



OPEN DAY  
2022





# ***WaterSmart Farms: prospecting for fractured rock aquifers in the wheatbelt***

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Resources

# Acknowledgements

- Richard George (DPIRD)
- Brett Harris (Curtin University)
- Landholders and grower groups
- GSWA & other workshop attendees who helped plan the targeting

# It's a drying climate for the SW



ABC RURAL

## Drastically changing rainfall patterns are reshaping WA's vast wheatbelt

WA Country Hour / By Jon Daly  
Posted Mon 30 Dec 2019 at 5:33am



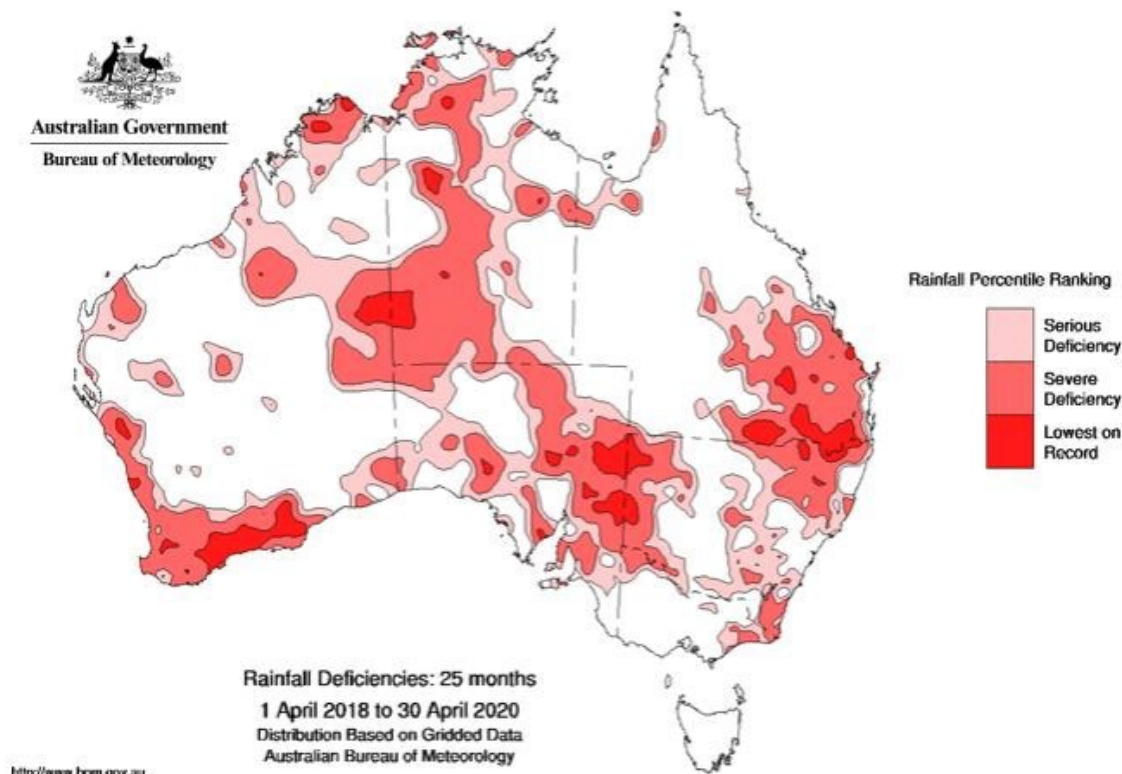
Boypup Brook farmer Peter Reid says his decision to shift towards commercial cropping was an economic one. (ABC Rural: Jon Daly)

BoM

Variable	Season	2030 RCP 4.5 Median	2030 RCP 4.5 Range	2030 RCP 8.5 Median	2030 RCP 8.5 Range	2090 RCP 4.5 Median	2090 RCP4.5 Range
Rainfall (%)	Annual	-6	-15 to -1	-5	-15 to 1	-12	-22 to -1
	Summer	-8	-31 to 17	2	-23 to 20	-4	-29 to 28
	Autumn	-4	-20 to 10	1	-20 to 17	-4	-26 to 12
	Winter	-7	-18 to 4	-9	-18 to 2	-14	-28 to -4
	Spring	-11	-23 to 4	-11	-28 to 4	-19	-36 to 1

