

BRACKEN RHIZOME RECORDING AND ASSESSMENT MANUAL
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On behalf of

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Background

This manual is to be used when assessing the impact of bracken rhizomes on archaeological deposits. Work at Teigncombe and Moistown between 1999 and 2011 has provided an insight into the variable character of bracken rhizomes and demonstrated the detrimental impact they are capable of having on archaeological information. Post-excavation analysis has allowed the development of an easy to use tool which enables rapid and accurate quantification of the intensity of damage at different sites and depths. The results of this research enable areas and types of site where bracken is a particular problem to be pin-pointed and therefore be prioritised for management solutions. The results of this work and acceptance of their validity will represent the culmination of the Dartmoor Archaeology and Bracken Project.

THE MANUAL

The methodology described below is designed to be used only to examine the character of a rhizome mat in situations where particularly sensitive or complex archaeological deposits are not believed to exist.

The technique is ideal for:

- Relict field systems
- Areas adjacent to structures

Select the area that you wish to assess

Clearly evidence of bracken infestation is essential, but you need to ask what information the proposed study area might yield about the archaeology and bracken that is being assessed. The primary aim of this technique is to efficiently collect information on rhizome impact without damaging particularly sensitive deposits. Care should therefore be taken to avoid interiors of buildings or other sensitive areas.

Assessing the rhizome damage in the study area

The field element of the assessment can be divided into 11 distinct stages. These should be followed in the following sequence:

Stage 1

Mark up a 1m square area. Define with string held in place by nails at each corner. The easiest way to set up a 1m square is by using a planning frame placed on the ground. The bracken fronds may need to be cut to allow placement of the frame, but ensure that a substantial length of stipe remains for later counting.



Stage 2

Count the number of bracken stipes within the study area, cutting them out as you go. As a double check retain the stipes and re-count. Agree the final number and record.



Stage 3

Set up dumpy level

Pick a nearby stone or other fixed point and use as back-sight. A nominal height of 10m for the back sight should be used if a true Ordnance Survey reading is not available.



Stage 4

Carefully remove the turf and topsoil. The turf should be removed with a spade and the very thin turfs placed together on a plastic sheet in the configuration of how it came out. There is no need to recover or record any rhizomes that may be in the turf.



Stage 5

Excavate the topsoil with trowels. Remove and measure any rhizomes encountered. Where rhizomes pass into the edges of the trench they should be cut off about 1cm from the edge. Even the short lengths of rhizomes removed during this trimming should be retained and measured. Any finds recovered should be recorded three dimensionally.



Stage 6

Excavate in approximately 4cm deep spits through the next layer being careful not to remove the underlying layer in the process. Remove and measure any rhizome encountered. The rhizomes may be measured as work proceeds or at the end. The crucial figure is the total length. All parts of the rhizome including any off-shoots should be measured. Information on the depth will be recovered from the sections.



Stage 7

Repeat this process until either: bedrock is encountered; no further rhizomes are found or the pit becomes too deep to dig any further. To ensure that all the rhizomes are recovered the pit should if possible be extend for at least 5cms below the depth of the deepest rhizome.



Using a mattock to remove the final 5cms.

Stage 8

Clean up the edges of the pit and photograph each face. Place a small ranging rod vertically on the right side of the face being photographed.



Stage 9

Record the sections showing all the visible layers, stones and rhizomes. A scale of 1:10 should be used and each section labelled with grid references, the direction it faces and the height of the horizontal line used for the drawing. Rhizomes should be drawn as solid thick lines or circles.



Stage 10

Check that all the information you have collected is together in one place and that nothing is missing. Sounds obvious but it so easy to overlook the paperwork.

Stage 11

Backfill ensuring that everything is returned in the proper order.



Post Excavation

This should be completed as soon as possible after the excavation and it may be possible to do some elements on site on the day. The tasks that need to be completed are:

Task 1

Scan all the paperwork.

Task 2

Calculate the total lengths of rhizome recovered.

Task 3

Produce inked versions of the sections.

