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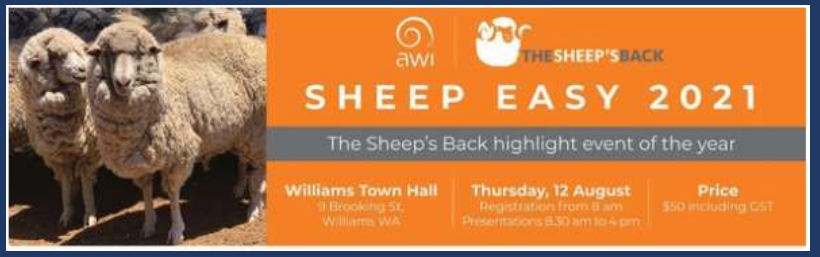
GOVERNMENT OF WESTERN AUSTRALIA

Stock water – meeting the future needs

Water in a variable climate

Dr Richard George – DPIRD



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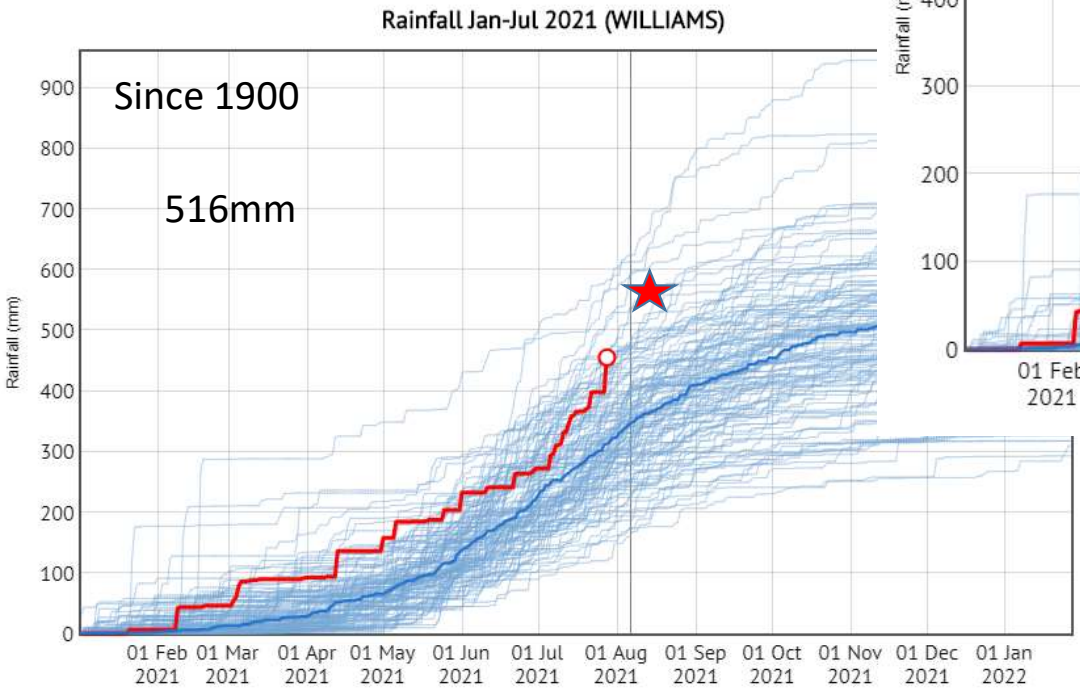
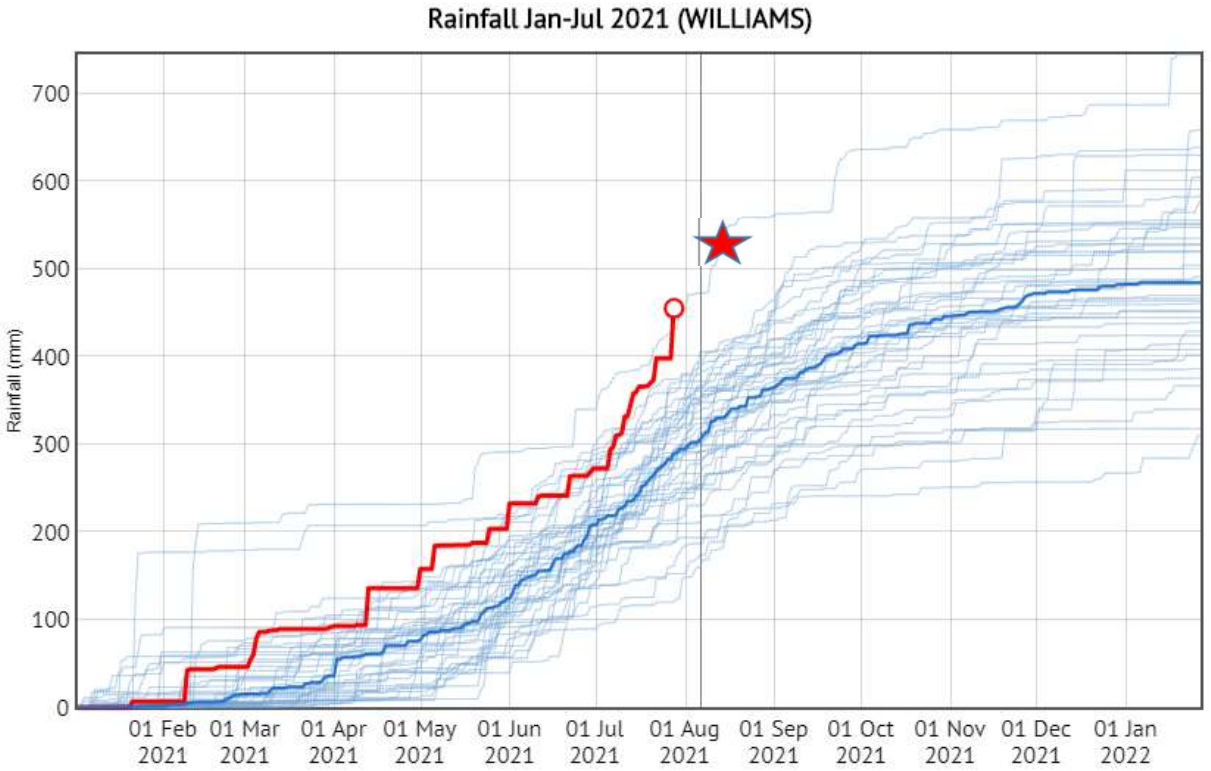
Google "CliMateApp"





95% tile

Its all about planning for variability

1962-1963

2017

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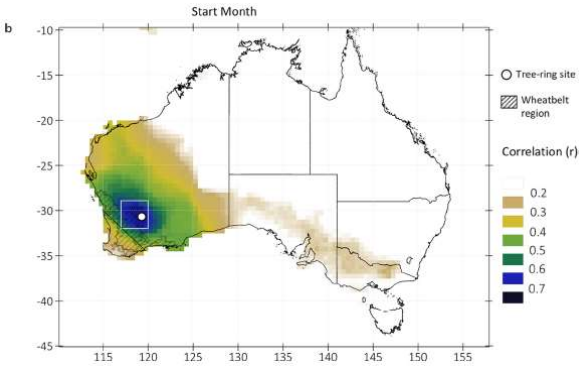
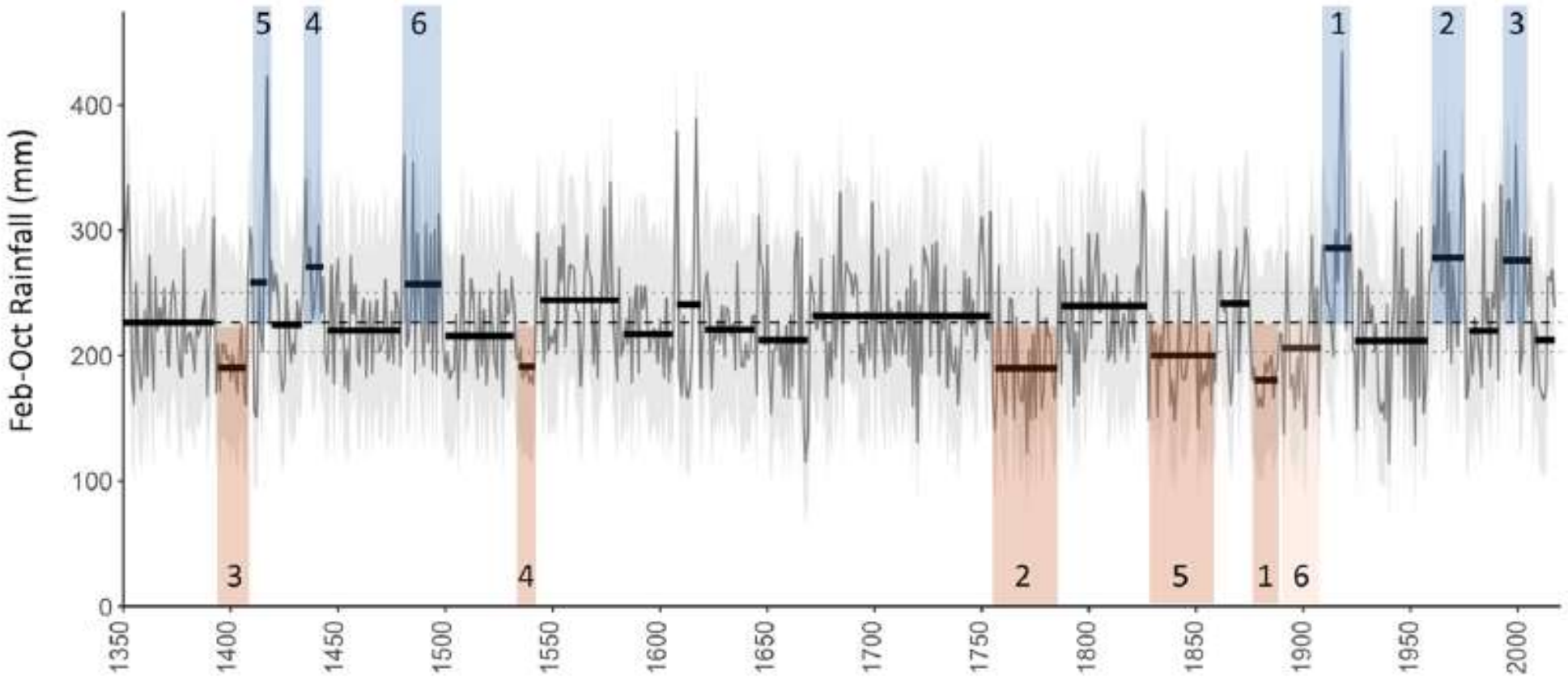
Alison O'Donnell et al, UWA 2021



