

Late Quaternary Fossil Vertebrates of the Broken River Karst Area, Northern Queensland, Australia

GILBERT J. PRICE¹ , JONATHAN CRAMB¹ , JULIEN LOUYS² , KENNY J. TRAVOUILLO³ ,
ELEANOR M. A. PEASE¹ , YUE-XING FENG¹ , JIAN-XIN ZHAO¹ , AND DOUGLAS IRVIN⁴

¹ School of Earth and Environmental Science, The University of Queensland, Brisbane Qld 4072, Australia

² Australian Research Centre for Human Evolution, Griffith University, Brisbane Qld 4111, Australia

³ Western Australian Museum, Locked Bag 49, Welshpool DC WA 6986, Australia

⁴ Hills Speleology Club Limited, Sydney, Australia

ABSTRACT. Two new fossil deposits from caves of the Broken River area, northeast Queensland, provide the first regional records of vertebrate species turnover and extinction through the late Quaternary. Fossil assemblages from Big Ho and Beehive Caves are dominated by small-bodied vertebrates, especially mammals. They represent owl roost deposits, although limited presence of larger-bodied taxa such as macropodids may be the result of occasional pitfall trapping. U-series dating demonstrates that Big Ho dates to the penultimate glacial cycle (c. 165 ka) and Beehive to the early Holocene (c. 8.5 ka). A total of 34 mammalian taxa were identified; within the two deposits, seven taxa are unique to Big Ho and another seven are found only in Beehive. The deposits also preserve five extinct fossil taxa (bandicoots and rodents) that add to a growing list of small-bodied species known to have suffered extinction in the late Quaternary. The deposits further yield the remains of four species of bandicoots and rodents (*Chaeropus yirratji*, *Notomys longicaudatus*, *Conilurus albipes*, and *Pseudomys gouldii*) that suffered extinction post-European colonization. These new fossil records represent significant increases in the known geographic and temporal range of several species and begin to fill an important gap in our understanding of the faunal history of tropical northeast Australia.

Introduction

Modern Australian ecosystems emerged during the Quaternary under a backdrop of major fluctuations in atmospheric carbon dioxide concentration, sea levels, and temperature, with a long-term trend towards progressively drier climates (Martin, 2006; Kershaw *et al.*, 2003; Price, 2013). The period was marked not only by significant evolutionary events, but also major extinctions and geographic range shifts of many flora and fauna (e.g., Kershaw, 1994; Jordan *et al.*, 1995; Reed & Bourne, 2000,

2009; Hocknull *et al.*, 2007; Prideaux *et al.*, 2007; Price, 2012; Price *et al.*, 2005; Black *et al.*, 2014). Today, at a time of widespread awareness over detrimental anthropogenic and climatic impacts on Australian ecosystems, it has become critical to understand the history of ecosystem origins and responses to similar past events. The Quaternary fossil record has a significant role to play in yielding that crucial information (Reisinger *et al.*, 2014).

While many vertebrate fossil deposits of Quaternary age have been recognized in Australia, the record is patchy and geographic coverage is strongly biased towards southern

Keywords: Quaternary; Pleistocene; mammal; marsupial; extinction; range shifts

Corresponding author: Gilbert J. Price g.price1@uq.edu.au

Received: 3 February 2020 **Accepted:** 27 August 2020 **Published:** 25 November 2020 (in print and online simultaneously)

Publisher: The Australian Museum, Sydney, Australia (a statutory authority of, and principally funded by, the NSW State Government)

Citation: Price, Gilbert J., Jonathan Cramb, Julien Louys, Kenny J. Travouillon, Eleanor M. A. Pease, Yue-xing Feng, Jian-xin Zhao, and Douglas Irvin. 2020. Late Quaternary fossil vertebrates of the Broken River karst area, northern Queensland, Australia. In *Papers in Honour of Ken Aplin*, ed. Julien Louys, Sue O'Connor, and Kristofer M. Helgen. *Records of the Australian Museum* 72(5): 193–206.
<https://doi.org/10.3853/j.2201-4349.72.2020.1723>

Copyright: © 2020 Price, Cramb, Louys, Travouillon, Pease, Feng, Zhao, Irvin. This is an open access article licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original authors and source are credited.