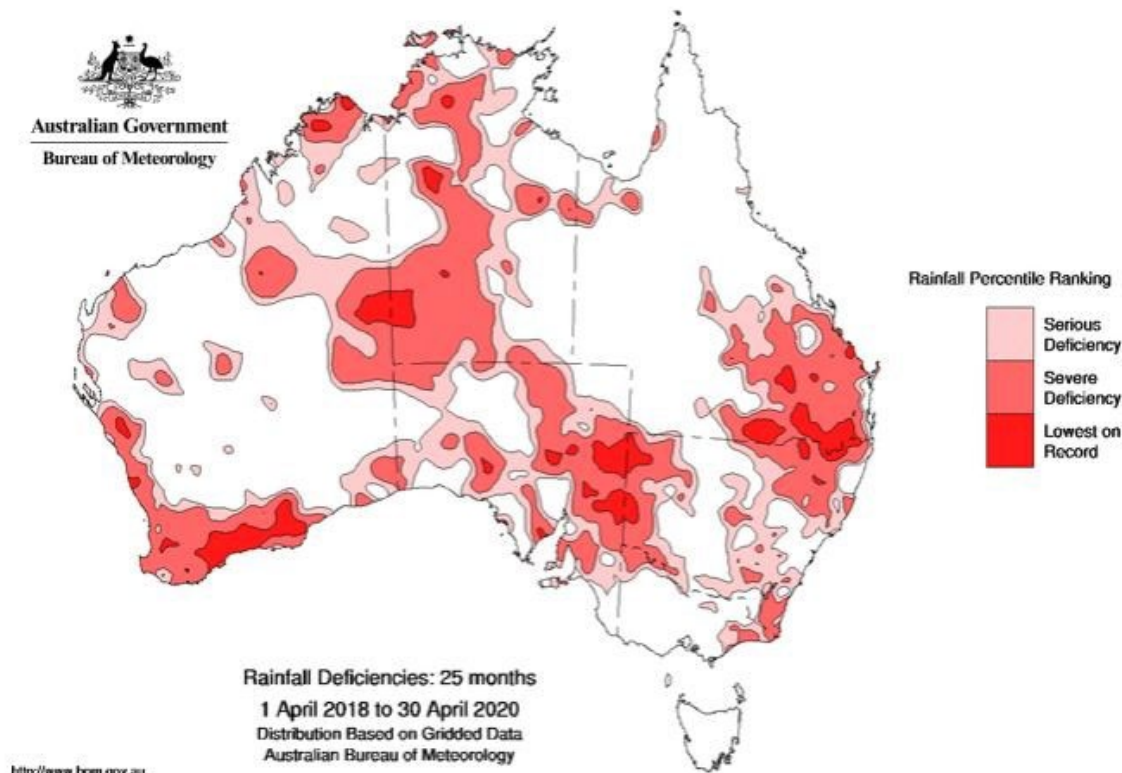
Southwest Outlook: Dept. of Agric Bulletin 4870