Climate variability – century scale



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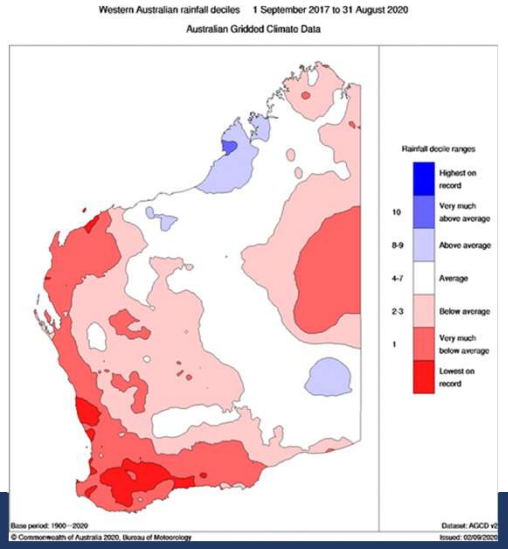
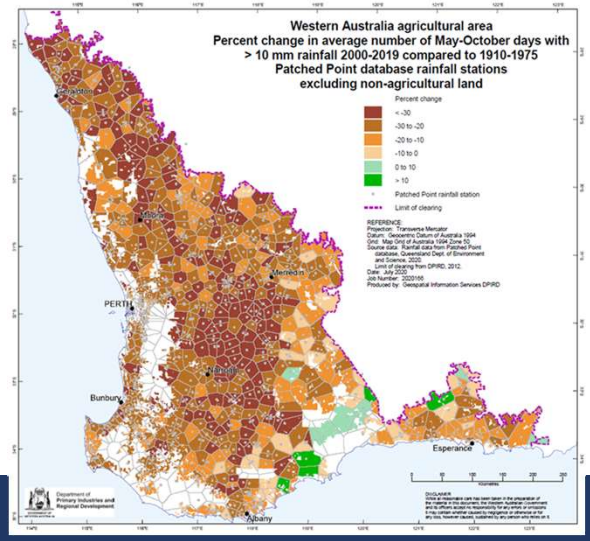
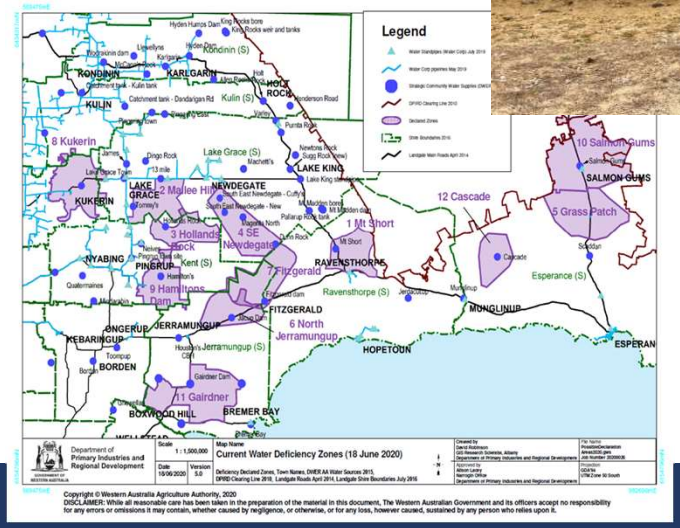
Its all about managing variability…

- Recent dry seasons – … saved in recent months…
- Old water options exposed (dams, few non-saline bores, backbone IWSS)
- Industry risk after 2-3 dry winters,
- 450 road trains carting water to livestock - weekly







