# Archaeological Field Walking or Systematic Surface Collection Survey

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Figure 1: Fieldwalking survey under way on the Hill of Slane, Co. Meath

*Introduction*

Archaeological fieldwalking, perhaps more precisely known as systematic surface collection survey, is a technique that has been widely used across the world for some time. The technique, while being very low-tech in comparison to many remote sensing techniques used in archaeology today, involves the systematic collection of artefacts from the ground surface, usually in recently tilled fields, recording the findspots with appropriate accuracy and interpreting the resulting distributions to learn about past human behavious.

There has been a series of major fieldwalking surveys carried out in important archaeological landscapes in the UK since the seventies but relatively little work has been done here in Ireland. The best known UK landscape survey is the Stonehenge Environs Project which resulted in the collection of over 150,000 artefacts over the landscape and helped to highlight the settled nature of that landscape during the Neolithic period (Richards 1990). In Ireland, a number of surveys have been carried out including the Bally Lough Survey in Waterford which examined the transition from the Mesolithic to the Neolithic (Zvelebil et al 1987). The results indicated that there was a degree of continuity between the two periods because the dated scatters from the Mesolithic and Neolithic were found in similar landscape locations, quite close to each other. The Lough Swilly Survey in County Donegal looked at the same question on the Inishowen Peninsula in Donegal (Kimball 2000). My own work, undertaken as fieldwork for my doctorate looked at the question of settlement in the Brú na Bóinne landscape around Newgrange and demonstrated that this was as much a landscape of the living as a landscape of the dead (Brady 2002, 2007a, 2007b).

Fieldwalking is most often compared to excavation which is not the best kind of comparison to make because it must be remembered that it is a quite different technique, it operates on a different scale and produced different type of data. It has a number of distinct advantages:

- It is low-cost compared to other techniques (e.g. geophysical survey or excavation), the only real costs involved being those related to the time inputted by personnel carrying out the surveys and those carrying out the post-survey processing and analysis.
- It is rapid to carry out. A well-trained and experienced individual walker can comfortably cover up to 20 hecatres of ground in a day depending on the sampling strategy being used, the artefact density encountered and the agricultural regime in operation.
- It provides landscape-scale data which can be used to interpret relatively large-scale settlement and landuse strategies for particular periods over large areas.
- It provides data on sites and activities that took place a certain points in the landscape that might be invisible to other techniques.
- When used on a systematic basis using a national grid system, the data are directly compatible with and comparable to all other types of archaeological remote sensing data.

However, as with any technique, there are some drawbacks:

- The results of fieldwalking surveys are limited to those archaeological periods during which the materials were used to make artefacts were durable and survive in the dynamic ploughzone. Such surveys are particularly good at mapping the extent of Stone Age or, to a lesser extent, Bronze Age activity across a landscape because the main material used for tool making was stone. For other periods, the survival rate of other materials like pottery varies depending on climate, soil type and agricultural regime. Furthermore, the number of chronologically diagnostic artefacts (i.e., easily dateable) varies from period to period.
- There have often been difficulties in interpretation of surface-collected artefact scatters with a tendency in the past to uncritically assume that artefact scatters automatically indicates the location of a habitation site. Scatters of artefacts can have accumulated as the result of a variety of different processes, both human behaviouor and natural.
- The assemblages retrieved from fieldwalking are tiny samples of what is contained within the ploughsoil. Studies have shown that between 1% and 10% of artefacts contained within the ploughsoil are visible on the surface at any one time. When a transect approach is taken to surveying, then there will be a further reduction in the proportion of material recovered, depending on the transect spacing chosen.
- Post-depositional factors can greatly influence the visibility of artefacts on a field surface (alluviation, agricultural practices).
- The degree of weathering and the conditions on the day of the survey can influence the visibility of material on the field surface. It is also likely that there will be different recovery rates recorded by different individuals walking in the same survey.
- Surveys are restricted to where tilled land is available. In other areas like pasture, other techniques must be used to gather compatible information.

Although there are drawbacks with the method, if surveys are conducted with a knowledge of the limitations of the technique and a properly constructed methodology, it is clear that the results represent a major source of data on the past use of particular landscapes. As such, the method should be an integral part of any landscape-scale surveys, particularly

because it provides direct archaeological data from the areas investigated, as opposed to proxy data which is provided by many remote sensing techniques.

*Understanding Artefact Scatters*

One of the key principles underlying the archaeological fieldwalking technique is the so-called 'Ploughzone Paradox'. This recognises that ploughing is a destructive process and results in the destruction of archaeological features, either partially or completely. However, although it is destructive, this unlocks the visibility of otherwise invisible sites through ploughing out durable artefacts from subsurface archaeological features. Each time the field is ploughed, some of these artefacts are turned to the surface where, following weathering, they may be seen by archaeological surveyors.

