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## Ironstone gravel types in Western Australia: Re-purposing a geological survey to improve soil management

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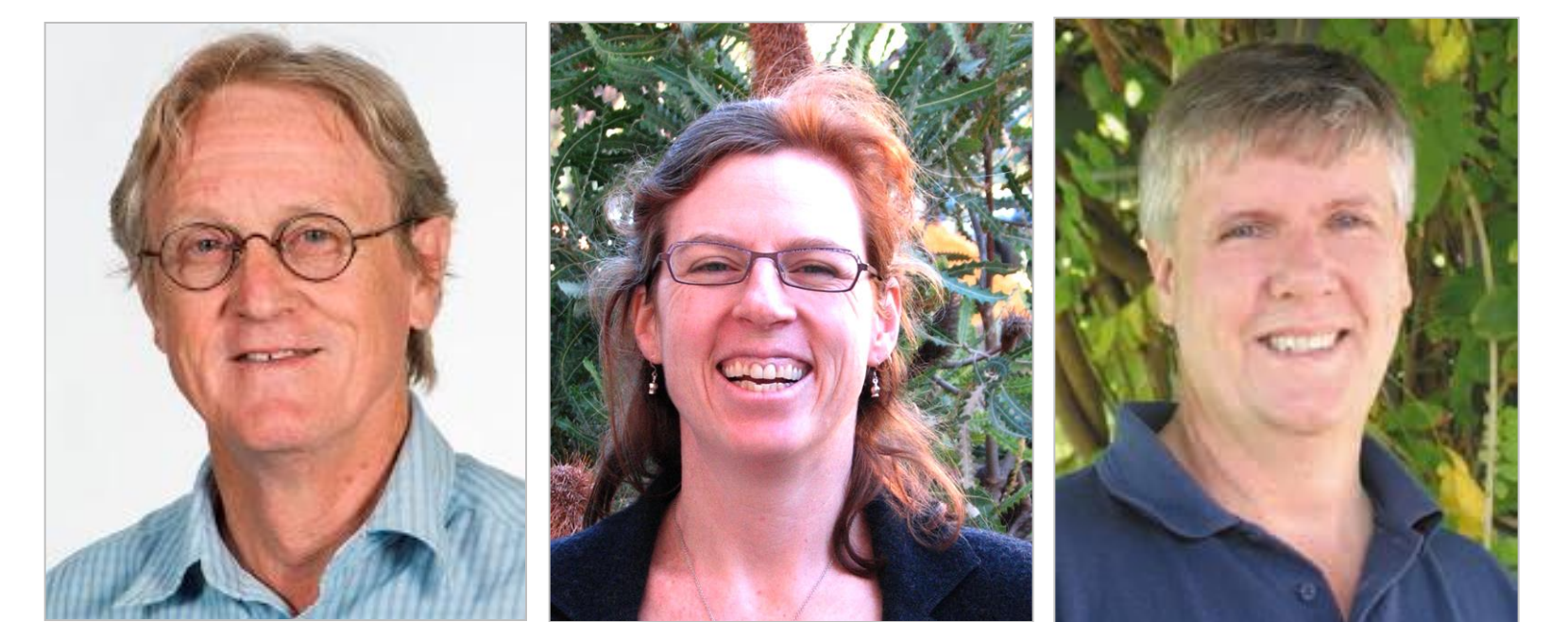
Griffin, E A, Holmes, K, and Overheu, T. (2016), Ironstone gravel types in Western Australia: Re-purposing a geological survey to improve soil management, *New Zealand Society of Soil Science and Soil Science Australia Conference*, Queenstown, New Zealand.

