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## **The Eastern Vale of Glamorgan Palaeoenvironmental Resource Assessment Project: Summary Report**

Tudur Davies, University of Sheffield

Oliver Davis, Cardiff University

Andy Seaman, Canterbury Christ Church University

### **Project Background**

The Eastern Vale of Glamorgan Palaeoenvironmental Resource Assessment Project arose out of a collaboration between ongoing research projects focused upon Caerau Neolithic Causewayed Camp, Iron Age hillfort and Norman ringwork (Davis, Sharples, and Wyatt 2014), and Dinas Powys early medieval promontory fort (Lane and Seaman 2013). Whilst these nationally significant sites lie within just 7km of each other (as do a number of other important sites including Llandough Roman villa and early medieval cemetery, and the medieval settlement at Cosmeston) very little is known about their wider landscape contexts. A multi-period collaborative 'environs project' was therefore formulated, focused on elucidating patterns of settlement and land-use in the eastern Vale of Glamorgan. It soon became evident, however, that the particular nature of the archaeological record in the Vale would preclude the realization of such a project through the application of the traditional techniques of landscape archaeology (field walking, aerial photograph, test pitting etc.). An alternative approach to establishing the wider context of our sites was therefore required. On the basis of a small number of comparable studies, most notably that undertaken by Rippon and Fyfe (2004) on the upland fringe of Dartmoor and Tudur Davies (Forthcoming) in Gwynedd, a research methodology based upon intensive pollen analysis of lowland waterlogged sites was identified as a potentially effective strategy. Such a project would not only dramatically improve our understanding of the wider context of the sites in the Vale, but the emphasis on examining spatial variation in land use through the analysis of lowland sampling sites represents a major innovation in palaeoenvironmental research methodology, which has hitherto concentrated largely on upland sampling sites with regional pollen catchments. A project of this scale would require considerable resources however, and its success would be dependent upon identifying sampling sites which offered suitable preservation of pollen, suitable temporal coverage of pollen sequences, and a suitable spatial distribution of sampling sites across the eastern Vale. It was therefore decided that a pilot project was needed in order to test the validity of our methodology, and establish the potential of and capacity for a larger project.

### **Aims and Objectives**

The aims of this project were to establish the potential of and capacity for a multi-period paleo-environmental centred landscape archaeology project focused on the landscapes of the eastern Vale of Glamorgan. This was achieved via a resource assessment exercise which undertook the following tasks:

1. Identify and sample potential pollen sites in the eastern Vale of Glamorgan and southern edge of the Glamorgan uplands;
2. Establish levels of pollen preservation; and, should suitable samples be identified:
3. Establish the temporal limits of pollen sequences.

### Field Prospection

The project team devised a two stage approach to identifying potential pollen sites; in the first stage potential waterlogged sampling sites were identified through a desktop assessment of modern and historic Ordnance Survey maps, geology maps, and historic aerial photography. In a short space of time were able to identify 35 potential sampling sites through this method. The second stage was ground reconnaissance, consisting of a site visit and depth probing survey using a window sampler and steel rods. The aim was to record the depth and characteristics of sediments at regular intervals along transects crossing the site, and hopefully identify locations suitable for full sampling with a Russian corer. Fieldwork was undertaken during 18 days in August 2014, during which time twenty of the sites were examined. Several of these sites were found to have been heavily disturbed or did not possess suitable deposits for sampling. Indeed, a small number had been destroyed in recent years. Nevertheless, six sites were identified as being worthy of sampling for further analysis in the laboratory. An additional sample was collected from a possible palaeosol located beneath the banks of the Tyn y Coed earthwork (immediately adjacent to the Dinas Powys promontory fort) to assess the potential for archaeological samples to provide localised pollen signatures (see table 1 and Figure 1). Once collected, cores were placed in cold storage at the University of Sheffield ahead of the laboratory assessment of pollen preservation.