The structural elements of prehistoric houses and shelters were chiefly constructed of organic materials, very little of which survives for any length of time under normal conditions. However, we are fortunate that stone tools were used from earliest times through to the Bronze Age at least. These tools are usually of flint and a number of other rock types were also used.

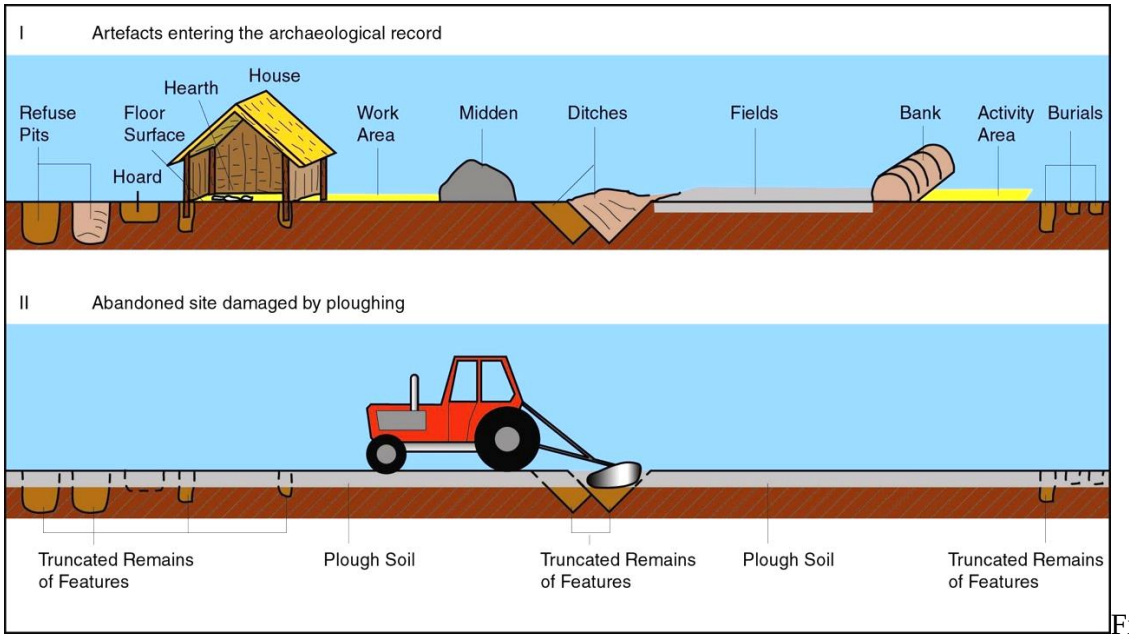


Figure 1: Artefacts entering the ploughsoil (after Hasselgrove 1985).

In a ploughzone artefact scatter, finds that might normally be excavated from features on archaeological excavation sites have literally been 'ploughed in' to the ploughsoil with each tillage event. The surfaces and features with which they would have been associated are now largely (or even completely) destroyed and only the deepest elements of trenches, pits and post-holes survive below the ploughzone. The durable finds from the disturbed portion remain suspended within the ploughsoil and a proportion of these and later material are turned to the surface when fields are ploughed.

Figure 1 presents the range of activities and archaeological features that might have been related to the deposition of artefacts that now form artefact scatters. So, paradoxically, one of the processes that have contributed to the destruction of these site types actually allows us to 'see' beneath the soil without excavating. In effect, the plough does the excavating for us. The stone tools will, of course, be disturbed from their original contexts

but studies have shown that scatters of material within the ploughzone will largely retain their spatial integrity and will be recognisable if a suitable systematic method of recovery is used.

When systematic surface collection surveys are carried out and the finds distributrions are plotted and analysed, it is often found that there is a 'background scatter' of material, against which denser scatters may be measured. Background scatter relates to the routine activities being carried out across the wider landscape that did not involve the intensive manufacture, use and deposition of artefacts. Dense background scatters can be formed when there is repeated and prolonged use of a landscape during prehistory. When many episodes of intense activity took place at the same location over time, it is likely that the resulting scatters will be indistinguishable from each other. Lighter background scatters can be formed by a variety of mechanisms including the dispersal through ploughing of low density scatters which may have been due to activity episodes of short duration, possibly as short as a few minutes, the discard of waste material and broken tools in pits away from habitation areas for safety, ritual deposition and chance loss of items by individuals over time.