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# IRONSTONE GRAVEL TYPES IN WESTERN AUSTRALIA

Re-purposing a geological survey to improve  
soil management

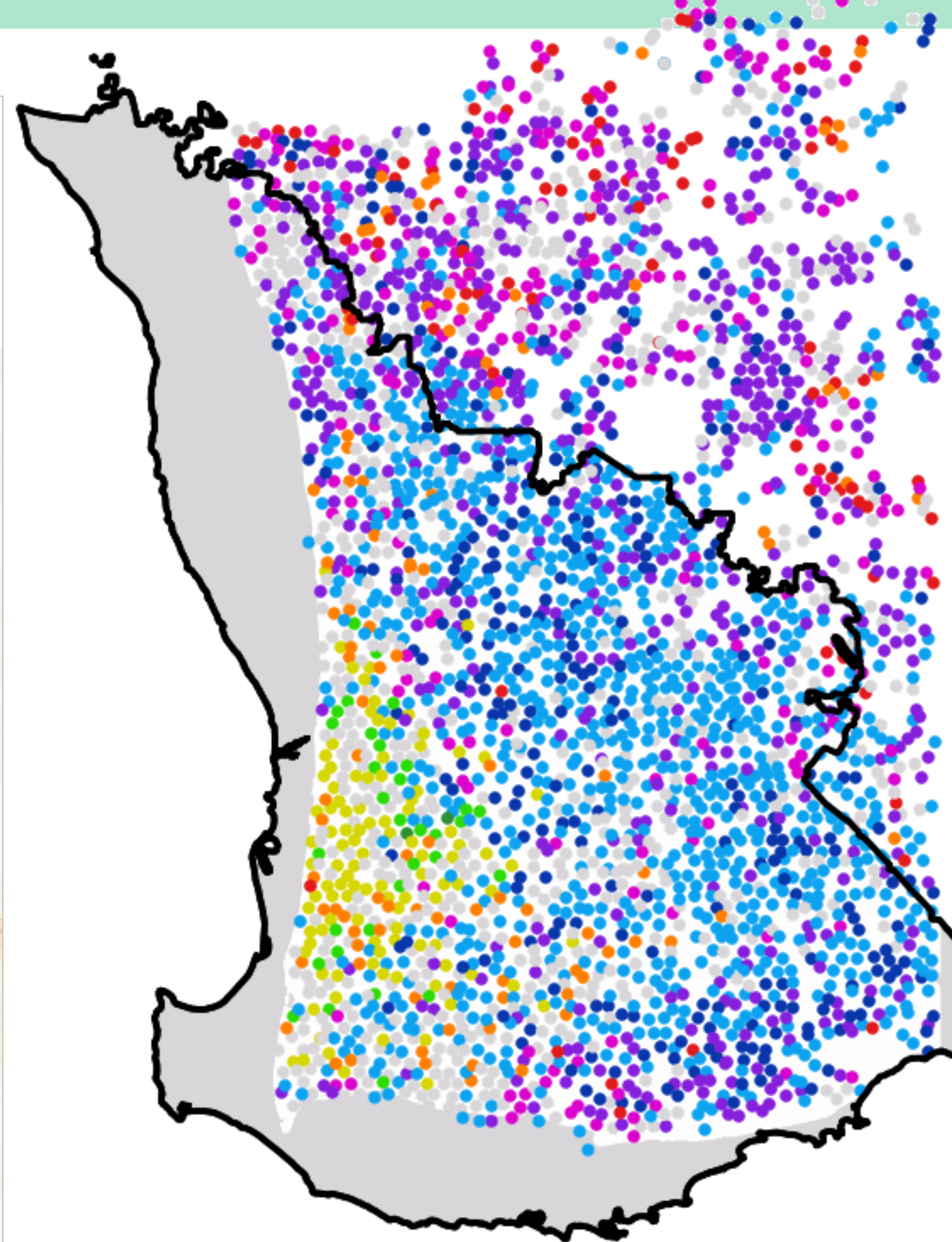
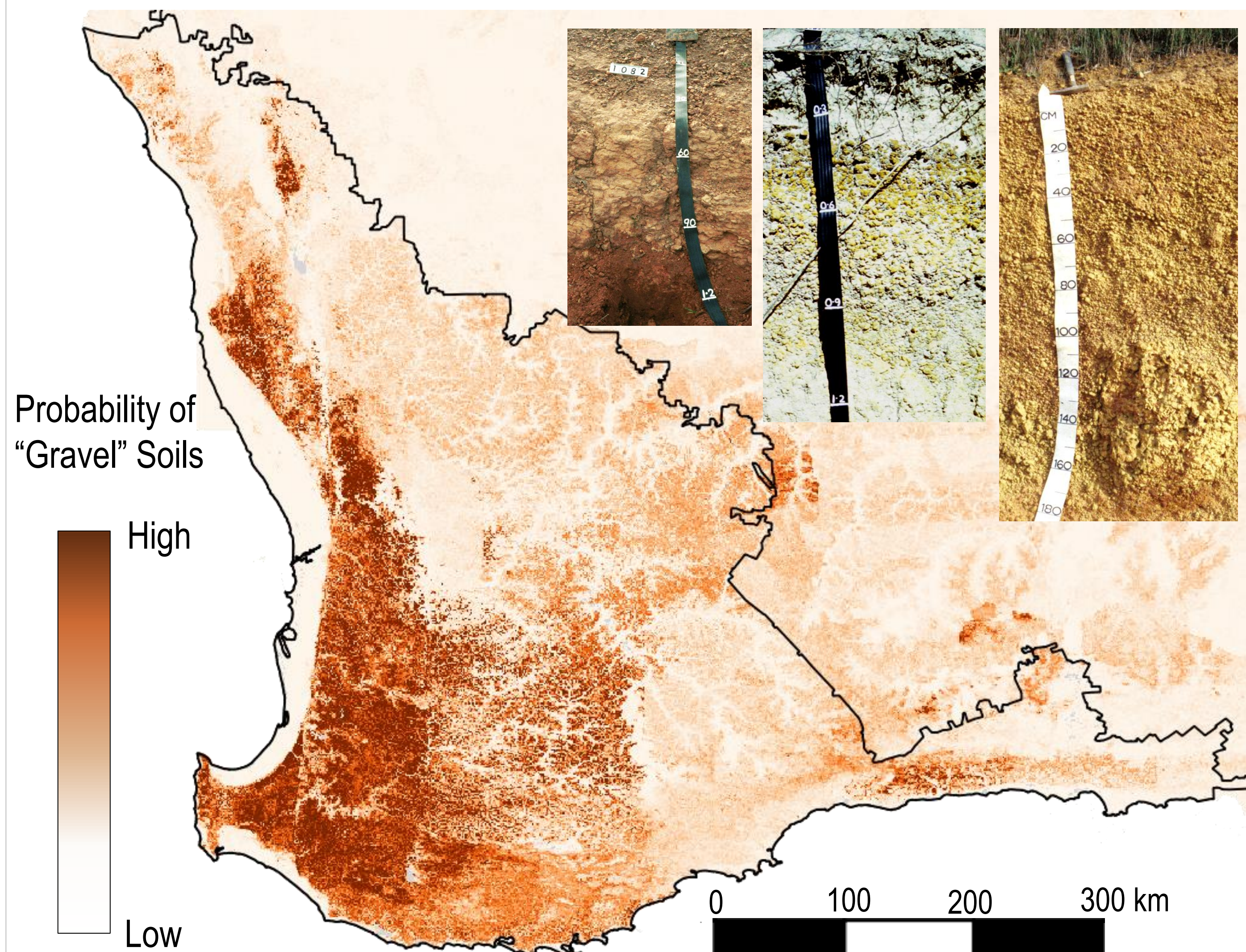