Task 4

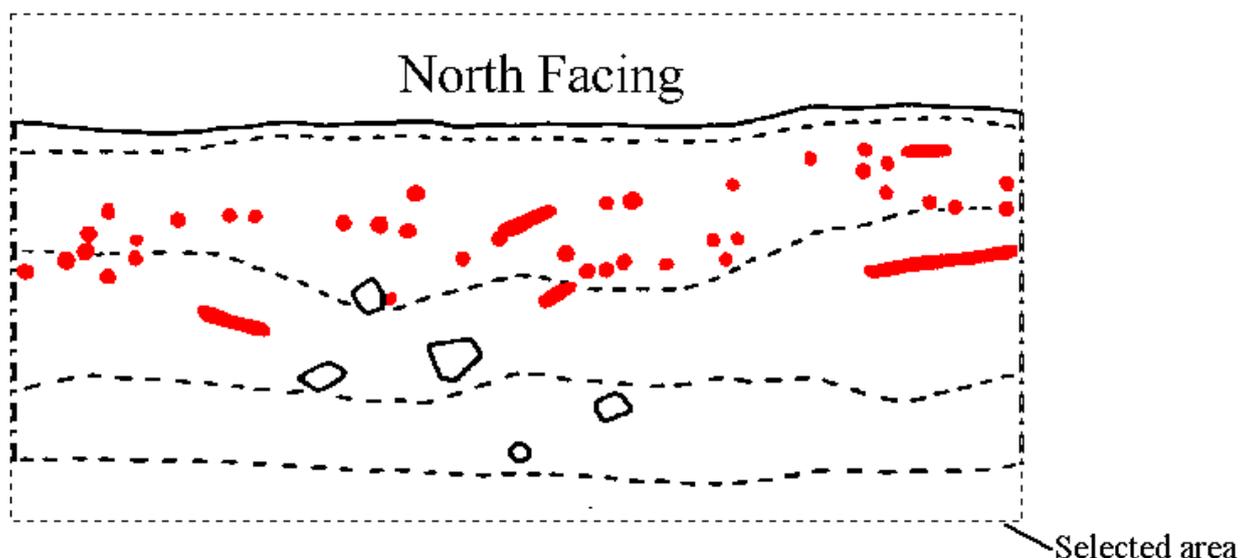
Scan the section drawings and create a final version of the drawing. To highlight the rhizomes it is useful to present them in a different colour. Red works well.

Task 5

Calculate the displacement of bracken. This task is carried out by measuring the position of each rhizome relative to the interface between the topsoil and the next layer. The results are plotted onto a spread sheet and a graph generated which shows the percentage of displacement at each 1cm vertical interval.

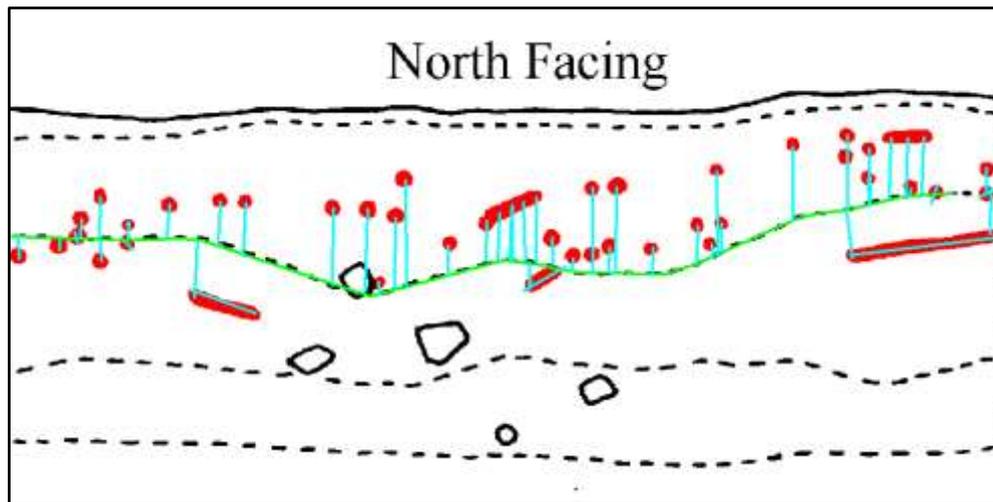
The methodology employed to carry out this final stage of the assessment is as follows:

- Open the digital copy of the completed section drawing.
- Select one face of the pit ensuring that the left and right hand sides of the selection coincide with the section edges.



- Copy the selection and paste into a new drawing
- Resize the drawing so that the total width is now 1000 pixels.
- Save

- You now have a scaled section drawing where the 1 pixels represents 1mm or 10 pixels represent 1cm
- Repeat this process for all four sections.
- Open each scaled drawing in turn and add a line in green to denote the position of the interface between the topsoil and the next layer.
- The vertical distance between the green line and every recorded rhizome is measured and recorded. The pixel measurement recorder that most raster software has will make this task easy.