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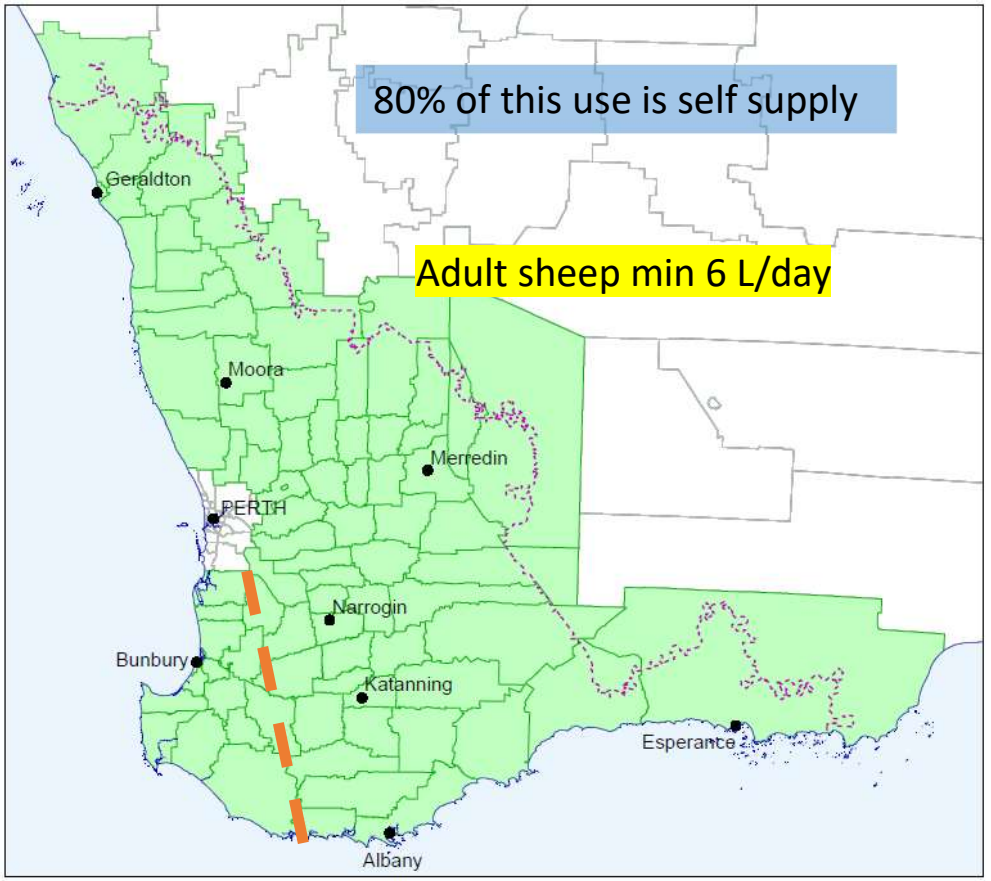
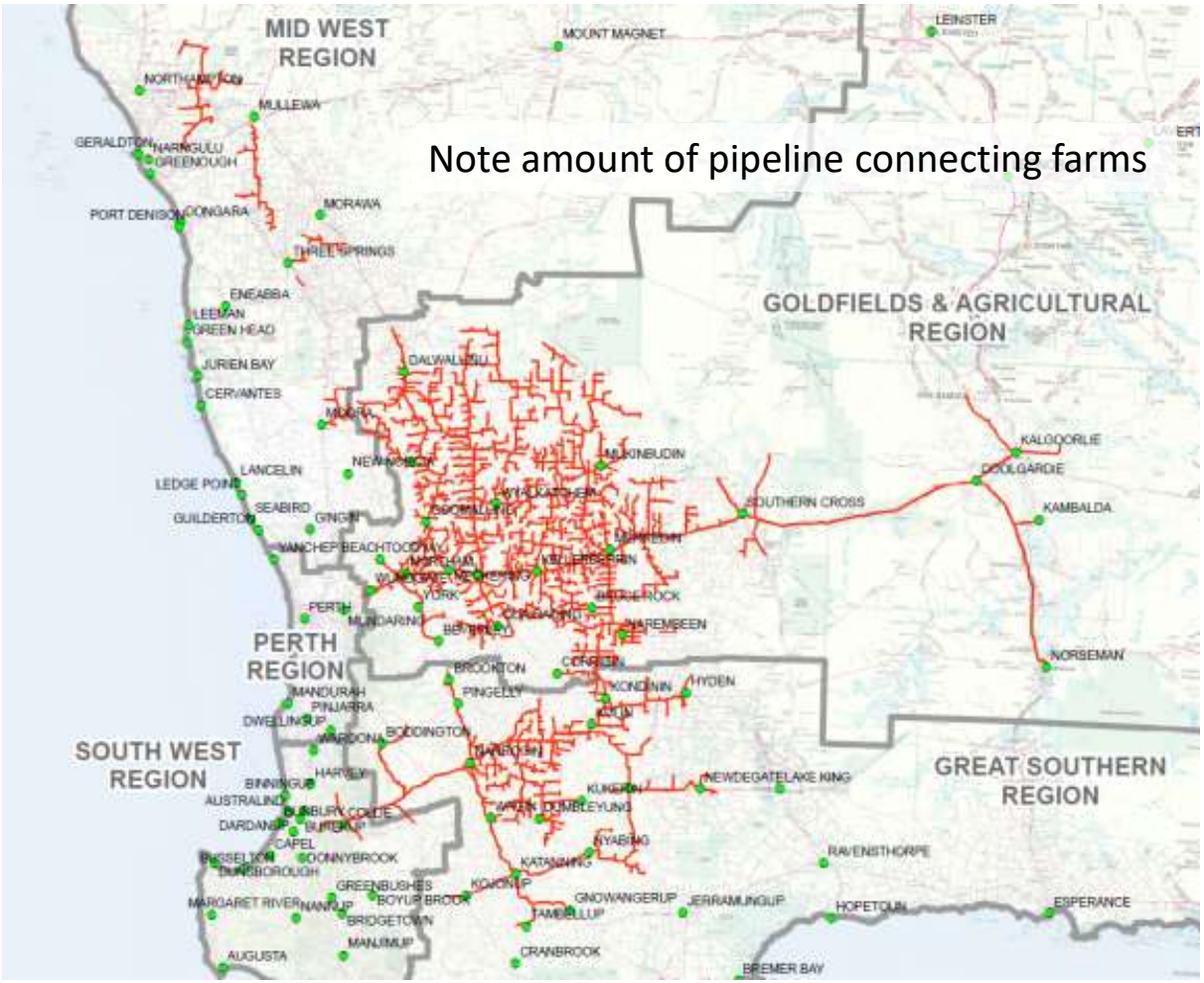
Water demand – dryland agriculture

SW Industry (non irrigated)	Total Water Requirement (GL/year) Average	Total Water Requirements (GL/year) High Demand
All Livestock	43	50
Cropping (7.8 m ha)	*2	*4
Industry processing	*5*	*6*
Total	**50**	**60**

* Accuracy low



IWSS Farmlands – public supply (10-20% demand)



	GAWS (Mundaring to just past Southern Cross)	GSTWSS
Length of mains	8800km	3000km
Farmlands customers	2900 out of 19900 total customers	1290 out of 37900 total customers
Farmlands usage	3.85GL out of a total of 9.9GL	1.68GL out of a total of 5.00GL

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WaterSmart Farms

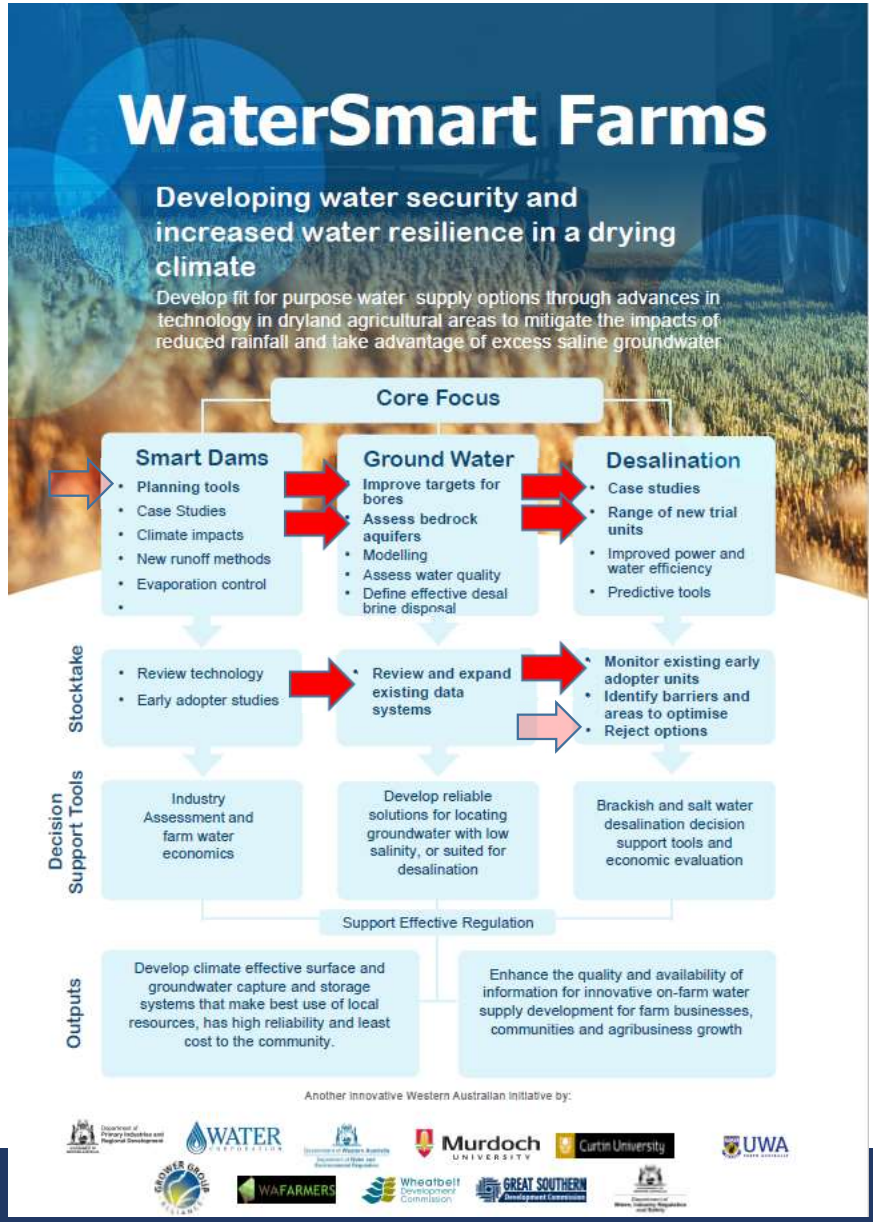
- Minister announced January 2021 ($1.5m <2.5 years)

R&D partnerships to deliver:

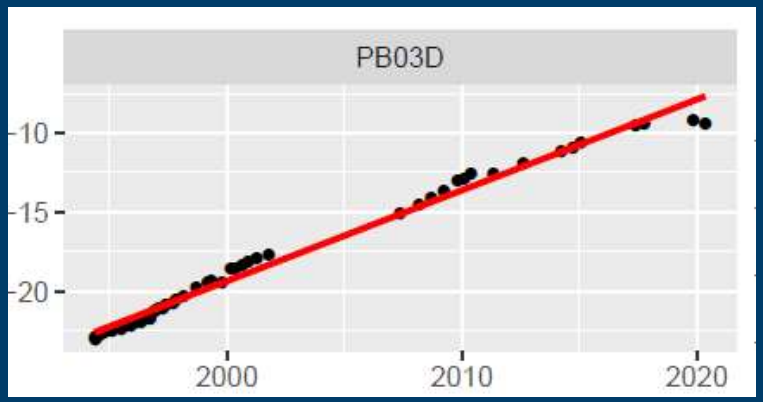
- $0.2m Assessing early adopters and technology
- $0.7m Assessing groundwater options and disposal
- $0.6m Assessing desalination equipment and systems