# Pressure on water drives deeper drilling





# Pressure on water drives deeper drilling



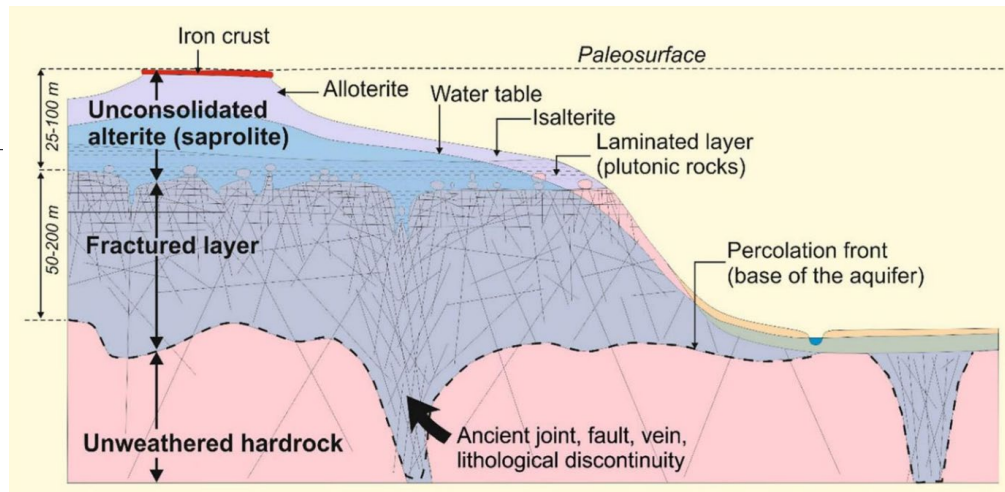
# What's the likely water source

## Untapped water source in Merredin

Updated March 10 2016 - 10:47am, first published November 4 2010 - 1:19pm

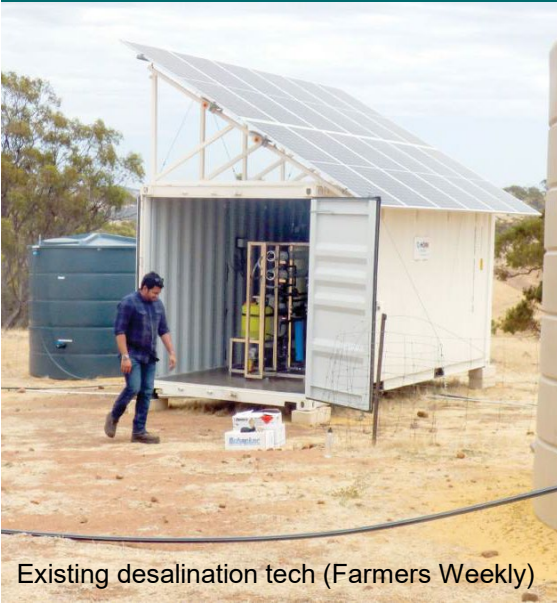


**Fault line:** This photograph was taken by a remote-controlled camera inside the Merredin drill hole. As they drilled through solid granite at a depth of 327 metres, Globe Drill came across this fault line (seen here as a dark crack), from which water was flowing in vast quantities.

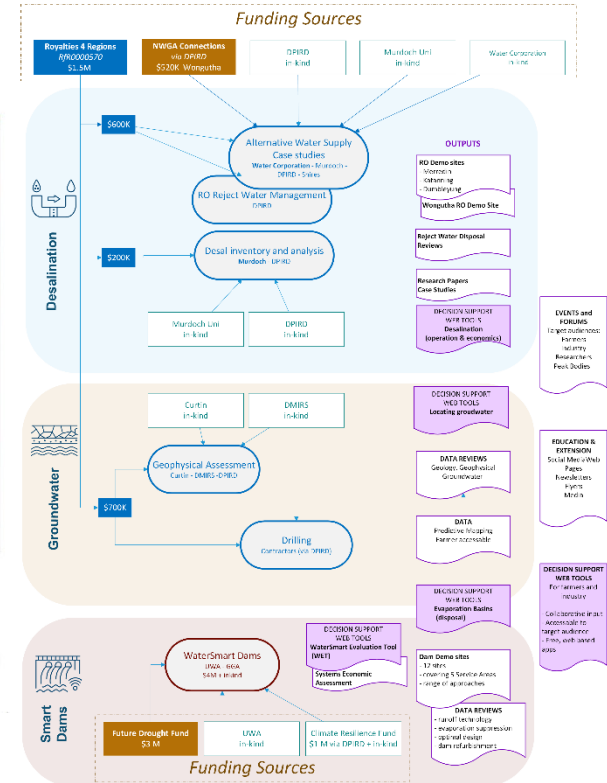
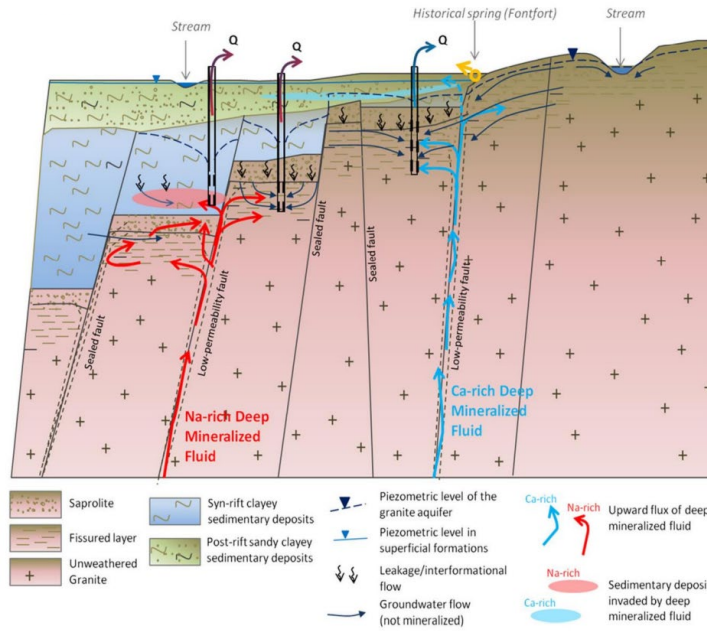