Research has demonstrated quite clearly that dense lithics scatters do not always automatically equate with settlement locations. In many cases, large scale working of materials took place at a remove from the settlement purely for safety reasons; freshly struck flint flakes and waste is as sharp as glass; not a material to have lying around the house in large quantities!

There is a sequence which lithic raw material goes through from its initial quarrying and collection through to the finishing, use, resharpening, repair and eventual discard of tools. House sites are generally characterised by material that falls into the later stages of this sequence and there are generally larger proportions of tools, utilised flakes and blades, trimming (retouch) flakes (which often require sieving to recover on excavations) and prepared platform cores than would otherwise be expected.

*Carrying out a Survey - Methodology*

Before carrying out a survey, it is essential to decide why the survey is being considered. There is a need to clearly define what the objectives of a surface collection survey are. It is not sufficient to decide to carry out a survey just to collect artefacts, even though this might be an interesting passtime. Surface collection survey is an archaeological technique and as such, is designed to provide data that can help us to understand the lives of past people better. No other objective is acceptable from scientific standpoint; indeed, without a proper scientific objective, damage is being done to our archaeological heritage because the record is being depleted and information about the lives of past peoples is being lost.

Archaeological excavation cannot be legally undertaken without an archaeological excavation licence from the National Monuments Service of the Department of Arts Heritage and the Gaeltacht, nor can any form of archaeological geophysical investigation or survey, including metal detecting, which also requires a licence from the National Monuments Service, archaeological fieldwalking or surface collection survey does not currently need a licence. However, under National Monuments legislation, all archaeological objects or artefacts found within the state are automatically regarded as belonging to the state and the finder of any such objects is obliged by law to report them to the national Museum of Ireland within 96 hours. Fieldwalking is an activity that is likely to recover a significant number of artefacts, sometimes very large numbers. Thus, it is good practice to inform the Duty Officer of the NMI of the intention to carry out a survey. If they are satisfied as to the reasons a survey is being carried out and also the experience of the individual or group undertaking the survey, they will normally issue a collection number. This number is to be used in all correspondence with the State services concerning the survey and also should be used for the proper recording of the finds and findspots from the survey. It of course goes without saying

that landowner permission is also essential – it is very important to maintain the goodwill of landowners!

When a survey has been carried out the finder has a number of responsibilities to follow through on their commitment and ensure that all findspots are correctly and accurately recorded and documented, including plotting on maps. They are also responsible for the cleaning of the artefacts and labelling using the NMI collection number previously issued. The finds need to be properly packaged for long-term storage in clean write-on zip-loc bags in the required NMI specified standard collection boxes. The artefacts should also be properly catalogued, i.e., listed and described in scientific terms, item-by-item, including all findspot information. A specialist report on the assemblage should be written to ensure the maximum amount of scientific information about the assemblage is examined and recorded. The finds will ultimately be handed over to the NMI for permanent storage. Thus, there are a number of issues that must be sorted out in advance of a survey; many of these will involve expense. No survey should be undertaken unless the funding is secured to process all finds and the appropriate specialists have been contacted to ensure proper reporting and without prior notification of the National Museum of Ireland.

It is strongly advised that any surface collection survey being undertaken by an amateur group should involve the assistance if not the direction of a professional archaeologist who will be familiar with the legal requirements surrounding such activities, and will also be able to organise the correct finds processing procedures and storage the and arrange for the production of required specialist reports.

*Survey Grid*

When carrying out archaeological fieldwalking or systematic surface collection survey, it is essential to use some form of grid so that findspots can be recorded properly. The spatial information about the location where an artefact was found is as important as the artefact itself. Without clear findspot information, the scientific value of an artefact is seriously reduced because it reduces our ability to talk about the activities carried out by past peoples in that landscape. The objectives of the survey will help to determine the type of grid to be used.

There are a variety of ways in which a grid can be established. Some make use of technology like GPS receivers and total stations and result to a grid being established that is accurate to within 10cm or less. However, given the nature of the ploughsoil which is a highly dynamic environment, it is not necessary to know the position of an individual artefact with sub-10cm accuracy; while being highly precise and perhaps appearing to be good practice, this level of accuracy does not contribute in any way to the better understanding of the artefact findspot or individual scatters. It is perfectly acceptable, given the amount of movement within the ploughsoil, to use a much less stringent approach and pace out the grid in the field. However, it is important to be as consistent as possible: the surveyor should know the length of their stride in a ploughed field and also be able to adjust for slopes. A map of some sort should be used and the grid should be planned out in advance. The leader should have a copy of this map/aerial photo in the field and make whatever notes on it that would help to reconstruct the grid during the processing and analysis stage.

Whatever way the grid is established, the most common method is to walk available (i.e., ploughed/tilled) fields in a defined study area using a grid system with regularly spaced transects crossing over the field, resulting in the sampling of the surface of the field.