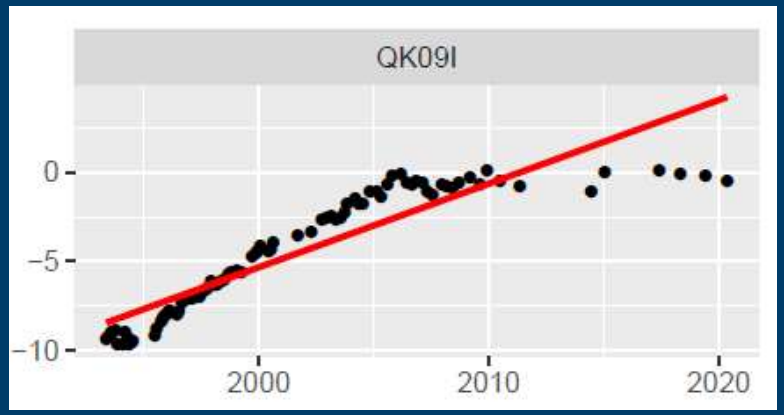
Looking to grow initial project through new partnerships

Advance *SmartDams* and other aspects (Drought Hubs… etc)



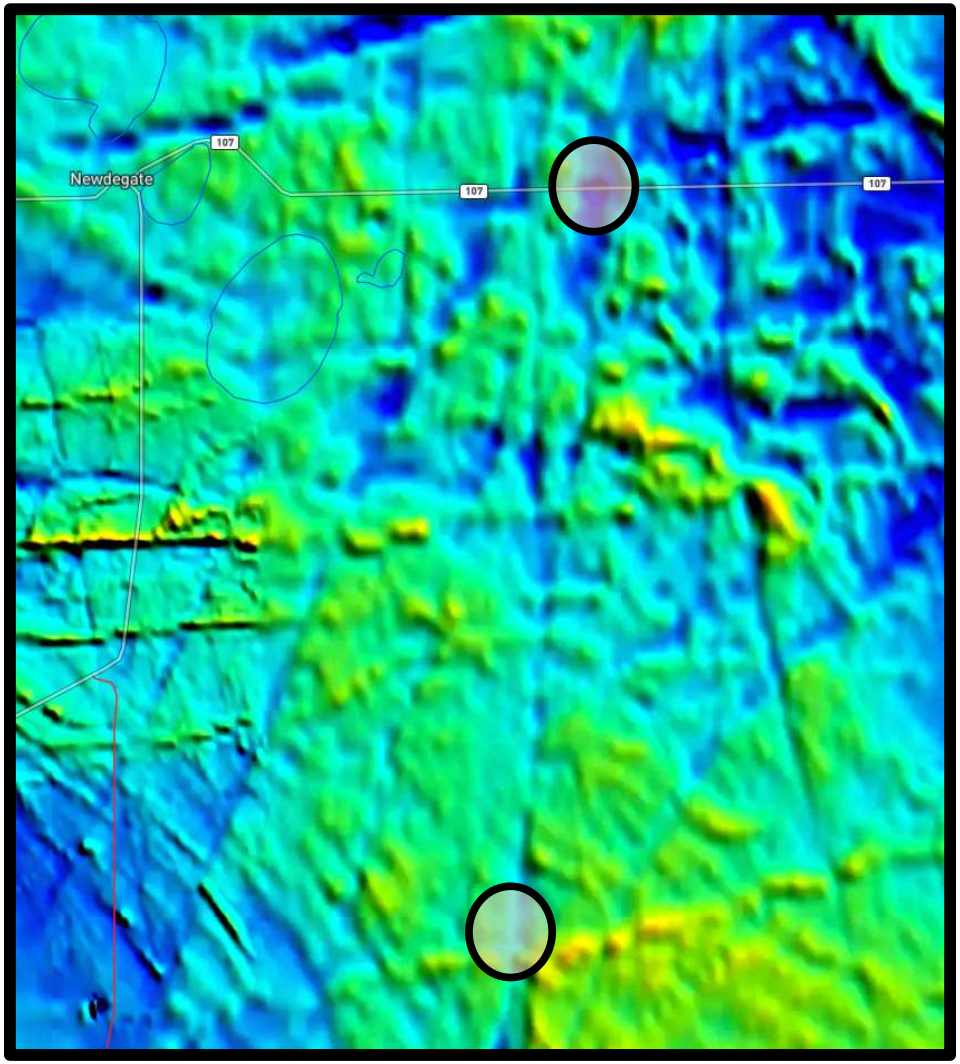
Clearing & salinity – Part 2 - groundwater options…



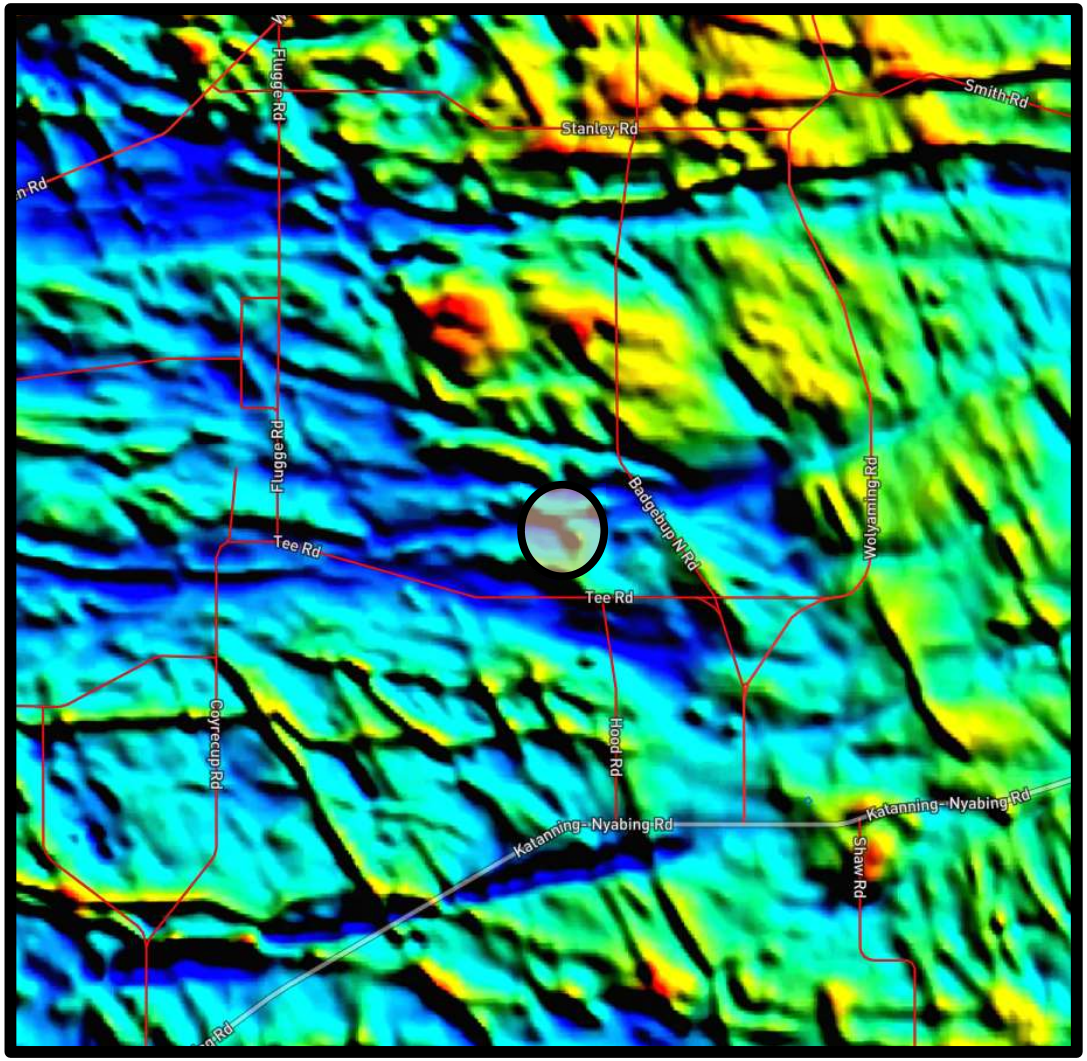


Where do you drill?

