavation techniques may be considered. Where stratified material deposits are recovered during excavation, it may be possible for these to be scientifically dated using specialist techniques such as radiocarbon dating, optically stimulated luminescence, or thermoluminescence. This may help to build a more accurate chronology for the site. These are not discussed here but more detailed Standards and Guidance for Archaeological Excavation have been published by CIfA and should be consulted.

With regard to specific excavation techniques appropriate for lithic scatter sites, details will vary by project but whatever the site the normal stratigraphic principles of excavation should be applied. In general, it is important to record the location of the lithics and the context, or feature, where they were found.

Before excavation the area should be gridded out: suitable grid sizes include 10cm, 25cm, or 50cm depending on the size of the site, density of lithics, and financial and time restraints of the project. Where possible individual find locations are recorded using GPS or EDM, though occasionally constraints mean that recording to the nearest grid square is necessary. Contexts should be excavated by hand and deep contexts should be subdivided into spits of no more than 50mm in depth.

Within the stratigraphy it is possible that smaller features such as fire settings, pits, or post holes will survive. These may contain lithics and should be excavated and recorded as is the standard practice for any discrete archaeological feature – such as by half sectioning. All spoil should be sieved (by context and grid square) through 5mm mesh; where a source of water (and power) is available, wet sieving is usually quicker and more productive.

While the aim of excavation is to recognise and record finds by hand, the excavation of a lithic scatter will inevitably involve many pieces that are too small to recognise by eye and these can be picked out of the sieved residues and allocated back to their original grid square. This small fraction is vital for a full understanding of elements of the site such as knapping techniques and tool repair.

Figures 11 & 12 Opening up a test pit and excavating it. Nethermills Farm, Aberdeenshire.

	Manufacturing techniques	Chronology	Tool and Site Function	Site Organisation	Wider connections
Raw material types	✓				✓
Raw material sources					✓
Knapping techniques	✓	✓			
Refitting	✓			✓	
Typology	✓	✓	✓		✓
Breakage	✓		✓		
Usewear	✓		✓	✓	✓
Residue Analysis			✓	✓	
Spatial analysis			✓	✓	

Table 4 The range of specialist lithic analysis that may be used on an excavated assemblage.

Where sieving does not take place the final lithics report is likely to be very biased towards larger elements such as cores, blades and flakes. Gridding and locational recording means that differential activity spots or deposition locations across the site can be recognised in the post-excavation analysis.

Sites do not have to be excavated in full, and the extent of excavation may be determined by consents, permissions, or sampling strategy. If a site is not to be destroyed by development, then it is good practice to leave a portion for future investigation. Where destruction is inevitable it may still not be practical to excavate in full and, depending on individual circumstances. Partial excavation can still yield useful information.

4.2.4 SPECIALIST FINDS ANALYSIS

The specialist analysis of excavated material can involve a wide range of techniques which will depend on the aims of the project and the assemblage recovered. As the focus of this document is on lithic scatter sites, this section will consider specialist lithic analysis, but other artefacts may occur and may also require specialist attention.

The integrity of the scatter, contexts of the lithics and research aims of the project all need to be carefully considered before resources are committed to specialist analysis. In general, the application of use-wear or residue analysis to lithic tools which don't have a secure archaeological context will be of limited significance, as the information which they provide cannot be discussed with reference to the rest of the site. Similar constraints apply to the analyses of other types of finds which are out of context. They can yield interesting results, but without a secure context their ability to answer questions about the site as a whole is limited.

5. CONCLUSION

Lithic scatter sites are a core archaeological resource; for the first few thousands of years of human occupation in Scotland, they are the only archaeological resource we currently have. They present unique technical challenges to the archaeologist.

An initial assessment of the significance of a site can often be undertaken relatively quickly with a clear project design. Understanding of the site and clear research questions is key to knowing which methods of analysis will work best. Development-led archaeology has made a significant contribution to the research of Lithic scatters, as has community archaeological investigation which has been a highly effective tool for investigation in Scotland. Specialist input is required for many forms of analysis and in all cases reference should be made to appropriate recognised standards and guidance.

Lithic scatter sites also present management challenges – by definition, lithic scatter sites are under active threat from the very thing that is bringing material to the surface. Sites that are judged to be of high significance should be proactively managed and protected, and advice on management strategies can be sought from the Local Authority Archaeologist. It is important to note that assessing the significance of a site, as well as how it may be best managed, is dependent upon first recognising and understanding it. Therefore, appropriate archaeological investigation of lithic scatter sites is key to researching, understanding, and managing this important archaeological resource.

6. FURTHER READING AND CONTACTS

Further reading

Guidance: Management of Lithic Scatters in Scotland, Association of Local Government Archaeological Officers (Scotland, 2020)

Historic Environment Policy for Scotland (HEPS) Historic Environment Scotland (2019)

Managing Lithic Scatters and Sites: Archaeological Guidance for Planning Authorities and Developers (Draft), Historic England (2019)

Regulations, standards and guidance, Chartered Institute for Archaeologists

Scottish Archaeological Research Framework, Palaeolithic & Mesolithic Panel: Lithic Scatters

The Illustration of Lithic Artefacts: A Guide to Drawing Stone Tools for Specialist Reports, Association of Archaeological Illustrators & Surveyors

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Lithic Scatters
A Short Guide

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Produced by:

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

SCOTLAND'S ARCHAEOLOGY STRATEGY

Scottish Charity No. SCO45925

Front cover image:
Scrapers, a multi-purpose tool which was used in many periods, from the lithic scatter site at Kinloch Rum.