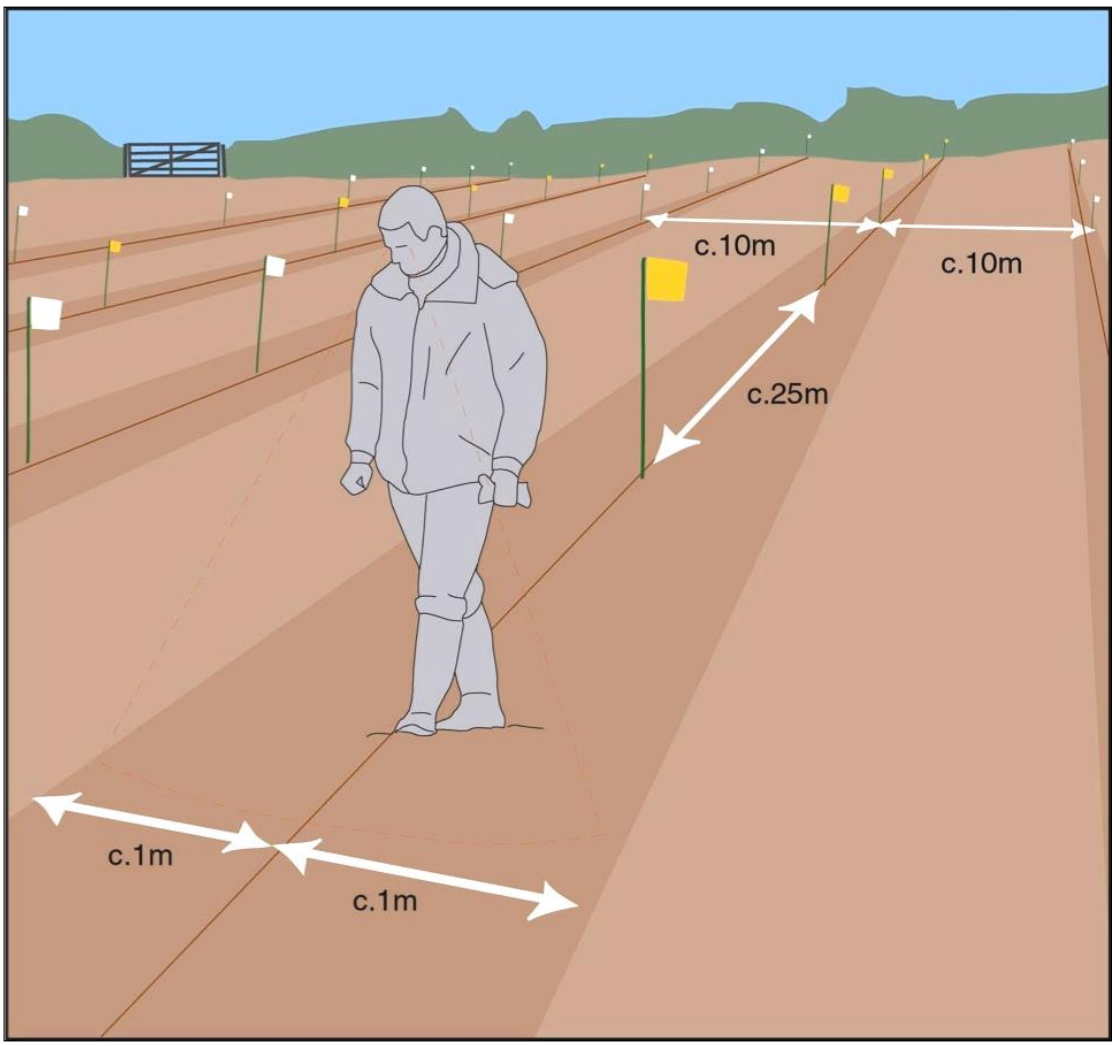


Figure 2: A field survey grid. Every find can be localised to within an area measuring 10m x 25m.

The spacing of the transects is determined by the objectives of the survey. If it is a priority to locate small ephemeral sites (like Mesolithic work areas) or establish the internal structure of larger scatters, then a relatively narrow spacing will be required. If, on the other hand, a rapid assessment of presence or absence of artefacts relating to a series of different periods along with a rough indication of their locations is required, perhaps as a preliminary phase in a multi-stage landscape project, then a wider transect spacing will be adequate. Each transect is subdivided into regular stints of a set length so each find will come from a recordable location, which facilitates the plotting of finds on distribution maps. Many research projects that have been carried out in eastern Ireland have adopted a transect spacing of 10m with stint lengths of either 25m or 50m. Each walker can effectively cover a corridor of *c*. 2m wide, i.e. 1m to either side of their path, resulting in 20% coverage of the surface of each field (Figure 2).