**Table 1: Suitable sampling locations.**

Sampling site	NGR	Sampling site type
Cog Moors 1	ST 1581 6940	Off site
Erw y Delyn farm 2	ST 1670 7155	Off site
Garn 1	ST 1259 7144	Off site
Nant yr Argae 1	ST 1307 7170	Off site
Wrinstone Farm 1	ST 1362 7262	Off site
Cosmeston 1	ST 1759 6895	Off site
Tyn y Coed 1	ST 1759 6895	Archaeological site

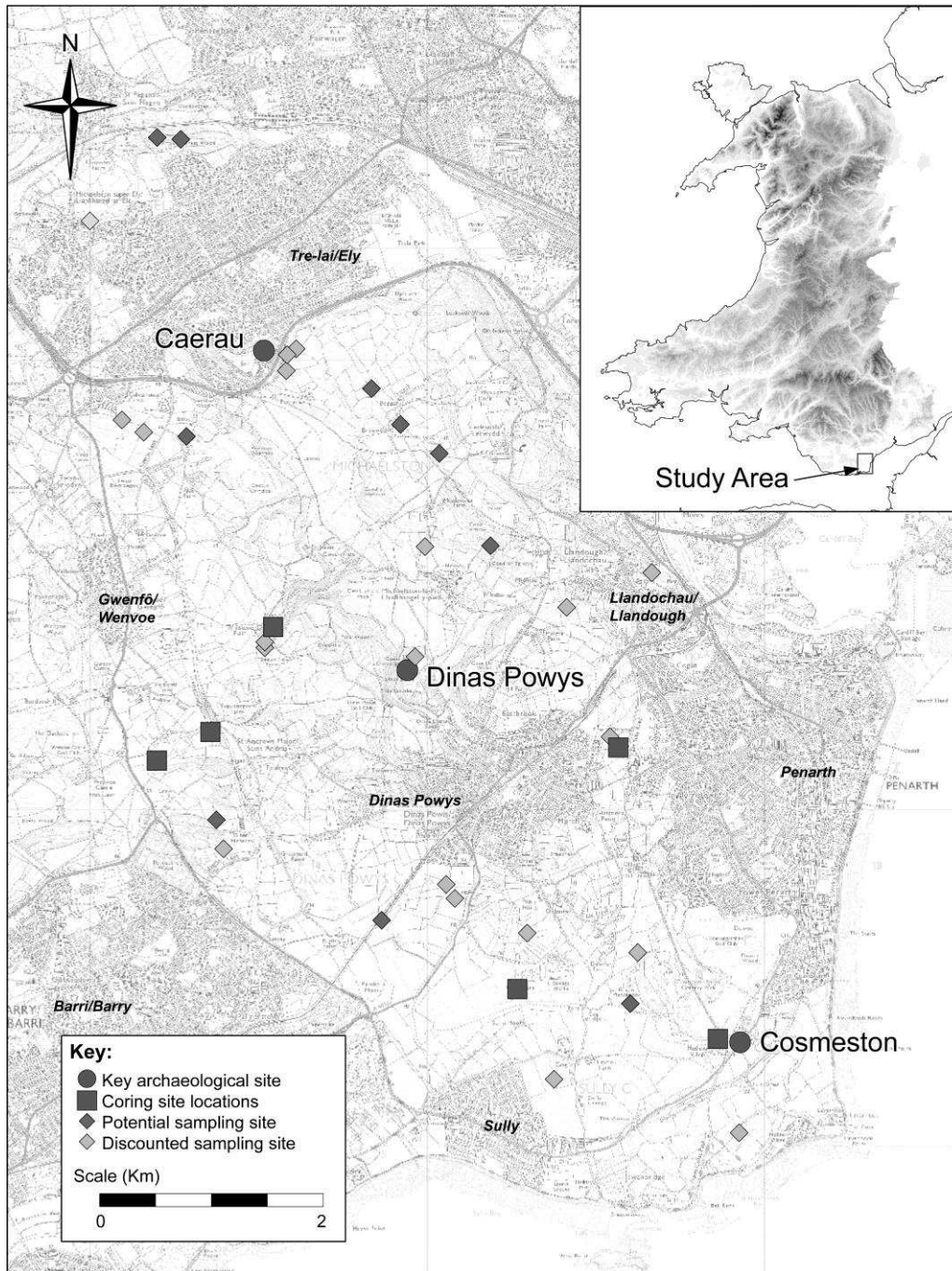


Figure 1: Sampling sites in the Eastern Vale (© Crown Copyright and Database Right 2015. Ordnance Survey (Digimap Licence)).

### Laboratory Analysis

The laboratory analysis of pollen preservation was undertaken by Tudur Davies at Sheffield University, and a full report detailing the findings has been prepared (Davies 2014). A total of eight sub-samples from the environmental cores were assessed for pollen preservation; these included a single sample from the base of each core to establish the preservation conditions of that site, and two additional samples from the site of Wrinstone Farm 1. The two additional samples from Wrinstone Farm 1 were assessed to ascertain the variability in pollen preservation within the core. Wrinstone Farm 1 was selected for this purpose as it

was located relatively centrally to the study area, and field observations noted that it might potentially be one of the cores most affected by drainage schemes.