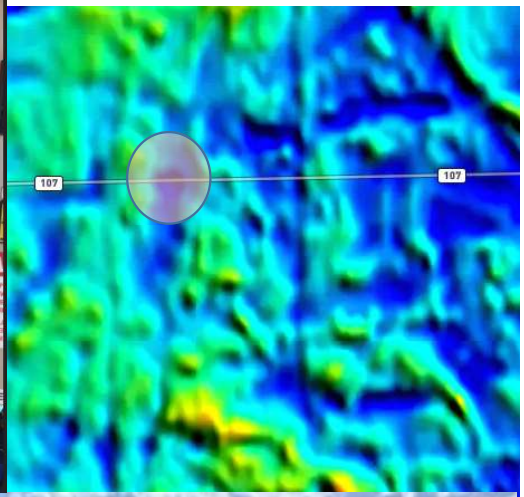
Case study 1 – Newdegate (saprock)



Case study 2 – Badgebup (saprock & hardrock)

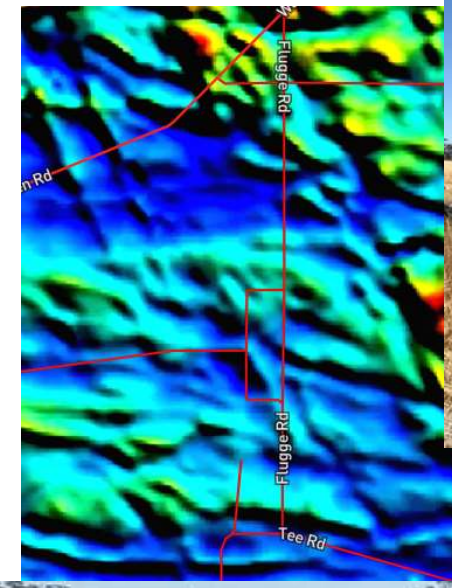


Case Study 1



<20 kL/d (50 kL reject)
23,000 TDS

Case Study 2

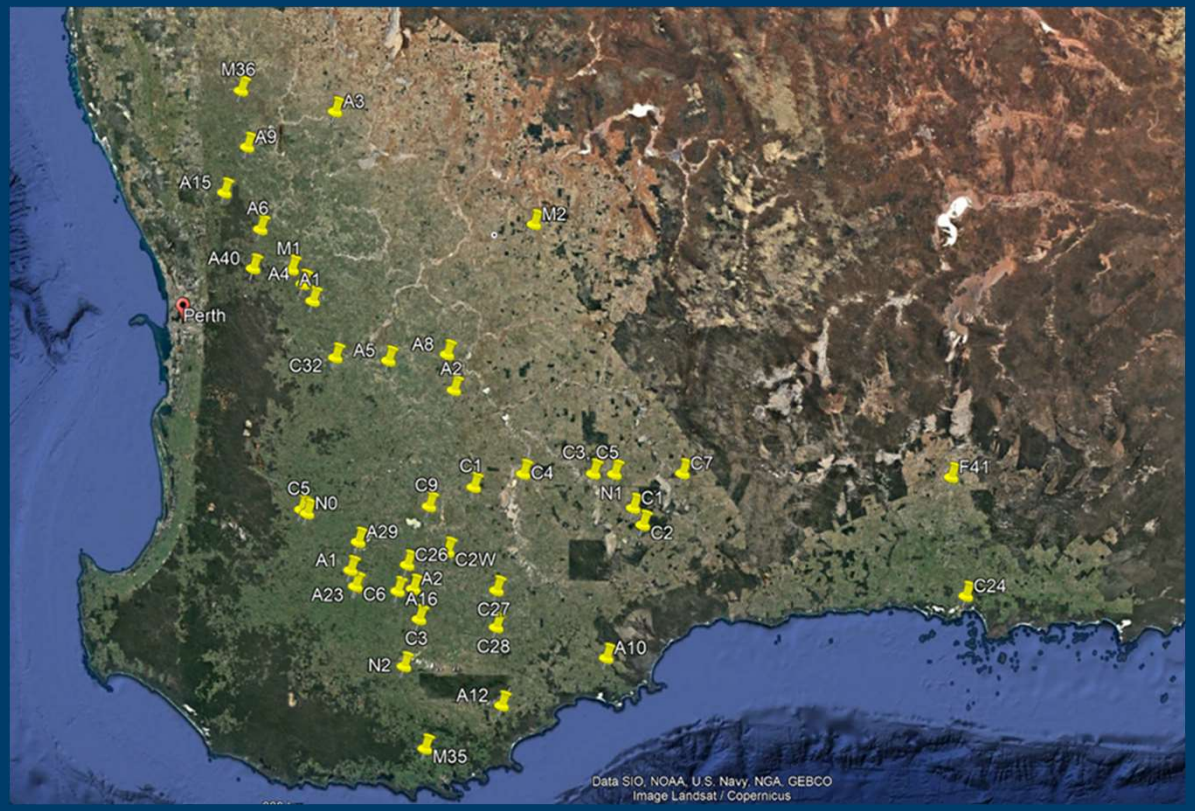


70 kL/d (120 kL/day reject)
15,000 TDS

RO Desalination

- First trial mid - 1980s
- Initial farmers - 2008 & 2014
- Build up - 2019-20 with dry season (21 NOIDs)
- Now 40 plus installed
- Great Southern focus

Numbers estimated from industry and DPIRD



4-5 Main RO suppliers

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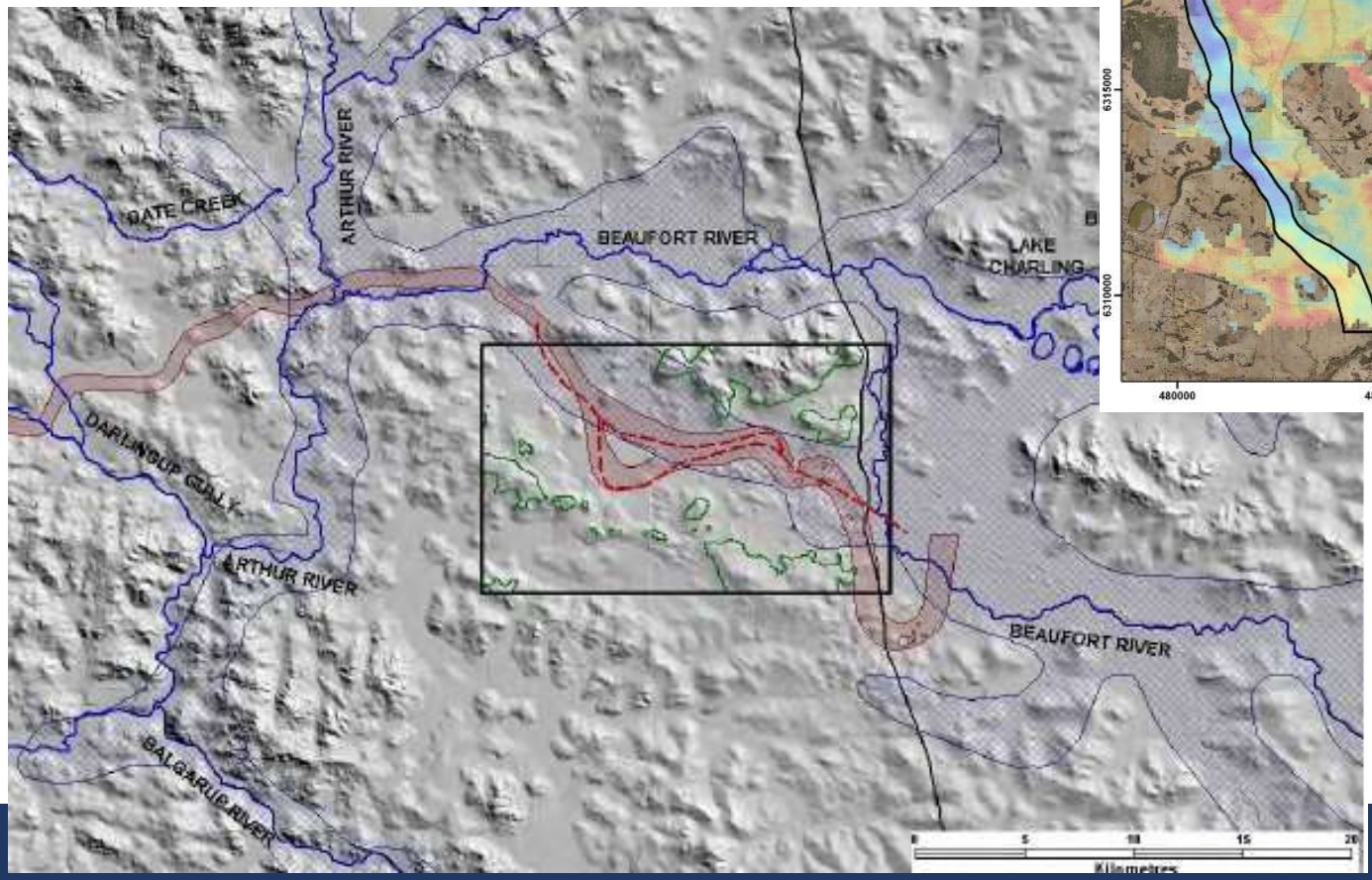

