Heat retainer hearth identification as a component of archaeological survey

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Surface artefact scatters are almost always associated with the remains of one or more heat-retainer hearths, or earth ovens, where the charcoal from long-ago cooking fires may be preserved beneath a capping of fire-cracked rock. The rocks once lined a fire pit in which food was buried and cooked, but over the centuries, erosion has removed the topsoil, leaving the clusters of stones as a protective cap. Hearths provide a means of developing a chronology for Indigenous occupation, via radiocarbon dating of charcoal (e.g. Holdaway et al. 2002, 2005, in press). They are the most recognisable indicator of Indigenous occupation in the past, they are an important part of Indigenous cultural heritage, and they are on a one-way trip to oblivion due to erosion. It is critical, therefore, that we seek to understand as much as we can about how they were constructed, how they were used and reused, when they were used and when they were not. To do that, however, hearth identification and recording needs to be consistent and objective. The Western NSW Archaeology Program (WNSWAP) has developed a method which addresses these issues.

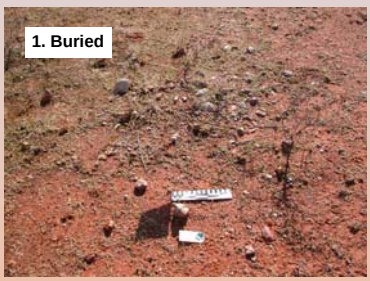
Remnant hearth on hard scald surface near Rutherfords Creek

WNSWAP Hearth Survey Protocol

1. Intensive systematic pedestrian survey
2. Potential hearths flagged
3. Temporary tag with a database number
4. Fluxgate gradiometer test
5. Attributes recorded
   - Location (DGPS)
   - Width, length, orientation (for AHIMS)
   - Number and lithology of hearthstones
   - Visible charcoal
   - Condition assessment
6. Digital image

Buried hearth exposed by bank erosion

Hearth condition: six categories based on visual assessment of degree of disturbance by erosion.



1. Buried

2. Partially exposed

3. Intact

4. Disturbed

5. Remnant

6. Scattered

Using a fluxgate gradiometer to test hearth identification and condition assessment

Hearth condition	Number	Proportion
Buried	3	1%
Partially exposed	179	43%
Intact	55	13%
Disturbed	96	23%
Remnant	20	5%
Scattered	62	15%
Total	415	100%

Table 1: Rutherfords Creek 2005 survey - heath condition

- Buried hearths are relatively few because they are only those visible at surface: how can we determine the true number?
- Scattered and remnant hearths: how can we test if they are really hearths?

Fluxgate gradiometer FM36 used in survey mode

- Calibrate and zero locally
- Take readings on N-S transect that crosses potential hearth
- Accept or reject on basis of difference between background and hearth readings: threshold = ±5 nT
- Record attributes of accepted hearths only: might be an underestimate but *never* an overestimate of true number

Hearth condition	Pearson	N	P	Spearman	N	P
Partially exposed	0.4	179	**<0.01**	0.17	179	**0.03**
Intact	0.35	55	**0.01**	0.42	55	**<0.01**
Disturbed	0.23	96	**0.03**	0.24	96	0.2
Remnant	0.27	20	0.24	0.48	20	**0.03**
Scattered	0.38	62	0.77	0.54	62	0.68

Table 2: Parametric and non-parametric test results showing degree of correlation between hearth condition and gradiometer reading (significant results are in bold type).

- Correlation between hearth condition and magnitude of gradiometer reading.
- Clearest for 'partially exposed', 'intact' and 'disturbed' hearths.
- This is consistent with predictions.

References

Holdaway SJ, Fanning PC & Littleton J. (in press) Assessing the frequency distribution of radiocarbon determinations from the archaeological record of the late Holocene in western NSW, Australia. *In* A. Fairbairn & S. O'Connor (Eds.) Australasian Archaeometry Conference 2005 Proceedings. Pandanus Press, Canberra.

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