



Calendar 2014



Government of Western Australia
Department of Mines and Petroleum



Geological Survey of
Western Australia





*Breakaway in weathered Archean
granite, west of Leinster*



January 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		New Year's Day 1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	Australia Day 26
27	28	29	30	31		



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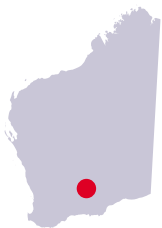


Geological Survey of
Western Australia

January

www.dmp.wa.gov.au/GSWA

Deeply weathered profile in Archean granite produces white kaolinitic clay. Core stones are evident in the right of the photo, resulting from fluids percolating through joints in the granite



February 2014

The 34th International Geological Congress field excursion to the Eastern Goldfields included a visit to the Leviathan openpit at St Ives Goldfields' operations near Kambalda

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	 GSWA Open Day 21	22	23
24	25	26	27	28		



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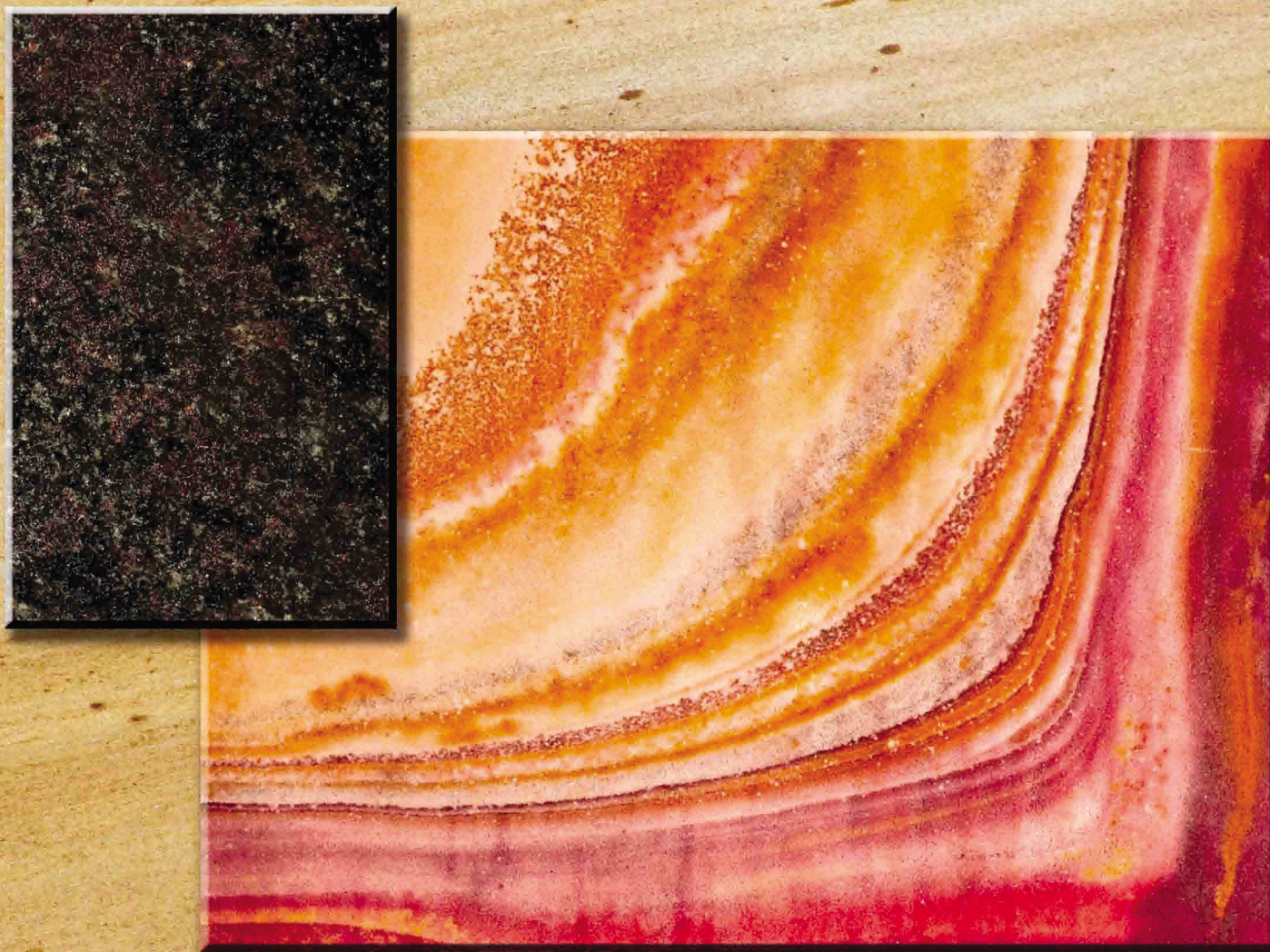