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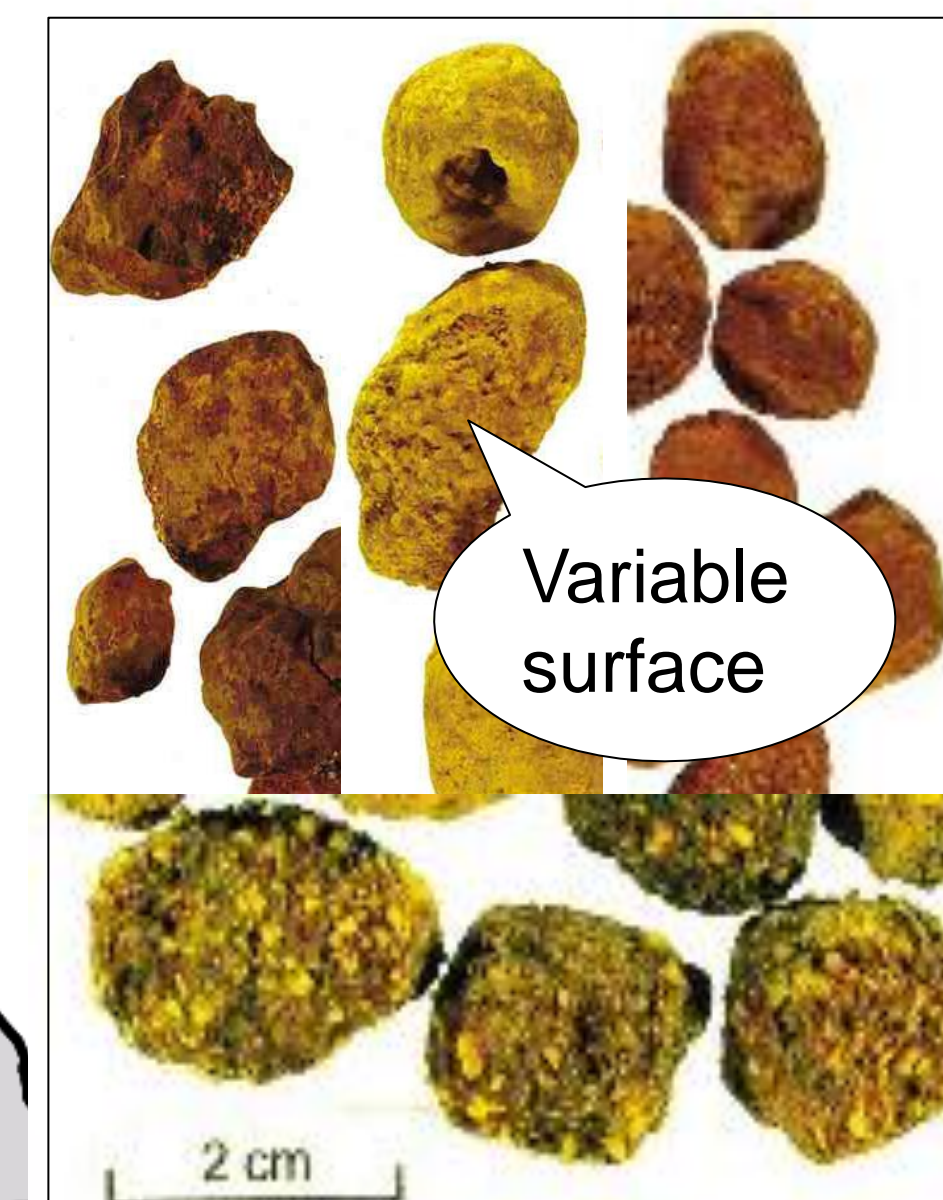
Department of Agriculture and Food,  
Western Australia



