### PROGRESS REPORT FOR AINGRA05122

**PROJECT TITLE**  
Archaeological sequences versus past fire activity: elucidation of the humans, climate, fire nexus

**INVESTIGATOR(S)**  
Chief Investigator: Dr Scott Mooney  
Institution and Department: Biological, Earth & Enviro Sciences, The University of New South Wales  
Other Investigators: Dr Val Attenbrow, Anthropology, Australian Museum, Sydney.  
Dr Johan Kamminga, National Heritage Consultants, Canberra, ACT.  
This proposal does not require students to be supervised by ANSTO staff. The proposal requests AMS ^14C dating only, using relatively straightforward materials.

**Students**  
This project is likely to involve one or more Honours students at UNSW.  
Mr Manu Black, a PhD candidate at UNSW is likely to be involved in the project.

**ANSTO Investigators**  
Dr Ugo Zoppi

### SCIENTIFIC OBJECTIVES

Contemporary research is often directed towards unravelling the relative contribution of ‘natural’ and anthropogenic processes: this project aims to address whether Holocene fire activity at two locations in humid eastern Australia can be better related to humans or climate (and climate change). In Australia pre-European fire is often related to Aboriginal activity (e.g. fire stick farming) however recent research by the CI suggests that climate is the dominant control. Here I propose to quantify fire (charcoal) and vegetation (as a proxy for climate using palynology) at two locations and to compare this to nearby archaeological sequences. It is proposed that ANSTO’s expertise in AMS 14C dating will provide the chronology for the sediments and archaeological materials. This research seeks to understand past fire and to apply any insights to contemporary/future management of fire-prone environments.

### PROGRESS REPORT and RESEARCH OUTCOMES

This project requested 13 AMS C-14 dates to determine the chronology of sediments for two projects with similar aims, located at Capertee and Broughton Island. As AINSE Grant 05/122 awarded 8 AMS C-14 analyses it was decided to concentrate on one of these projects (Capertee) and hence this report only concerns this work.

The AINSE grant was submitted at a time when a student had expressed interest in a PhD to investigate the objectives as enunciated above. This student subsequently deferred (and still is) such that sampling of the sediment sequence was not undertaken until January 2006. C-14 samples were submitted in February 2006 and I personally did the preliminary pre-treatment of the samples in April, 2006. Due to a backlog of samples the C-14 targets were not analysed until mid-2006 and I received final results in October, 2006.

The submitted sediment samples were obtained from three d-section cores (QS, QS2 and QS3) recovered from a Gymnoschoenus sedge swamp at 665 m asl. (These dates supplemented previous standard C-14 dates from the QS core.) Unfortunately, the chronology from these 3x cores is less than clear with age-reversals and a lack of consistency between them.
Despite these problems, the results (Fig. 1) have some significance. As an example of this, the sample from ~315 cm in core QS returned an age of 15,770 ±110 (OZI702) which is one of the oldest peat samples yet analysed in the Blue Mountains. The chronology of the other core locations (QS2, QS3) confirms that peat was accumulating at the site before the Holocene.

Figure 1. The chronology of sediments at Queens Swamp.

\[
y = 42.965x - 55
\]

\[R^2 = 0.8396\]

Detailed macroscopic charcoal work has been completed for the three cores (QS, QS2, QS3). The results for QS3 are shown in Fig. 2.

Figure 2. The results of the charcoal analyses of core QS3, showing charcoal quantified as an area (mm\(^2/cm^3\)) and as a count (no./cm\(^3\)) against depth in the core.

The work on Queens Swamp is ongoing, and as an example of work to do, no palynology has been completed. The work is included in a background summary for a current ARC Discovery Project Grant and forms a case study in several forthcoming conference presentations, including at the 2007 INQUA conference.
PUBLICATIONS / REPORTS arising as a result of your work.

No publications have resulted from this work to date, but I’d note again that the final results were only available in October, 2006.

Presentations:


PhD STUDENTS

Although one PhD student is involved in this project she has deferred and may not be involved in future.