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February

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The southwest wall in the Leviathan pit exposes the northeast-dipping, mineralized Repulse Fault and Flames Porphyry within mineralized Archean mafic and ultramafic rocks. GSWA's field guide (Record 2012/11) with schematic diagrams aids excursion participants with real-time geology in the field. Historical workings (centre right) provide geotechnical difficulties with mining and demonstrate the longevity of mining in the goldfields



*Trio of dimension stones mined
in Western Australia*

March 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30



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March

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Dimension stones are used across the Perth cityscape for cladding, flooring, statuary, and road paving. From left: Early Cretaceous Donnybrook Sandstone fronts 2 St Georges Terrace Perth; magenta-tinted pyroxene granulite from Phill's quarry, Fraser Range area; spectacularly banded Kimberley Sandstone is a quartz-rich, hematitic sandstone enhanced by Liesegang banding. Find out more from GSWA Mineral Resources Bulletins 23 and 24



Geologists at work in the Kimberley



April 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	1	2	3	4	5	Geologists' Day 6
7	8	9	10	11	12	13
14	15	16	17	Good Friday 18	19	Easter Sunday 20
Easter Monday 21	22	23	24	Anzac Day 25	26	27
28	29	30				



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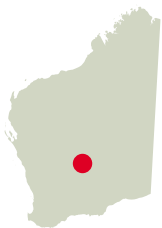


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April

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*Geologists measuring bedding and annotating samples from
a creek on Bedford Downs station, East Kimberley. Marooned
debris shows flood height during the wet season*



May 2014

Gwalia can lay claim to having the first Government-owned hotel, built in 1903 for £4800. Gwalia and Leonora were rival settlements about 5 km apart, with the Sons of Gwalia mine the major employer

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	



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May

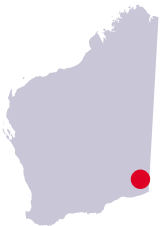
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Although Gwalia was not a gazetted town, some 1114 people lived there. Illegitimate liquor trading was rife, and in 1903 the Government experimented with a State-run hotel — managed by the Department of Mines! The fortunes of the hotel and the mine were closely entwined; thus in 1963 when the mine finally closed Gwalia's population disappeared almost overnight, leading to the demise of the hotel by 1964. Gwalia's historic buildings and mining heritage now make it an attractive tourist destination



*Foreground photo of drill rig is superimposed onto
Nullabor Plain vista (actual rig on the far horizon)*

June 2014



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

June

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ROYALTIES
FOR REGIONS

EXPLORATION INCENTIVE SCHEME

Downhole geophysical survey being set up at drillsite (visible on the horizon) in remote country on the Nullarbor Plain, about 60 km west of the South Australian border. The aim of the drilling — funded by the Geological Survey and the Western Australian Government's Exploration Incentive Scheme — was to intersect unknown basement rocks beneath the Eucla Basin



*Complex folding pattern in the Dales Gorge Member of the
Brockman Iron Formation, Pilbara region*



July 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			



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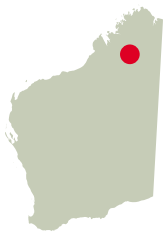
July

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*Complex folding pattern that may include soft-sediment
deformation in banded iron-formation within the Dales Gorge
Member of the Brockman Iron Formation at Ando's Crack,
eastern Ophthalmia Range, Pilbara*



Mount Pierre in the Kimberley region (then and now)



August 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



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August

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Top: Sketch of Mount Pierre (right) by geologist ET Hardman in 1883, part of a series by Hardman during his expedition to the Kimberley region with John Forrest, future Premier of Western Australia

