



**Australian Government**  
**Geoscience Australia**  
**National Water Commission**

# WASANT PALAEOVALLEY MAP

SCALE 1:4 500 000

MERCATOR PROJECTION

Central Meridian: 126°E Standard Parallel: 26°S

Geocentric Datum of Australia

**PREFACE:**  
This map of paleo-valleys in arid and semi-arid parts of Western Australia (WA), South Australia (SA) and the Northern Territory (NT), shows the interpreted distribution of paleo-valleys including those obscured beneath desert dunefields. The map extent is defined by the Köppen-Geiger classification of arid and semi-arid zones of WA, SA and NT (Figure 1). This map was produced as part of the 'Water for Australia's arid zone – identifying and assessing Australia's paleo-valley groundwater resources project' (termed the 'Paleo-valley Groundwater Project') that was funded by the National Water Commission (NWC) and led by Geoscience Australia, with support from respective state and territory government agencies. The four-year project (2008-2012) aimed to provide information about the role of paleo-valleys as aquifers in widespread regions where groundwater resources are scarce or need to be investigated for the future.

**EXPLANATORY NOTES:**  
The map was compiled using national-scale datasets (including Digital Elevation Models and geological maps), existing geoscientific data and reports in combination with expert knowledge. New information was obtained through demonstration studies in selected sites (Figure 2); examples of paleo-valley cross sections from these sites are shown on the left-hand column of the map. The methodology used to produce the map is described in the companion project summary report by English et al. (2012), cited below. This broad-scale map is intended to enhance our knowledge of Australian arid zone paleo-valleys as widespread but little understood geologic elements and potentially contribute to an improved understanding of paleo-valley aquifers. The paleo-valleys shown on the map do not necessarily correspond with underlying groundwater resources or indicate prospective borehole sites. Rather, the map serves as a guide for more detailed future hydrogeological investigation in areas of interest.

**CROSS SECTION NOTES:**  
1. Examples of cross sections shown in the left-hand column illustrate the heterogeneity and complexity (in terms of size, shape, structure and sediment infill) of paleo-valleys within the arid and semi-arid zone.  
2. Most paleo-valleys shown on the map are now infilled with variably thick sequences of Cenozoic sediments, although some contain older (Mesozoic and Paleozoic) sequences, such as the Permian glacial-derived sediments in the Palser Province (WA).  
3. The infill sequences depicted in these sections range from unconsolidated sediments to fully lithified sedimentary rocks. For consistency, the lithologic descriptions used here refer to the primary sediment type regardless of the degree of lithification.  
4. The sediment infill sequences are variably affected by chemical weathering. In places this has overprinted the original sediment compositions and also destroyed much of the primary sedimentary fabric.  
5. In most cases relatively thin (less than two metres) deposits of regolith and aeolian sands blanket the uppermost paleo-valley sediment layers, although dunes up to 20 metres high may occur in desert regions. These cover sequences were not deposited by fluvial or lacustrine processes associated with the paleo-valleys so have not been shown.  
6. To maximise the display of information the cross sections have inconsistent scales, conveying the significant variations in paleo-valley depths and widths.

**REFERENCES:**  
1. English, P.M., Lewis, S.J., Bell, J.G., Wischusen, J.D.H., Woodgate, M.F., Bastrakov E.N., Macphail, M.K., and Kilgour, P.L., 2012. 'Water for Australia's arid zone – identifying and assessing Australia's paleo-valley groundwater resources: Project summation. National Water Commission: Waterlines Report Series', August 2012.  
2. Gallant, J.C. and Dowling, T.I., 2003. 'A multi-resolution index of valley bottom flatness for mapping depositional areas'. Water Resources Research 39 (12): 401-413.  
3. Hou, B., 2004. 'Kingoonya paleochannel project South Australia. Department of Primary Industries and Resources. Report Book'. 2004/1.  
4. Köppen-Geiger classification of arid and semi-arid zones: [http://www.bom.gov.au/climate/environ/other/koppen\\_explain.shtml](http://www.bom.gov.au/climate/environ/other/koppen_explain.shtml)

**ACKNOWLEDGEMENTS:**  
This map has been produced by Geoscience Australia and funded by the National Water Commission. The map was compiled by J.G. Bell, P.L. Kilgour, P.M. English, S.J. Lewis and J.D.H. Wischusen (Geoscience Australia) and M.F. Woodgate (NT Department of Natural Resources, Environment, the Arts and Sport (NRETS)) with contributions from D.P. Commander, A.M. Kern and E.L. Leonhardt (WA Department of Water), B. Hou (Geological Survey of South Australia), and S.J. Tickle (NT METRS).

Published by Geoscience Australia, Department of Resources, Energy and Tourism, Canberra, Australia. Issued under the authority of the Federal Minister for Resources, Energy and Tourism.

Compiled by the Groundwater Group, Geoscience Australia.  
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**BIBLIOGRAPHIC REFERENCE:**  
Bell, J.G., Kilgour, P.L., English, P.M., Woodgate, M.F., Lewis, S.J. and Wischusen, J.D.H. (compilers), 2012. WASANT Paleovalley Map – Distribution of Paleovalleys in Arid and Semi-arid WA-SA-NT (First Edition), scale: 1:4 500 000. Geoscience Australia Thematic Map (Geocat No 73980) – hard-copy and digital data publication: <http://www.ga.gov.au/cse56/maps26>

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