The procedure often adopted here for laying out the grid is to first choose the longest, straightest field boundary to act as a baseline and then, using a sighting compass, to set out the transects and stints at right angles to this. It is good practice to do some homework in advance by acquiring a map of the field or fields to be surveyed so that these kinds of decisions can be made before arriving into the field. Mapping is available online, and even low-resolution screen grabs will do. Google Earth photographs are usually relatively recent and show field boundaries while allowing the viewer to ‘read off’ locations in latitude and

longitude. These can be converted to Irish national Grid to allow compatibility with other mapping and georeferenced datasets. Alternatively, where adequate mapping is available, or surveyors are using GPS devices, grids can be orientated relative to the national grid, independent of field boundaries. This makes for 'neater' mapping of findspots over large swathes of surveyed landscape. Transects and stints are marked with high visibility flags so that the walkers in the field are able to know where they are supposed to be and correctly record the locations of their finds at any given time. Each transect can be assigned a unique identifier within the field, i.e., a letter or combination of letters. Each individual transect is then divided up into shorter lengths or stints. These can vary in length: in the south of England lengths of 50m are common. In the Red Mountain Transect Survey, 50m lengths were also used. In the Brú na Bóinne Survey, lengths of 25m were used in order to have increased spatial resolution within the resulting dataset. Thus each stint will have a unique reference and finds are bagged according to what stint they come from. The transect letter and stint number are the equivalent of a context number on a conventional excavation.

Extra care must be taken where field shapes are irregular. Sometimes, a section of one side of a field is used as a baseline. The section being used should be carefully noted on a basemap and the grid through the entire field must be maintained in relation to this line, otherwise it will not be possible to reconstruct the grid on a map and produce distribution plots. Transects that line up with particular features that appear on maps should be noted, e.g. fixed points like gate piers, corners of buildings, corners of the field, changes in direction in the field boundaries. These can be noted by the leader on a sketch map and/or directly on the finds bags. Transects will rarely end on a field boundary at the end of a full stint; there will almost always be partial stints at the end of each transect. It is helpful in the final plotting up if a paced estimate of the distance to the end of the transect is given on the field sketch map and/or finds bags.

Artefacts are bagged up per stint where the find location of the artefact is likely to be close to its intital deposition. Generally, zip-loc bags with write-on panels are used. Each walker must have ann appropriate non-fade pen to write on the required information. This should include the following:

- Field name/number
- Transect number
- Stint ID
- Walker name/initials
- Date
- Length of stint (if less than 25m)
- Comment/additional info.

It is absolutely essential that the walkers are sure where they are on the grid at any one time. This is the most important thing to check. Sometimes surveys using volunteers will have the walkers proceed across the field at a constant speed in a line that is maintained at all times so that everybody knows where they are at any one time. Constant cross-checking should be encouraged. There is usually one person directing operations in the field, who has worked out what grid to use and who may be responsible for laying out the grid in the field. They also should regularly collect filled bags from the walkers and make sure that each transect and stint is documented and ensure that there are no gaps, overlaps or mis-labellings. This will often be a full-time operation and it is unlikely that this person will have any time to do any walking themselves.

Where fields are large and the grid is relatively tight, there will be a need for very

many markers. Often, it will be the case that there will not be enough markers to lay out over an entire field at any one time. As a result, the leader will have to work around the walkers picking up markers from ground that has been wlaked and transferring the grid to areas yet to be walked. This individual can have a lot of work to do and must constantly make sure that the walkers know where they are on the grid, especially of markers are being moved and recycled.

Conditions at the time of walking should be noted as these can effect the outcome and increase or reduce the densities of material being recorded. Dull even light is the best for fieldwalking as there are no dark shadows created on the field surface. Dry weather is, of course the preferred option for surveying; not only is it more comfortable but when the field surface is wet, colours tend to change to a uniform dark brown. In well weathered fields, however, damp rather than wet conditions can serve to highlight the distinct colours and smooth surfaces of flint.

It is also important that fields be left for as long as possible before walking in order to maximise the effects of weathering. Frost helps to break up larger clods while rain and wind help to clean stones on the surface. Directly after the ploughing of a field very few artefacts will be visible. As with much other archaeological work, patience is rewarded and six to eight weeks of weathering will result in dramatic differences in surface artefact visibility. Experience has shown that it is a good idea to walk fields some time after the crop has been sown, as a flat field surface is much easier to walk across than one that has only been ploughed. However, there is constantly a trade-off between the quality of the surface and the length of the crop. If a crop is left for too long it will damaged by walking on it, but generally speaking by this stage the crop is so high that it will begin to interfere with visibility anyway.