*Ironstone gravels common in WA's agricultural region, typically considered inert for cropping*



CSIRO & Geological  
Survey WA: Detailed  
geochemistry of >3000  
samples on Yilgarn  
Craton (Cornelius et al. 2007)



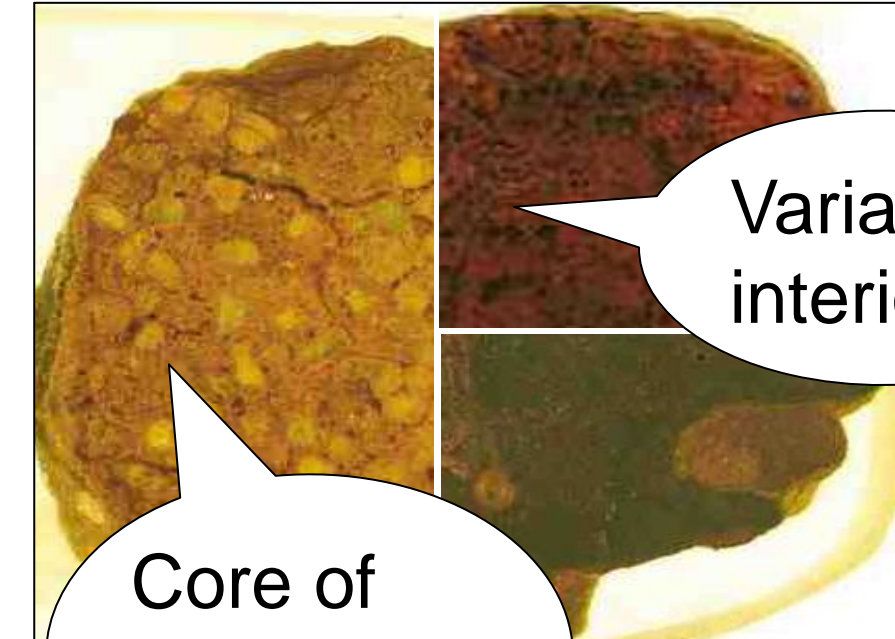
Variable  
surface

Thin sections



Variable  
rind  
thickness

Polished sections



Core of  
minerals &  
'cement'

Variable  
interior

Wide range of mineralogy and morphology, mainly controlled by parent rocks. Often redistributed by landscape processes; evidence of pisolith dissolution and reformation (ie. Some gravels from lateritic residuum, some pedogenic, which adds noise to gravel correlation with parent rock and current landforms.)

## SOIL MANAGEMENT RESEARCH FOCUS

A growing body of evidence suggests gravels play a role in soil water and nutrient retention, but is all 'gravel' the same?