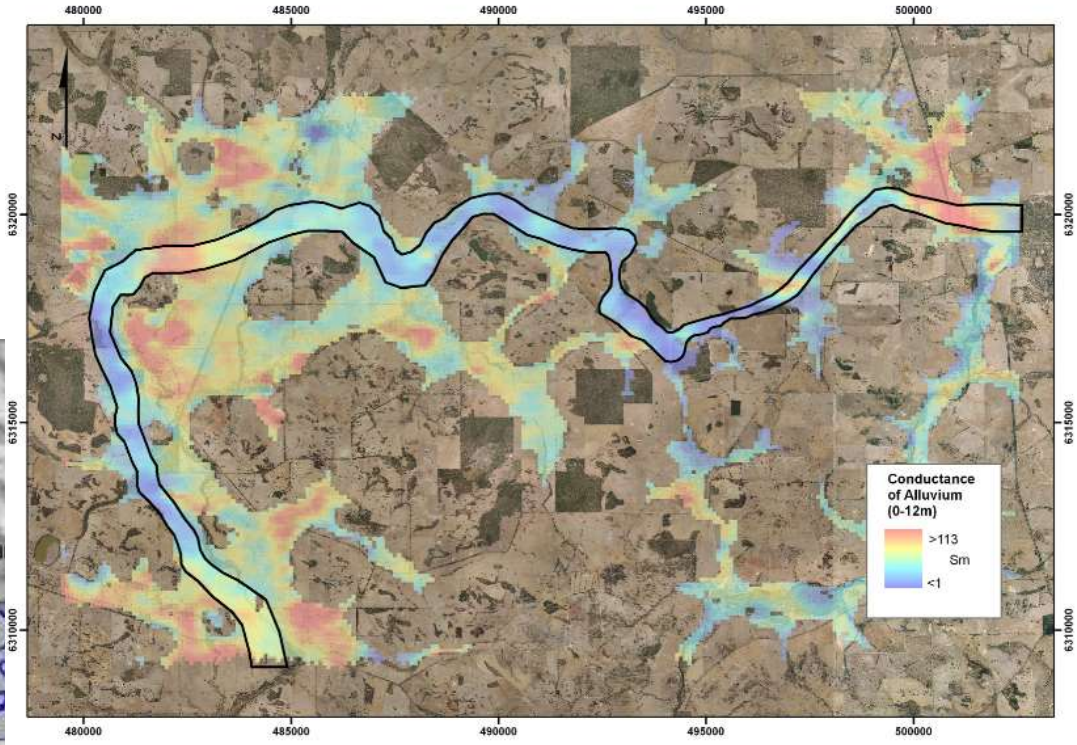

Eocene palaeochannels

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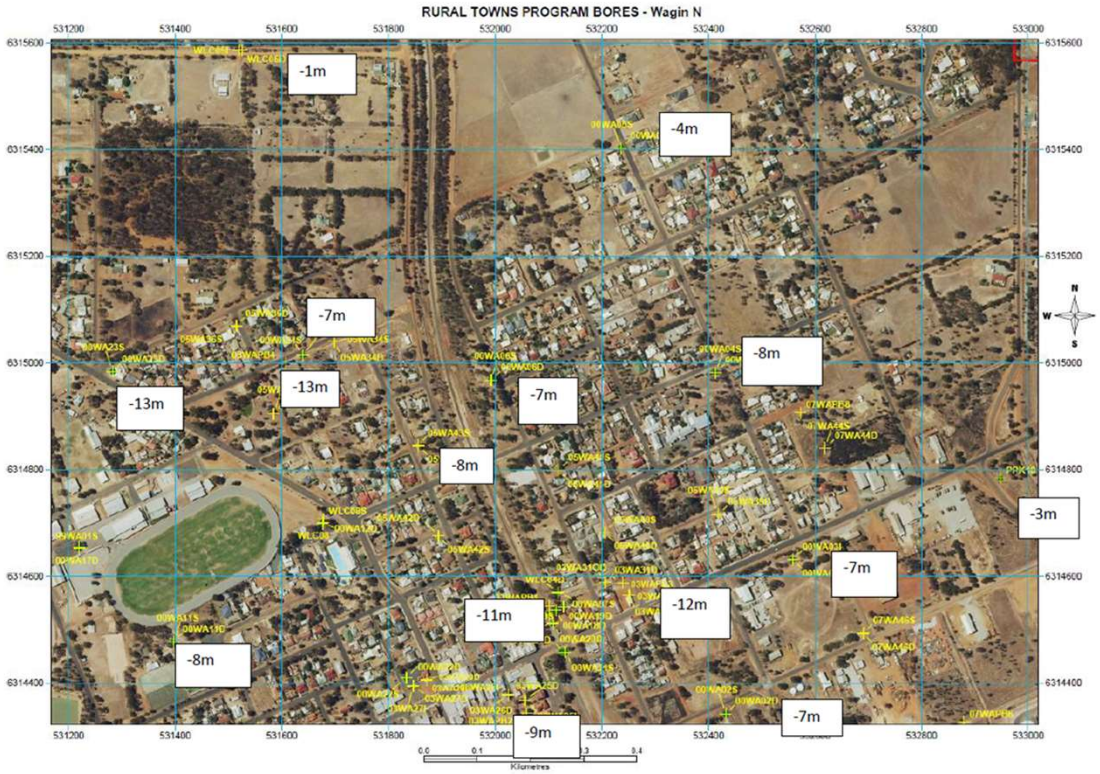
Wagin – dewater and desalinate



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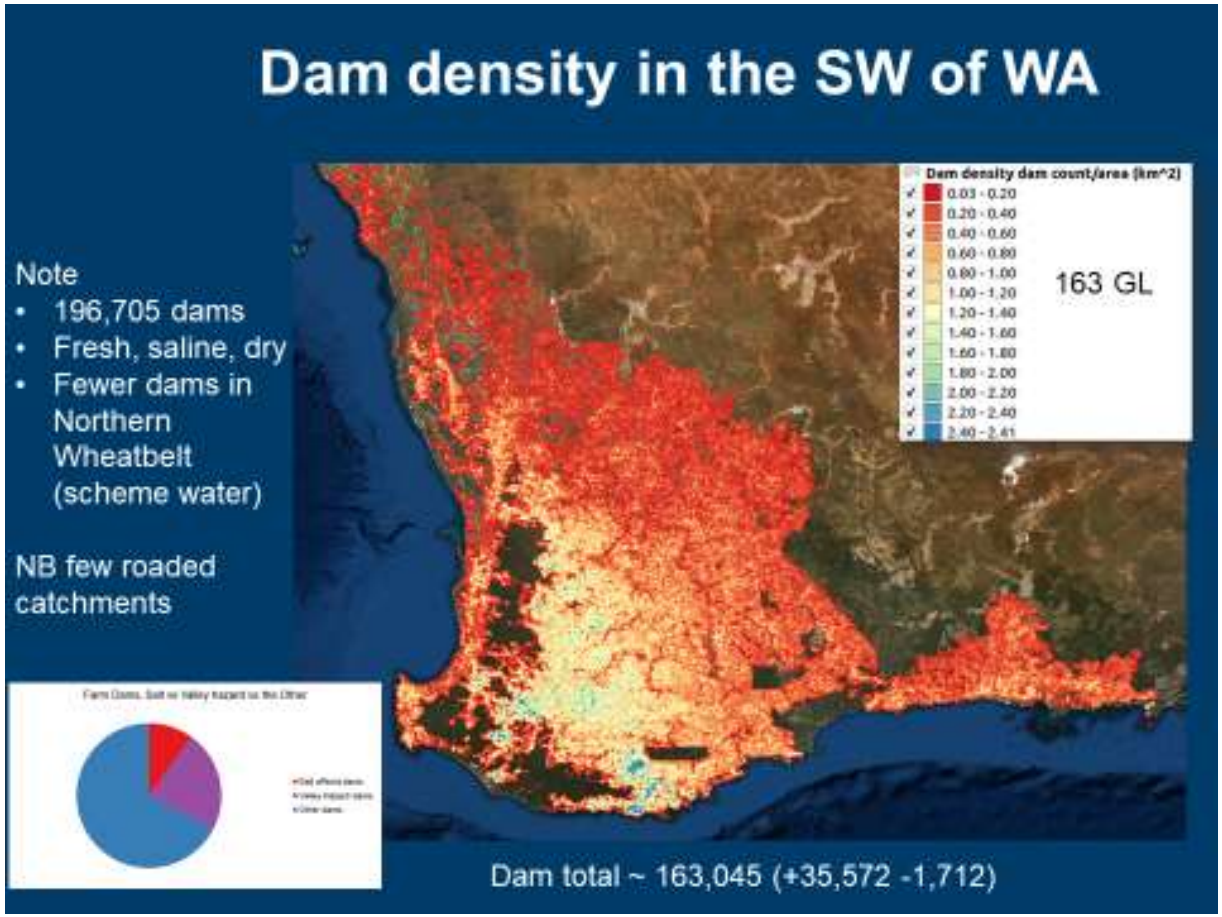
SmartDams