The number of walkers surveying on the day is also recorded along with the transects that they walked. This is essential as different individuals tend to see different things on the surface depending on their levels of experience. A subjective measure of each person's experience can be made in order to weight areas that appear to be of lighter relative finds densities if it is felt that finds were being missed. Calculations I carried out analysing the performance of walkers in my own study indicated that inexperienced walkers saw significantly fewer finds than experienced walkers.

An alternative to using a sampling/transect method is to carry out a total collection survey. Using such an approach the entire surface of an area or field is examined and artefacts collected. This increases the number of artefacts being collected and increases the possibility of more accurate interpretations of the artefactual material. This activity still needs an appropriate grid to be established in order to maintain spatial control over the artefacts being recovered. Sometimes a two-stage process is used whereby most collection is conducted using a standard grid using transects and once an area is encountered where the density is significantly higher than its surroundings, total collection will be used instead.

The results of the field survey, once plotted, ideally using GIS software, can be easily replicated or tested under differing conditions. Careful use of the same field grid from field to field is, of course, essential for results to be comparable.

*Analysis*

As already outlined, all archaeological objects found within this jurisdiction are automatically the property of the State. There is a requirement that any person discovering an archaeological object report it within 96 hours to the National Museum of Ireland. This is impractical in the case of surface collection surveys and the practice has been for the National Museum to issue a collection number of an assemblage.