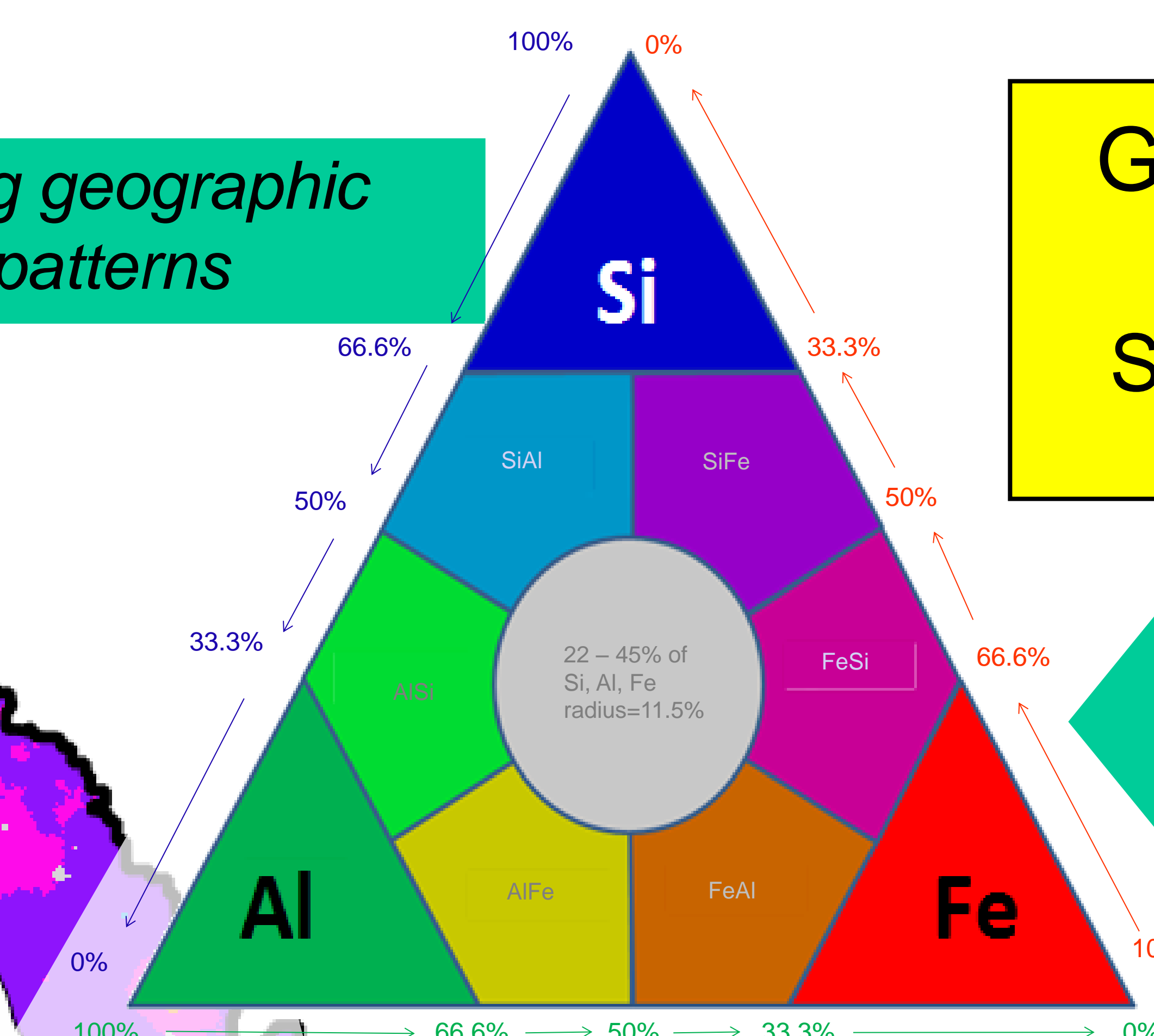
- This is step 1: define gravel types and their distribution
- Design optimal sampling strategy and collect for lab and glass house studies
- Characterise chemistry and morphology
- Plant nutrient interactions
- Soil water consequences
- Soil compaction potential
- Revisit gravel soil classification: update required?

Cornelius, M, IDM Robertson, AJ Cornelius, and PA Morris, 2007. Laterite geochemical database for the western Yilgarn Craton, Western Australia: Western Australia Geological Survey, Record 2007/9, 44p.