Build partnerships to look at surface water

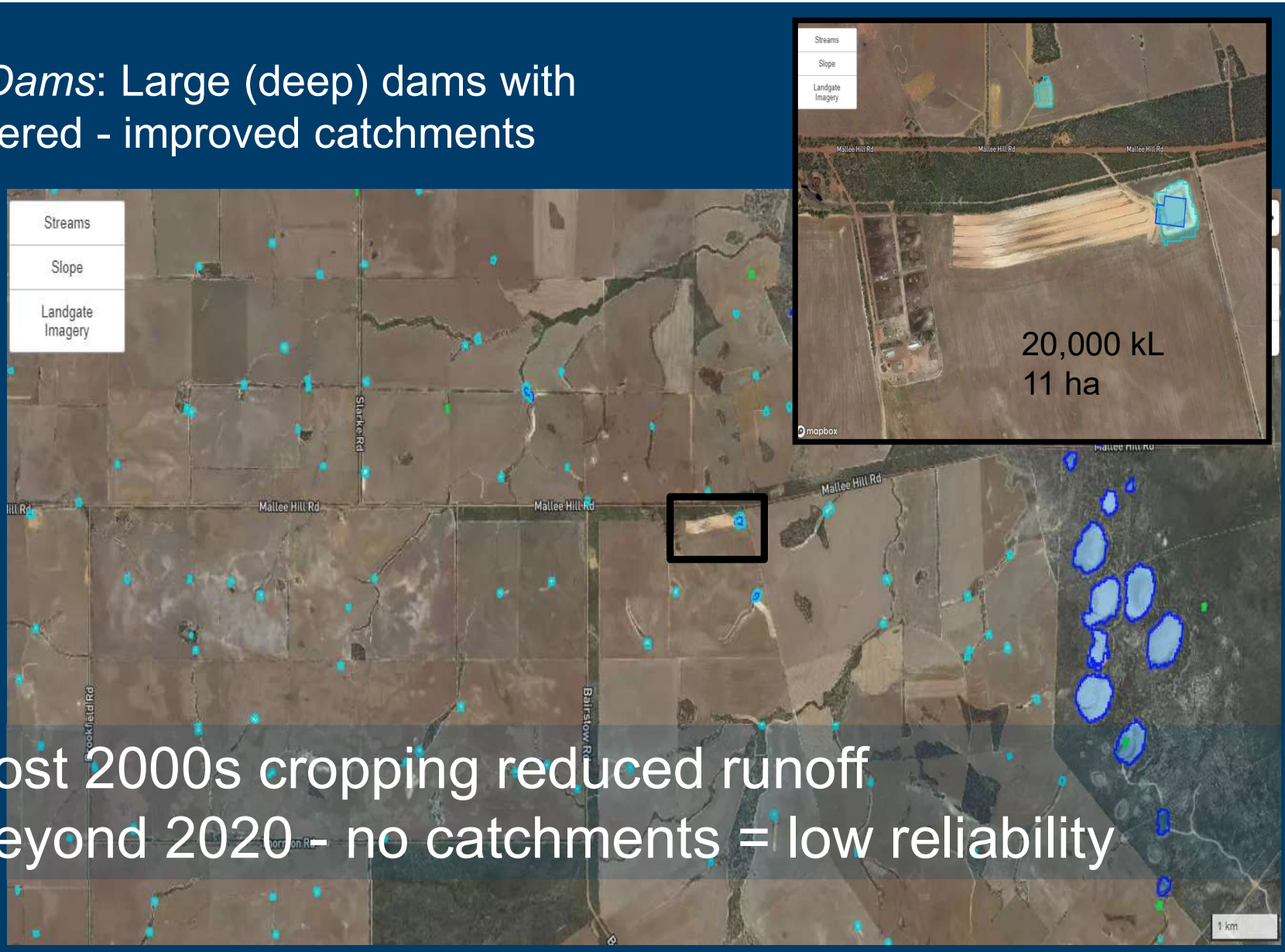
Drought Hub partnership…?

GGA - capacity

…but we started…..

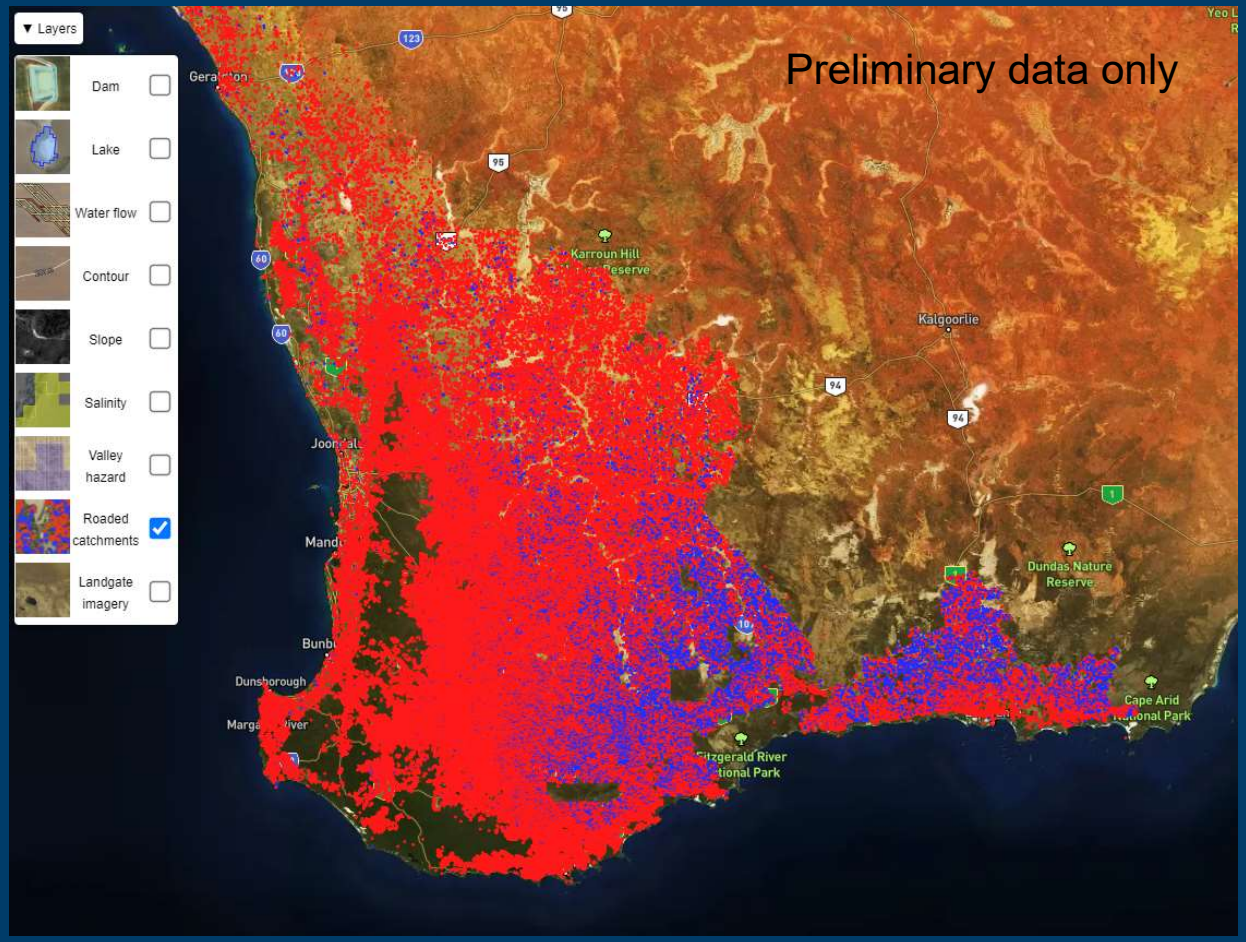


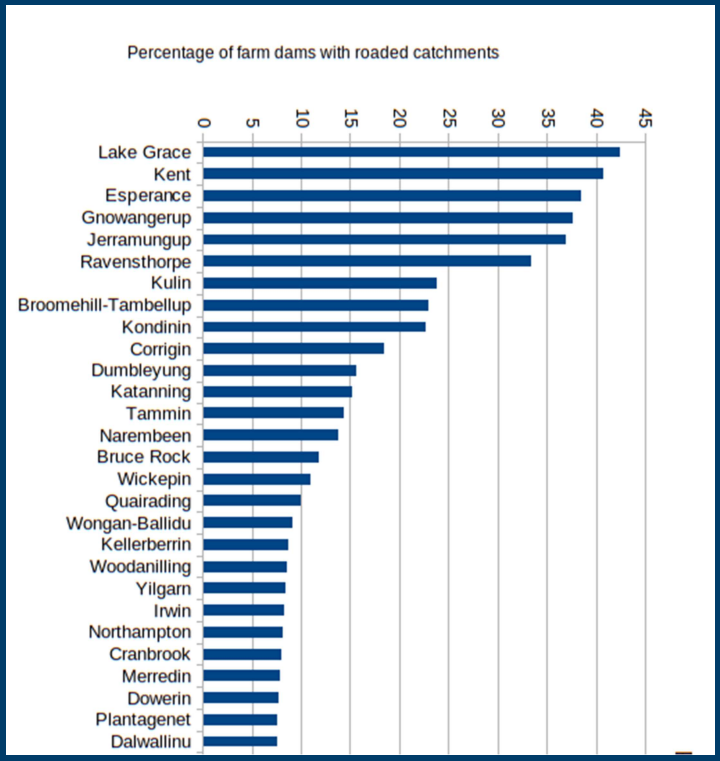
SmartDams: Large (deep) dams with engineered - improved catchments