Lachassagne, Dewandel & WYns (2021)

# WaterSmart Farms



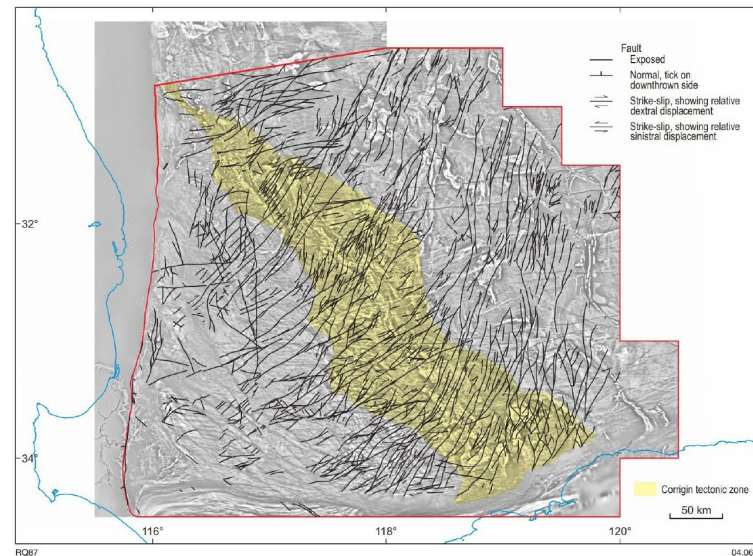
Existing desalination tech (Farmers Weekly)





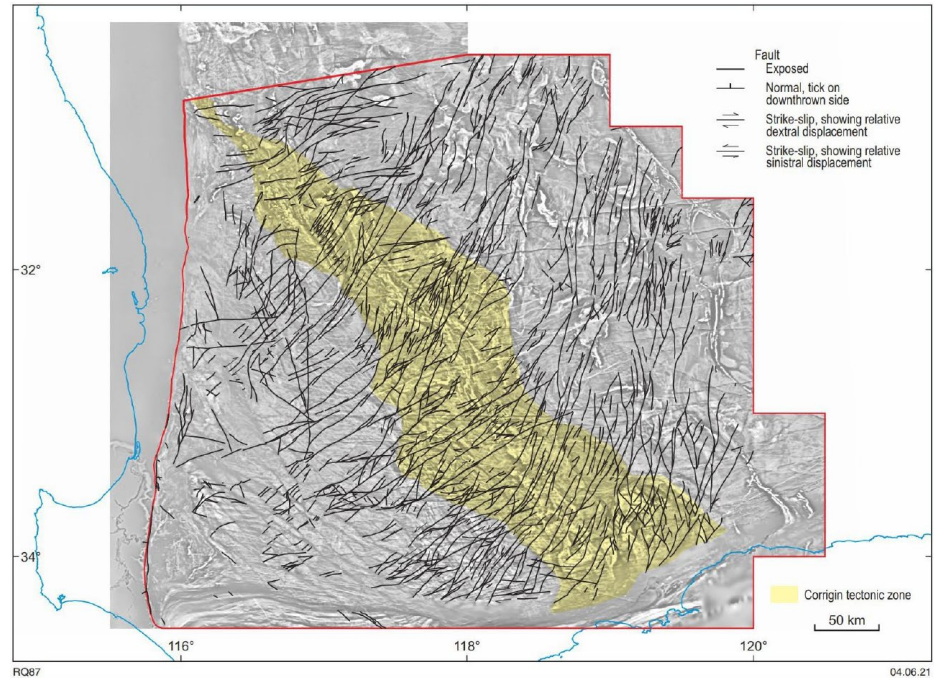
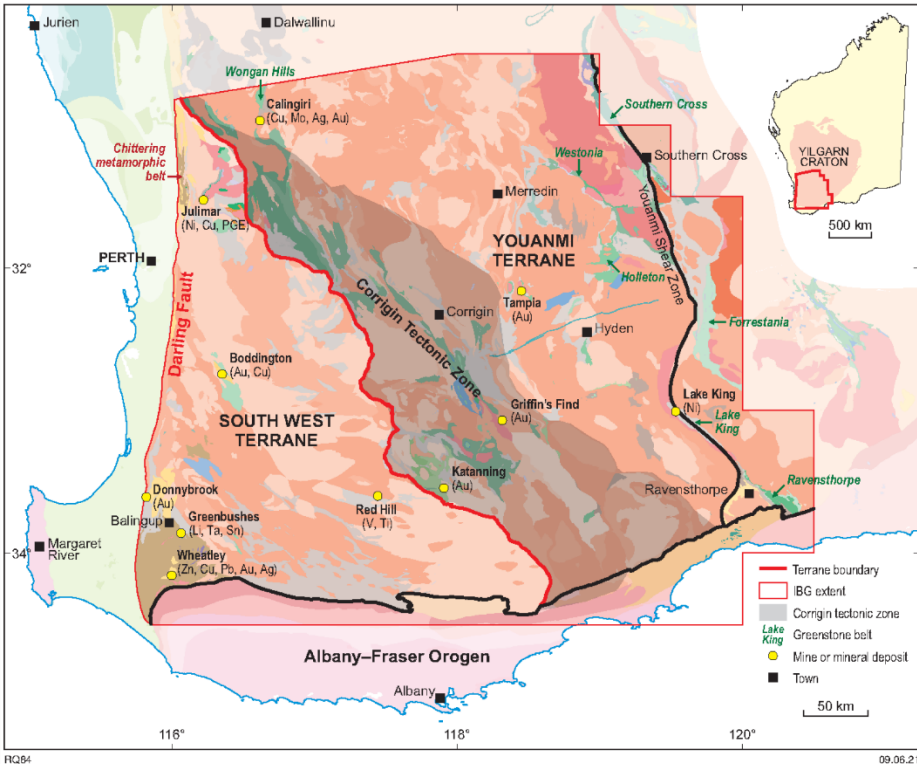
# Proxies of fracture systems