Below: The same view of Mount Pierre and adjoining hills photographed in 2003. Mount Pierre is capped with Famennian limestone of the Piker Hills Formation, over Virgin Hills Formation



*A classic Western Australian beach scene —
Tamala Limestone along the Burns Beach foreshore*



September 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	2	3	4	5	6	7
8	9	10	Petroleum Open Day, Fremantle 11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					



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September

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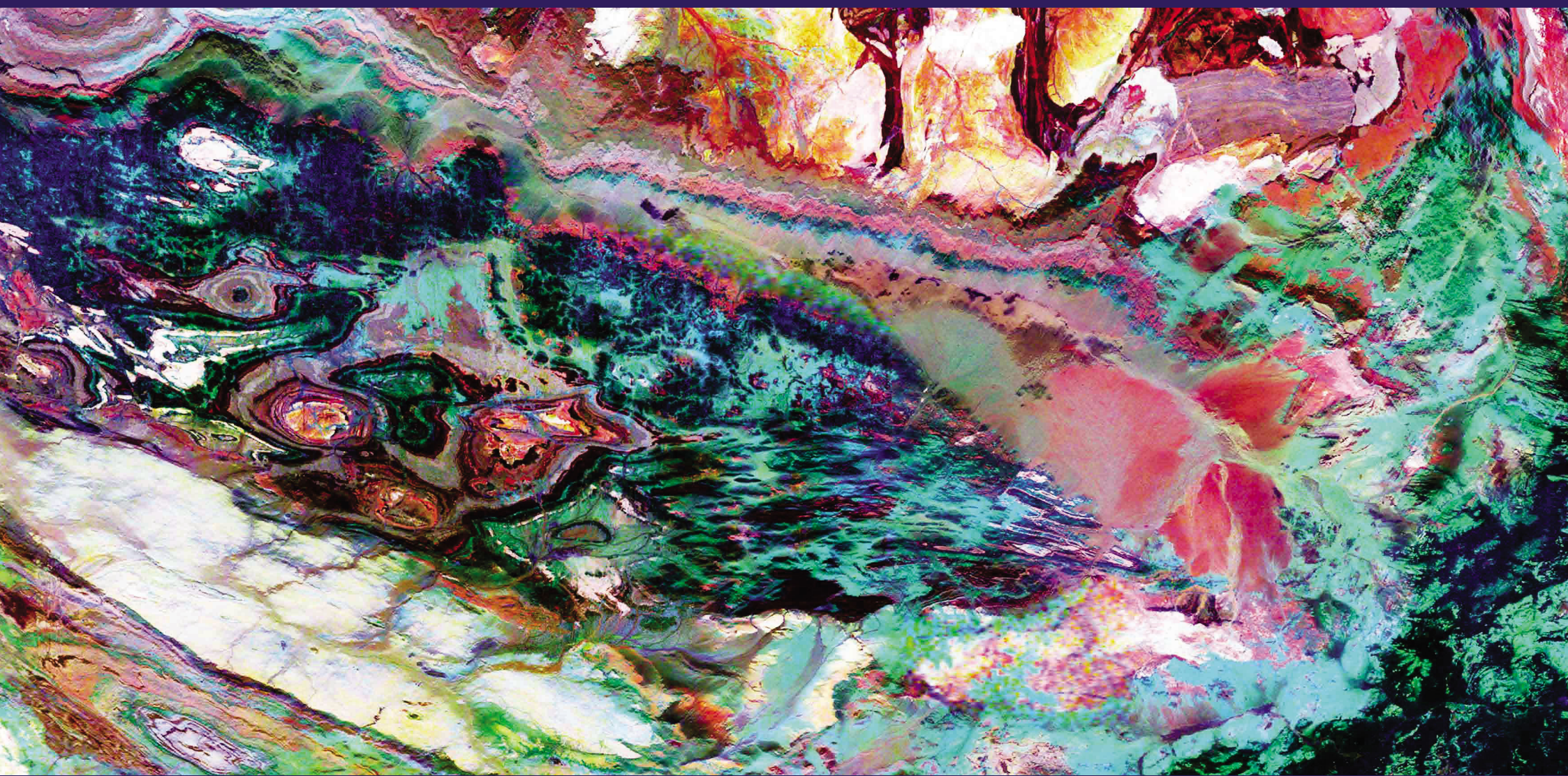
*Quaternary Tamala Limestone (about two million years)
outcrops along the Western Australian coast around Perth.
Note the smooth calcium carbonate-lined rhyzolith at the
western top edge of the cliff and another holding up the cliff.
Rhyzoliths are cylindrical structures formed around
fossilized tree roots*