Post 2000s cropping reduced runoff
Beyond 2020 - no catchments = low reliability

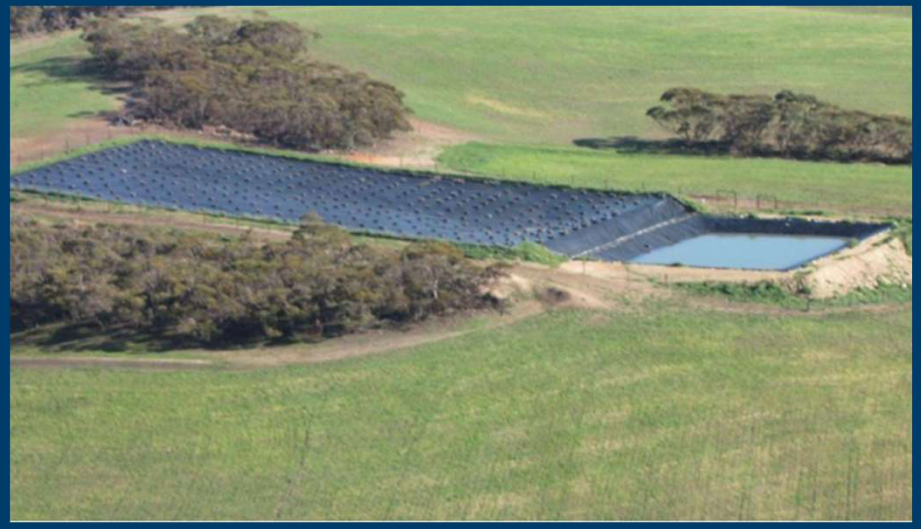
Machine learning – estimate of density of roaded catchments





Other options to improve farm water security

- Audit & Plan
- Double dams, deeper dams
- Seepage control – clay
- Evaporation control – covers, shade
- Polymers – improve runoff
- Plastics



Unfunded in WaterSmart Farms Phase 1

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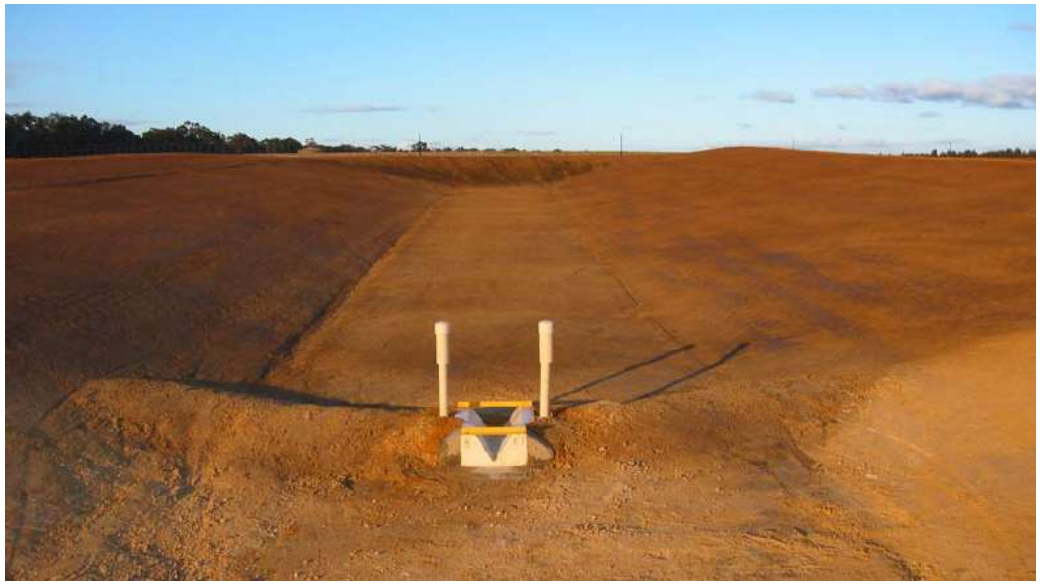
WINE INDUSTRY ASSOCIATION WESTERN AUSTRALIA

2006 - research into polymers



Product name	Company
Soil-Loc (Total Ground Control)	Omnichem
Road Pave	Rain Storm
Gluon 240	Rain Storm
Dustex	Dustex Australia Pty Ltd
Claycrete II	Dynamic Stabilisation
Soil Bond	Huntsman Chemical Company.
PK4	Eco-Enzymes Australia Pty Ltd.
Cooee Ecotrax	Cooee Products

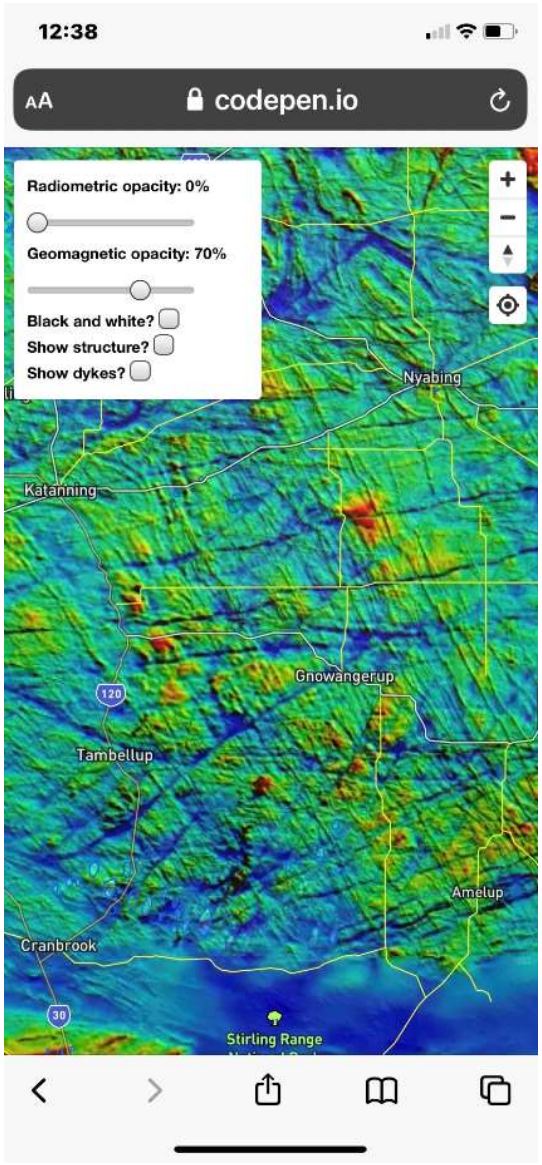
Effective at lowering thresholds to run water

Planning tools in development

Smart Phone M-apps

SmartsDams – location, design, planning surface water.

Geology – Geomaps as a exploration indicator tool for groundwater



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WaterSmart Farms v1 & v2

Goal - Improve on-farm resilience of agricultural systems

- WaterSmart Farms – find local fresh to brackish water, balancing IWSS and dams
- Desalination – review and develop technology – aspiration to have 1000 farms on 10-20kL systems - equate to the total IWSS Farmlands supply
- However desalination is a new cost and we have 200,000 dams. So how many do we keep, rebuild and update.
- Opportunity to improve landscape water balance – salinity, by better using water.
- Next – develop Drought / GGA partners to deliver regionally targeted elements

Radiometric opacity: 0%

Geomagnetic opacity: 27%

Black and white?

Show structure?

Show dykes?

Geo data from DMIRS

Williams

30

30

Fractured Rock
New geophysics
New opportunities and industry