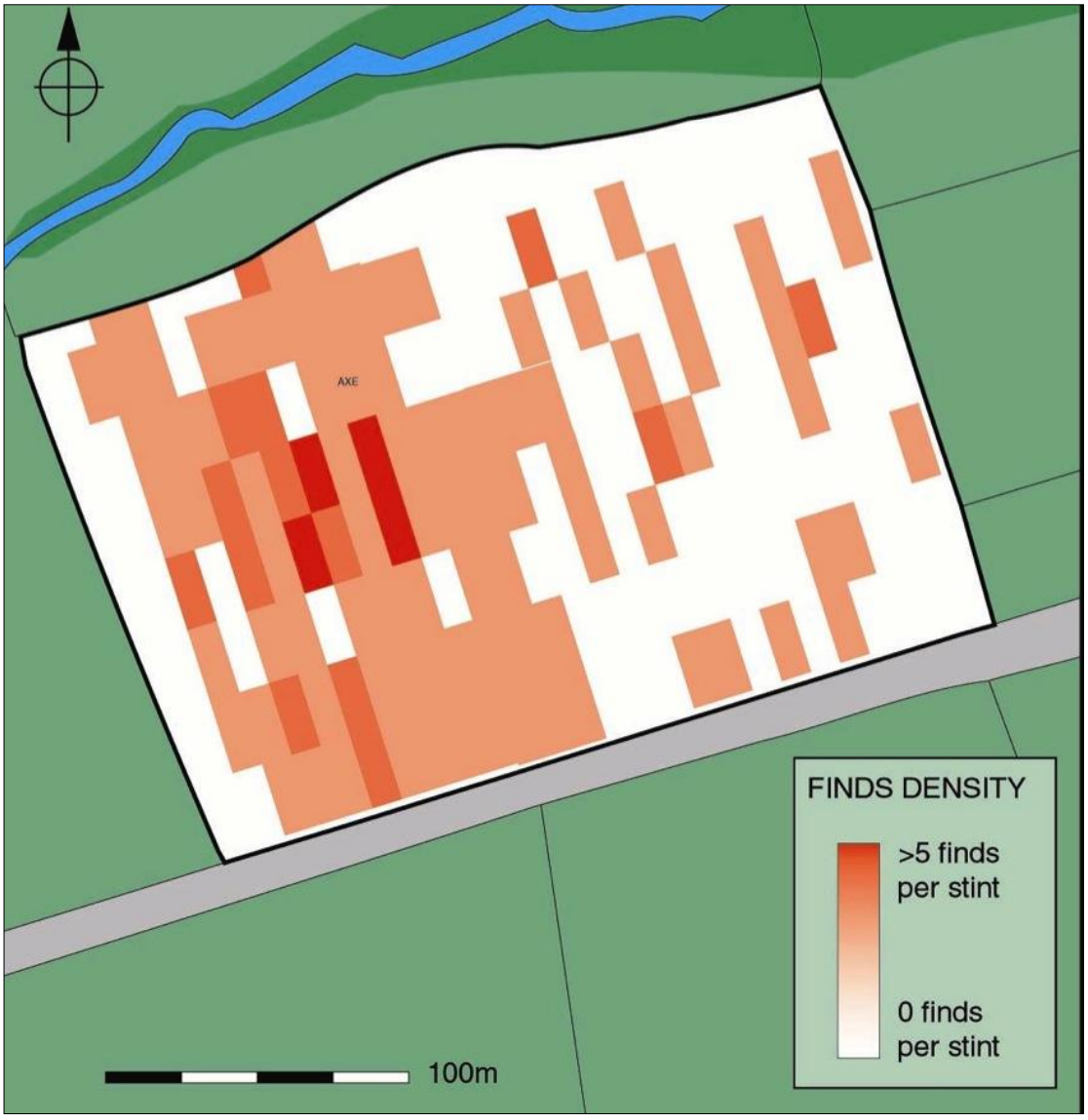


Figure 3: Plot showing the density of finds collected across a field surface.

Although surface collection survey is not presently a licensable activity in the same way as geophysical survey, this stands in place of a licence. The advice and direction of a professional archaeologist will be invaluable here as the way in which finds from a surface collection survey are processed is much the same as the way in which artefacts from any excavation are processed.

A range of materials will have been collected from lithics or chipped stone artefacts including flint, quartz, chert, and other stone types to more modern ceramic, glass, metal and brick. The finds are washed, numbered, catalogued and plotted on field maps, usually using GIS software.

Identification of scatters can take place once this has been done and interpretation of the material may then be made taking into account the densities of finds and how this varies across the landscape as well as the distribution of specific artefact types.

The assumption underlying this work is that the presence of a lithic scatter on the surface of a field is indicative of prehistoric settlement or work-related activity, not necessarily on that exact spot, but very close by. Rather than searching for ‘sties’, more

recent approaches look at the variation in density of collected material across a landscape as an indicator of the intensity of activity over time.

The presence of diagnostic artefacts can give broad indications of the dating of particular scatters while an analysis of the composition of the ploughzone assemblages can identify behaviours that were involved in their initial production. As has been mentioned already, lithic artefacts can belong to one of a series of stages in a sequence from initial collection through to eventual discard. Based on these observations, it has been established that a range of different activities can be recognised. Certain locations within the landscape mayhave been favoured above others for certain tasks. One of the problems in analysing scatters of material is that the distributions recorded are unlikely to represent just one episode or period of use of the landscape. Artefact deposition in a landscape is a cumulative process and particular locations tended to be either used continuously over long periods or reused on multiple occasions at intervals sometimes widely separated.

*Follow-up work*

Once all findspots have been mapped and scatters have been identified, it is possible to devise a programme of follow-up survey in order to generate additional complementary data to fine-tune interpretations. Various geophysical and geochemical methods can now be used on a targeted basis to try to identify subsurface features that might have been associated with the initial deposition of the material gathered during the collection survey.

Magnetic susceptibility used on a reconnaissance basis, i.e., with a transect spacing of around 10m, can be very informative. As is explained elsewhere, this technique identifies broad zones of enhancement caused by burning or the breakdown of other organic material associated with settlement. Areas of high lithics density which also show elevated levels of MS enhancement are possibly more likely to be areas of settlement as opposed to industrial areas or task-specific locations. MS survey is particularly suited to ploughzone situations as the ploughsoil, although disturbed, will retain its enhancement for some considerable time. As such, the technique will identify zones of enhancement rather than discrete artefacts, especially when used at a reconnaissance level to 5m to 10m transect spacing. Enhanced MS readings can suggest that the area may be prospective and that further geophysical survey using magnetic gradiometry and/or earth resistance might be worthwhile.