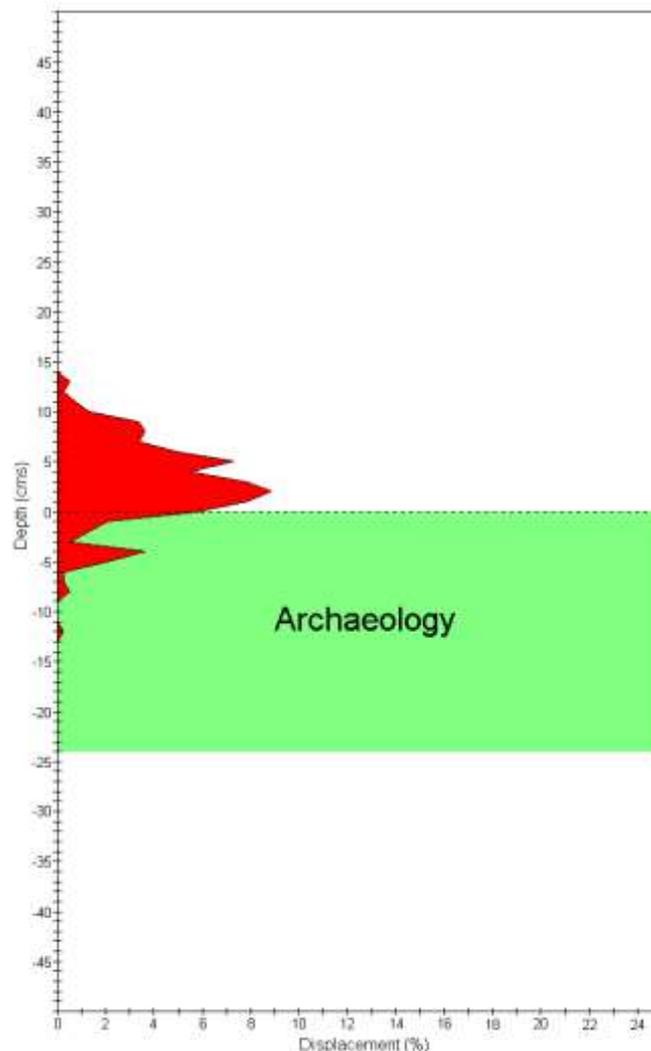
The light blue lines were created during the measuring process and ensure that each rhizome is measured only once.

- The measurements are recorded on a sheet of paper. It is appropriate to assume that the average diameter of each rhizome is 1cm and this makes the recording process much easier. A printed pro-forma along the lines presented below may be helpful.

Distance	No. of rhizomes	Total
5	111111	6
4	1111	4
3	1111111	7
2	11111	5
1	111	3
0	1111	4
-1	11111	5
-2	11	2
-3		0
-4	11	2

- This process is repeated for each section and the totals added together to provide a single figure for each 1cm band relative to the green line in each pit.

- These figures are then added to a spread sheet. The final figure of percentage displacement is calculated by dividing the total figure by 4 to take into account the fact that four 1m long sections have contributed to the final figures.
- The spread sheet will provide detailed information on the degree of displacement at each level above and below the selected interface. This information is most easily appreciated as a graph which allows rapid visual appreciation of the likely extent of rhizome damage and the position where it is at its greatest.



Interpreting the evidence

The example above clearly shows that the greatest rhizome displacement is happening a few centimetres above the top of the archaeological layer. This is good news in the sense that most of the damage is confined to the disturbed topsoil, however this work also illustrates that the archaeological layer is also being damaged and that therefore positive management to remove the bracken should be considered. The degree of damage to the archaeological layer is a maximum of about 4% and depending on other factors this may be considered acceptable or not. This technique could also be used to examine whether the amount of displacement is increasing or decreasing. Pits excavated in the same area over a period of time could be used to assess whether a problem is getting worse or improving. As part of the recording exercise in Stage 2 the number of bracken stipes within the 1m square were recorded. The reason for this is to try and establish whether there is a

correlation between the number of stipes and length of rhizomes. This is important because should it ever be possible to accurately estimate the length of rhizomes from surface indications alone then it may in future be possible to assess the likely impact without the need to carry out damaging excavation. To date, a broad correlation, has as one would expect, been identified suggesting that the more stipes there are the greater the percentage of displacement in archaeological layers. This result is however based on a relatively small number of interventions and further work is required to be able to quantify the correlation and allow reasonably accurate predictions to be made.

At this stage it is not known what percentage of displacement is acceptable or critical. The work to date has demonstrated that wherever bracken is present there is some degree of rhizome penetration into the archaeological layers and that damage is therefore happening. The degree of displacement does vary considerably as will the sensitivity of the archaeological layers being affected. Again further work should enable more precise quantification of the true character of totally unacceptable levels of displacement.

Conclusion

This bracken rhizome assessment tool allows quantification of the impact of bracken rhizomes on archaeological deposits. It does not however provide a definitive answer on how or even if intervention would be appropriate. Positive management of archaeological sites is a complex matter and bracken can often be one of a series of conflicting issues. The use of this assessment methodology will at least mean that future decisions can be taken within the context of a better appreciation of the actual level of damage being caused. On larger sites a series of pits scattered through the area may highlight areas where positive management of bracken would provide the best results. Indeed the possibilities are endless and with use it may be possible to more accurately determine the threshold at which a management response is not only desirable but essential.

Further Reading

The best source of further information related to this work is to be found on the ACE website:

<http://www.acearch.org.uk/brackenproject.htm>

The most pertinent article is the “Bracken Rhizome Damage Assessment Report” and this should be read in conjunction with this manual.

Contact us

If you have any specific questions please do not hesitate to contact us at:

<mailto:ace@acearch.org.uk>