Deformed pillow basalts of the Maggie Hays Formation in the Archean Lake Johnston greenstone belt outcrop on the western edge of Lake Johnston, 150 m east of Maggie Hays Hill

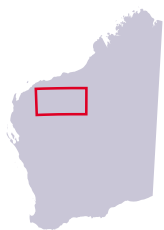
October 2014





*Radiometric image, southern Pilbara region,
shows a strong correlation with outcrop geology and
regolith. Compare this with the December image of
Total Magnetic Intensity*

November 2014



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					1	2
3	4	5	6	7	8	9
10	11	GIS Day 12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30



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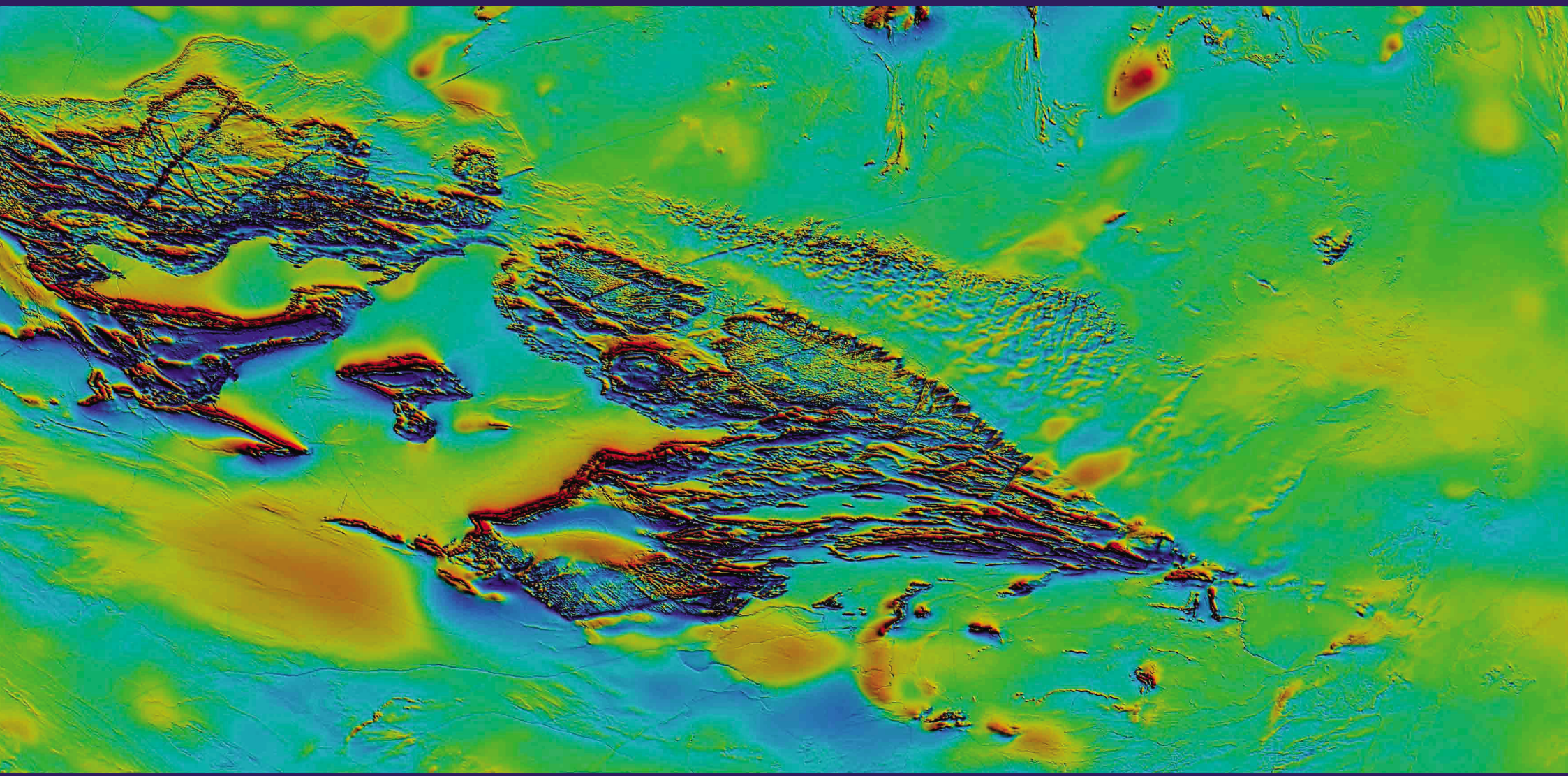
ROYALTIES
FOR REGIONS