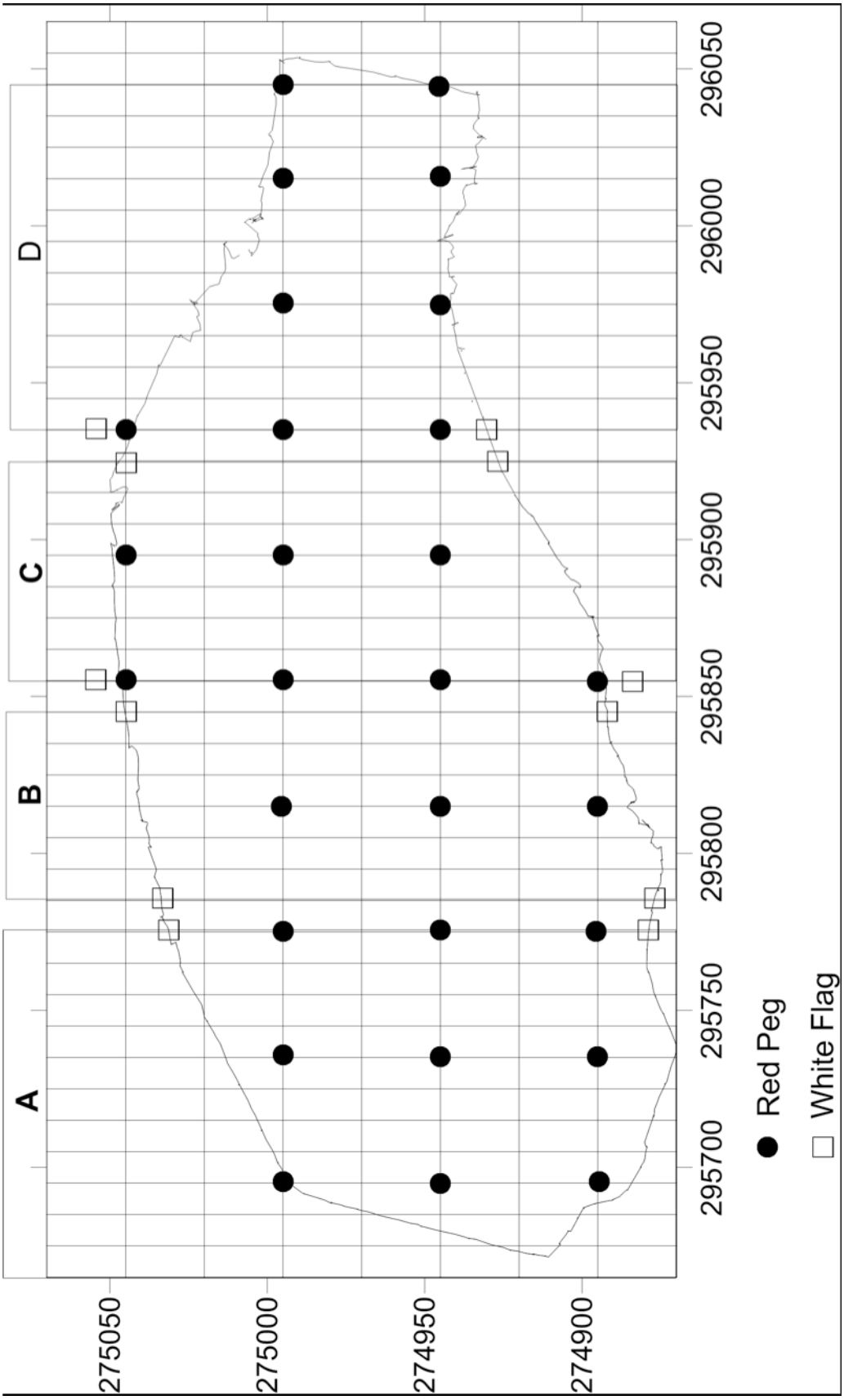


Figure 4: Irregularly shaped field showing grid laid out using surveying equipment, aligned to ING. Transect spacing 10m; stint length 25m.

Occasionally, there have been follow-up excavations of the ploughzone below an artefact scatter. This is usually carried out to establish the ration of surface finds to total finds within the ploughsoil and to examine the character of surface material relative to that within the rest of the ploughzone. Some studies have noted that certain size classes are disproportionately represented on the ploughsoil surface. Such approaches are often conducted using a test-pitting strategy and often include the use of sieves.

Some surveys have incorporated test-pitting strategies into their overall methodology to examine areas unavailable for surface collection survey or to compare artefact densities on the surface of a field with those within the ploughsoil generally. Others use this approach to examine the geomorphological processes at work within the study area to better understand the nature of the artefact distributions recorded.

**Conclusions**

Archaeological field walking is an ideal activity for community groups to get involved in. It is low-cost and rapid and produces excellent, useful information about past settlement and landuse for particular time periods. It is an ideal strategy that can be used as part of a larger-scale archaeological investigation of a particular area perhaps involving description and survey of known monuments, analysis of aerial photography, analysis of historical cartography, use of LiDAR coverage and archaeological geophysics. However, there are certain duties and responsibilities that go with the collection of archaeological material. Groups need to be clear about these responsibilities and whether there are financial implications before embarking on any projects. There is a particular need for a leader to take control of such a project to do whatever background research and organisation is required, manage the group and the activities in the field, oversee the processing and proper handling of the finds and appropriate reporting on the activity. Professional input and advice can be very useful in determining this.

Once these basic considerations are met, this can be an extremely informative exercise. Fieldwalking is an extremely useful tool in the armoury of the archaeologist and can be used to great effect to learn about prehistoric settlement at a landscape scale. The key challenge, as with all archaeological data, is the appropriate interpretation of the resulting distributions.

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