

## Kalbarri Area Map

# Kalbarri Area Depositional Sequences Western Australia

October Friday 13 to Sunday 15, 2017

PESA WA FIELD EXCURSION

To be run by Dr Roger Hocking & Professor Greg Smith



## OVERVIEW

**A Sequence Stratigraphic and Reservoir Geology Field Trip in the Kalbarri National Park**, to examine marine to fluvial facies in the North Perth and Southern Carnarvon Basins. Excellent exposures of ancient and modern depositional environments show the transitions and differences between marine shelf, shoreface, barrier systems and deltas, in a rift margin setting that spans the mid Palaeozoic to the present day.

The outcrops expose excellent 2-D and 3-D sections, allowing comparison with sediments and sequences as seen in core, logs and on seismic. This weekend field trip will focus on the spectacular outcrops of the Tumblagooda Sandstone in the famous Murchison Gorge at Z-bend and the Loop and at Red Bluff, with a half day look at the Permian – Triassic boundary section at Shell House (see Map). It will be a great trip for the serious geoscientists and reservoir engineers working in Exploration or Development, showing a range of reservoir sequences including those relevant to the Perth and Carnarvon Basins. The Kalbarri area is famous as a tourist haven with great beach and river swimming and fishing plus the National Park scenery, displaying some of the Earth's early animals and wildflowers along great walking trails, with plenty of good accommodation, so the trip will be suitable for all the family.

### Summary Itinerary

**Friday:** Drive to Kalbarri: Evening Sundowner - Overview of Kalbarri Geology

**Saturday:** *Z bend and Loop Gorge* sections in the Kalbarri National Park. Lookouts and walk down into the gorge with lunch between each section and views of Nature's Window.

**Sunday:** *Red Bluff coastal outcrop*: walk around the platform and up the section. After lunch we will view the coastal depositional environments, and for those with time, examine the Permo-Triassic boundary between the Wittecarra Sandstone and the Kockatea Shale.

**Sunday afternoon or Monday:** Return to Perth at your own leisure or stay for a while.

### Brief Description of Each Day

The PESA field trip will officially start on the Friday night in Kalbarri with a casual Sundowner where an overview of the Kalbarri area geomorphology, geology and palaeontology will be given in a brief slide show to "paint the picture" of what you will see over the next two days. Location to be advised to participants.

**Saturday** will we travel to the Murchison Gorge at Z Bend and The Loop. The gorges offer spectacular exposures of intercalated sheet-braided fluvial and tidal sand-flat sandstones and a rare exposure of a complete distributary channel system cut into the inter-distributary bay sediments, comparable to a seismic scale section. The rocks demonstrate the variety of sedimentary structures and trace fossils representative of these depositional environments and provide the opportunity to visualize 400 million years of evolution of the Murchison gorge and its rocks.



**Sunday** morning we will explore the Red Bluff section where more high-energy sheet-braided fluvial sandstones, deposited in a coastal location, grade up into interdistributary bay and marine sediments, with a different trace fossil fauna. After an early lunch we will view the present day coastal systems from the lookouts. Then we will have a quick look at the Permian-Triassic boundary below Shell House, where we can see the Permian Wittecarra Sandstone overlain by the Triassic Kockatea Shale in a small graben within the Tumblagooda section.

**Refs:** GSWA field guides to Kalbarri's geology, Records 2006/19 and 2008/11 (available free pdf downloads).

**Travel:** Make your own way to and from Kalbarri. You could drive up Friday and back Sunday afternoon or on Monday at your leisure (570 km, 6 ½ hour drive with a stop). Spend time with the family or friends before or after the excursion around Kalbarri. Coach buses run Perth to Kalbarri and connect to flights from Perth to Geraldton and we can help arrange car pooling between the participants.

**Transport:** A bus will be provided in Kalbarri for participants.

**Clothing:** The weather should be ideal – about 27° in the day and 14° at night (the gorges may get 5 to 10° hotter than Kalbarri). Reasonable field boots or sturdy joggers for rock scrambling (no sandals or thongs), good sun-protection clothing, broad brimmed hats, sunscreen and plenty of water. Z Bend and the Loop require moderate fitness levels for the 70 m return climb and 800 m trek back from the bottom.

**Accommodation:** Your choice. Kalbarri has accommodation ranging from caravan parks through motels and resorts to holiday apartments and houses, both family oriented and up-market. Search visitor centre site <https://www.kalbarri.org.au/accommodation> or <http://www.kalbarriaccommodation.com.au>.

**Cost:** \$275 (requires 19 participants)

### Trip leaders

**Roger Hocking** recently retired as Chief Geoscientist of the Geological Survey of Western Australia and has worked on the geology around Kalbarri for 40 years, starting with regional mapping in 1977, an M.Sc. in the 1980s, excursions through the 1990s and 2000s, and a recent a guide to the geology and landscape evolution of the Kalbarri region for the general public, soon to be published by GSWA. Roger has worked as a field-based stratigrapher and sedimentologist on siliciclastic and carbonate rocks ranging from Archean to Holocene, in undeformed to moderately deformed basins across WA, especially the Southern Carnarvon Basin, the Proterozoic Earraheedy Basin and the Devonian reef complexes in the Canning Basin (see Roger on the right above explaining the Gorge!).

**Professor Greg Smith** undertakes research at Curtin University with Honours, Masters and Ph.D. students on interpretation and modelling of large seismic, well log, core and production datasets. He has over 35 years experience at Exxon, ARCO, BHP and Woodside/Shell where he held principal geologist and senior management roles, enjoyed success in petroleum, coal and oil shale exploration, (including several major discoveries), and was responsible for field development and production for many large petroleum projects in Australia and overseas. Current interests include the application of sedimentary facies analysis and reservoir characterisation in the petroleum industry, low T-P burial and thermal modelling, organic matter petrology and geochemistry, and scenario modelling of the probable geology for resource estimates (see Greg on the left above walking in Roger's footsteps!).

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