

# Characterizing Environmental Change and Species' Histories from Stratified Faunal Records in Southeastern Australia: A Regional Review and a Case Study for the Early to Middle Holocene

FENJA THEDEN-RINGL<sup>1,2</sup>, GEOFFREY S. HOPE<sup>1</sup> ,  
KATHLEEN P. HISLOP<sup>3</sup> , AND BENEDICT J. KEANEY<sup>1</sup>

<sup>1</sup> Archaeology and Natural History, College of Asia & the Pacific,  
The Australian National University, Canberra ACT 0200, Australia

<sup>2</sup> Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage,  
The Australian National University, Canberra ACT 0200, Australia

<sup>3</sup> School of Archaeology and Anthropology, College of Arts & Social Sciences,  
The Australian National University, Canberra ACT 0200, Australia

**ABSTRACT.** We explore the potential contribution of faunal assemblages from the Australian Alps and surrounding regions towards the characterization of climate and landscape change, and for geo-chronological species distribution mapping. The limitations of existing faunal sites and collections—their rarity, their stratigraphic integrity and resolution, and accurate dating of their histories—are discussed in a regional review of known and potential assemblages and locations. We also revisit a faunal sequence from a stratified cave deposit at Wee Jasper, focusing on a Holocene “climatic optimum” phase. A suite of species fluctuations between 8000 and 6000 cal. BP suggests responses to local changes such as a warmer and possibly moister environment, with probable associated vegetation shifts. For example, eucalypt forests had replaced more open communities across the region by 8600 cal. BP, and were generally dominant until after 6000 cal. BP. Several faunal species are examined in a regional context using available chronologically defined species histories. Emerging robust multi-proxy investigations demonstrate the potential of faunal assemblages for the development of geographically detailed histories of species that can provide indications of palaeoenvironments. This approach can be strengthened by increasing resolution and developing improved age models in presently known fauna-bearing sites.

## Introduction

Many natural archives in south-eastern (SE) Australia, including fluvial, alluvial, peat, and lake records, have for decades contributed stratified layers with inclusions such as dust, charcoal, pollen, and other environmental

components to act as proxy records for the reconstruction of palaeoenvironmental conditions since the Last Glacial Maximum (LGM) (e.g., Costin, 1972; Dodson *et al.*, 1994; Eriksson *et al.*, 2006; Kemp & Hope, 2014; Marx *et al.*, 2009, 2011; Stanley & DeDeckker, 2002). In contrast, the contribution of faunal assemblages to inform our

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**Corresponding author:** Fenja Theden-Ringl [fenja.theden-ringl@anu.edu.au](mailto:fenja.theden-ringl@anu.edu.au)

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