With the exception the samples examined from the archaeological site of Tyn y Coed, all samples examined showed excellent pollen preservation. This was demonstrated by the relatively high pollen concentration values and the large diversity of pollen types (including those more susceptible to decay – e.g. *Salix* and *Quercus*). No pollen was identified within the sub-sample of the core from Tyn y Coed. Upon comparison of the three samples from Wrinstone Farm, it was clear that the upper samples showed little variation in preservation conditions between the upper and lower sections of the core. The upper sediments of the core did show reduced pollen concentration values in comparison with the lowest sample, but this could be easily be accounted for by differences in sediment composition between these samples.

Whilst this level of analysis precludes us from making detailed comment on the environments surrounding each sampling site, we can note that each ‘off site’ sampling site has a relatively high charcoal concentration value and several pollen and spore types indicative of anthropogenic activity, including Cereal-type pollen, *Anthemis*, *Chenopodiaceae*, *Plantago lanceolata*, *Rumex* (various types), *Urtica docia* and *Pteridium aquilinum*. It is therefore clear that these cores contain a useful record of human-environment interaction surrounding their sampling locations.

Given the excellent state of preservation of the pollen within all ‘off-site’ cores collected during the fieldwork, it is recommended that further analysis of the cores would yield a considerable amount of valuable data. The presence of several pollen types indicative of anthropogenic activity make these cores especially valuable to examining variability in land use practices undertaken by the inhabitants surrounding the sampling sites. No further palynological analysis was recommended for the samples collected from the potential palaeosols from the Tyn y Coed excavations however.

The presence Cereal type pollen and other arable indicators suggest that the cores are Neolithic or later, but absolute dating was required to establish whether the cores cover date ranges which are relevant the archaeological sites we are investigating. As the samples from Cog Moors, Erw y Delyn, Wrinstone farm and Nant yr Argae have peaty deposits suitable for radiocarbon dating, funds were sought for an AMS date from the base of each of these cores. An additional date from the top of the peat deposit at Wrinstone farm was obtained in order to establish the full date range and accumulation rate of the peat deposit. The results of the dating exercise are presented in table 2.

**Table 2: Samples submitted for radiocarbon dating.**

Site	Depth (cm)	C14 age	Error	Cal date (2 sigma)	Lab reference
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Cog Moors	203-204	3985	30	2572-2464 Cal. BC	UBA-27797
Erw y Delyn farm	93-94	569	25	Cal. AD 1309-1419	UBA-27798
Wrinstone farm	180-181	5870	49	4846-4600 Cal. BC	UBA-27799
Wrinstone farm	145-146	6792	45	5740-5625 Cal. BC	UBA-27800
Nant yr Argae	109-110	2495	28	773-518 Cal. BC	UBA-27801

The radiocarbon dating analysis has confirmed that the cores are very likely to cover the periods covered by the key sites in the eastern Vale of Glamorgan. There is, however, a date inversion in the Wrinstone farm core, suggesting that older material is eroding within the site's catchment whilst this deposit was accumulating. Further analysis of this core may have to use alternative dating methods to verify its chronology (e.g. Optically Stimulated Luminescence (OSL) dating, or geosecular magnetic variation dating).

### **Results and Future Work**

We have been able to locate sample sites which provide a suitable coverage of the study area, and identify cores with levels of preservation and chronological limits which are suitable for the purposes of a multi-period palaeoenvironmental environs project focused on the eastern Vale of Glamorgan. In the process of doing this we have also developed and tested a new research methodology, and collected pollen cores from an area which has not been subject to previous palynological research. Given the limited scale and resources of the project we have only investigated a portion of the potential sampling sites. We can conclude, therefore, that there is both the potential and capacity for a full-scale project undertaking a detailed palaeo-environmental examination of the study area. We are now in the process of working on the development of that project, which we anticipate will focus upon the full analysis of around twelve pollen cores from an area defined by the rivers Ely and Thaw. It is hoped that this project will pave the way for a number of additional projects aimed at elucidating patterns of settlement and land-use in the eastern Vale between later prehistory and the end of the middle ages. Such projects may include the creation of a comprehensive aerial photography database, a programme of field survey including geophysics, and a programme of radiocarbon dating of material from old excavations.

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