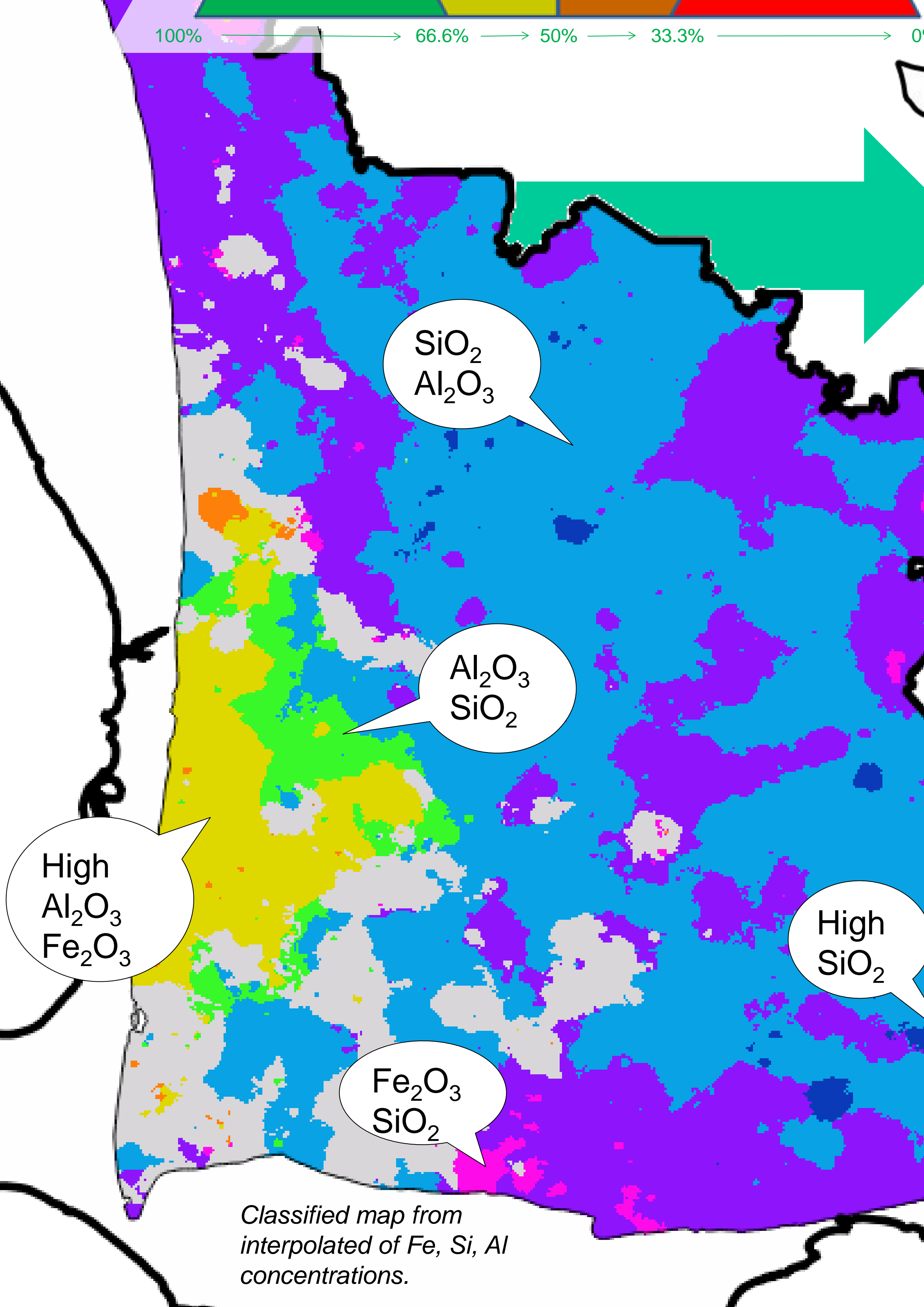
<http://www.crcleme.org.au/Pubs/OFRSindex.html> Reports 116 and 201. Includes data.

This project is supported by GRDC grant DAW00258.

Gravel composition  
classified by  
 $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$  &  $\text{Fe}_2\text{O}_3$



Strong geographic  
patterns



Classified map from  
interpolated of Fe, Si, Al  
concentrations.

(Above) Probability of a gravel soil (top left map) superimposed on gravel composition classes. Colours bright where gravels likely to be found, and fade to white where unlikely.