EXPLORATION INCENTIVE SCHEME

November

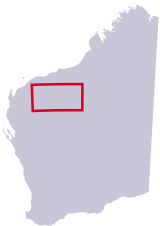
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Potassium, Thorium, Uranium (KTU) combined Ternary Radiometric image
picks out the elongated triangular Fortescue River valley (pink) south of
the oval-shaped granitic complexes (cream, yellow) of the Pilbara Craton



This Total Magnetic Intensity (TMI) image captures the magnetic properties of the bedrock at depth, in contrast to surface features shown on the Radiometrics of the same region (November)

December 2014



Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	2	3	St Barbara's Day* 4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	Christmas Day 25	Boxing Day 26	27	28
29	30	31				



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ROYALTIES
FOR REGIONS

EXPLORATION INCENTIVE SCHEME

December

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*Total Magnetic Intensity image of the southern Pilbara.
The red patterns on the image equate to highly magnetic
rocks, which are the extensive banded iron-formations of the
Hamersley Group*

** Saint Barbara is the patron saint of miners*

MINISTER FOR MINES AND PETROLEUM
Hon. Bill Marmion MLA

DIRECTOR GENERAL
DEPARTMENT OF MINES AND PETROLEUM
Richard Sellers

EXECUTIVE DIRECTOR
GEOLOGICAL SURVEY OF WESTERN AUSTRALIA
Rick Rogerson

The Geological Survey of Western Australia (GSWA) is a Division of the Department of Mines and Petroleum. Our role is to carry out geoscientific studies that reveal the geological framework of Western Australia and the potential for mineral and energy resources. Our aim is to make Western Australia the preferred destination for local, national, and multi-national explorers.

GSWA manages the Exploration Incentive Scheme (EIS), a State Government initiative to encourage exploration in Western Australia for the long-term sustainability of the State's resources sector.

This \$131 million initiative, funded over eight years, will stimulate increased private sector resource exploration and ultimately lead to new mineral and energy discoveries. Most of the activities in the EIS are focused in under-explored greenfields regions.

More information on EIS is available at: <www.dmp.wa.gov.au/EIS>



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EXPLORATION INCENTIVE SCHEME

Geological Survey of
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These calendar photographs arise from GSWA's field activities, which take our staff to remote, inaccessible, and beautiful locations throughout the State. Thank you to the following photographers for the stunning images:
Scott Brown, David Eyre, Michael Fetherston, Klaus Gessner, Charlotte Hall, Tim Ivanic, Phil Playford, Michael Prause, Rick Rogerson, Sandra Romano, Catherine Spaggiari, and Michael Wingate

Front cover image: Storm brewing over a GSWA field excursion to visit a ridge marking a synformal fold hinge at the southern end of the Edamurta Range in the western Yilgarn Craton, southwest of Yalgoo

Back cover image: Granite tors of the Bald Rock Supersuite (c. 2630 Ma) at Nannowtharra Hill near Yalgoo

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<www.dmp.wa.gov.au/GSWApublications>

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Information Centre
Department of Mines and Petroleum
100 Plain Street
EAST PERTH, WA 6004 AUSTRALIA
Telephone: +61 8 9222 3459; Facsimile: +61 8 9222 3444
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