- **Developed through a couple of workshops**
- **Key proxies appear to be:**
  - Unit contrast e.g. dolerites versus other units
  - Brittle structures are very apparent in magnetic data
  - Potential topographic expressions





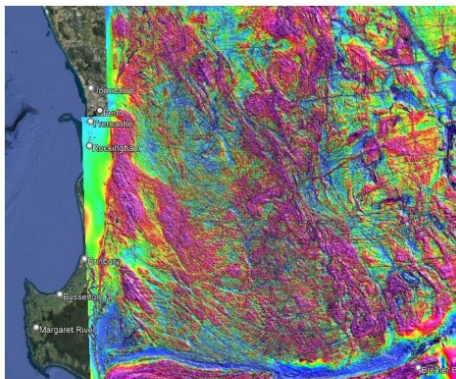
# SW Yilgarn IBG: units, brittle fractures



Quentin de Gromard et al. (2021): GSWAAGP abstract volume



# Regional data



## Data sets

### Geology

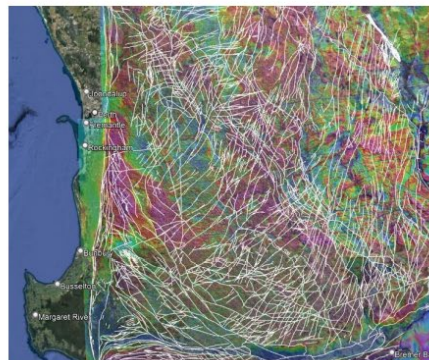
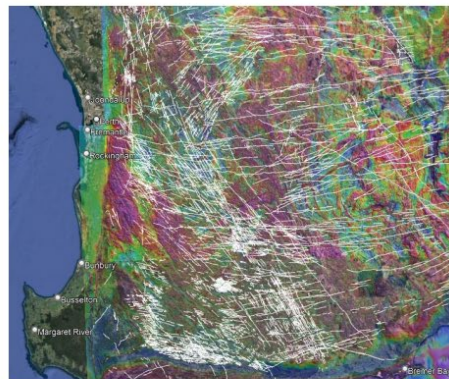
Faults  
Structures  
Lithology  
Ages

### Geophysics

AEM  
Mag  
Ground

### Drill holes

Shallow  
Deep



## Key questions:

- How do these data help localise the search?
- What tools are best to communicate to landholders or waterbore drillers?



# Local-scale geophysics

- Need to localise structures: magnetics, at a higher scale
- Have also trialled other geophysics to understand their targeting value





# What's next

- Finalising ground geophysics for targeting
- Drill drill drill after ranking
  - First round of holes only
  - Use this to evaluate targeting methodology
  - Next round next year