

# Policies and tools to promote economic use of groundwater in South Australia

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- Groundwater is the ONLY source of water for more than 80% of the area of SA
- It provides supplies for towns, irrigated agriculture, stock and domestic uses, the environment, and mining and energy developments- total value \$A 4 billion (€ 2.75 b)
- Increasing demand for high quality food by the growing middle classes of Asia represents a great economic opportunity for SA



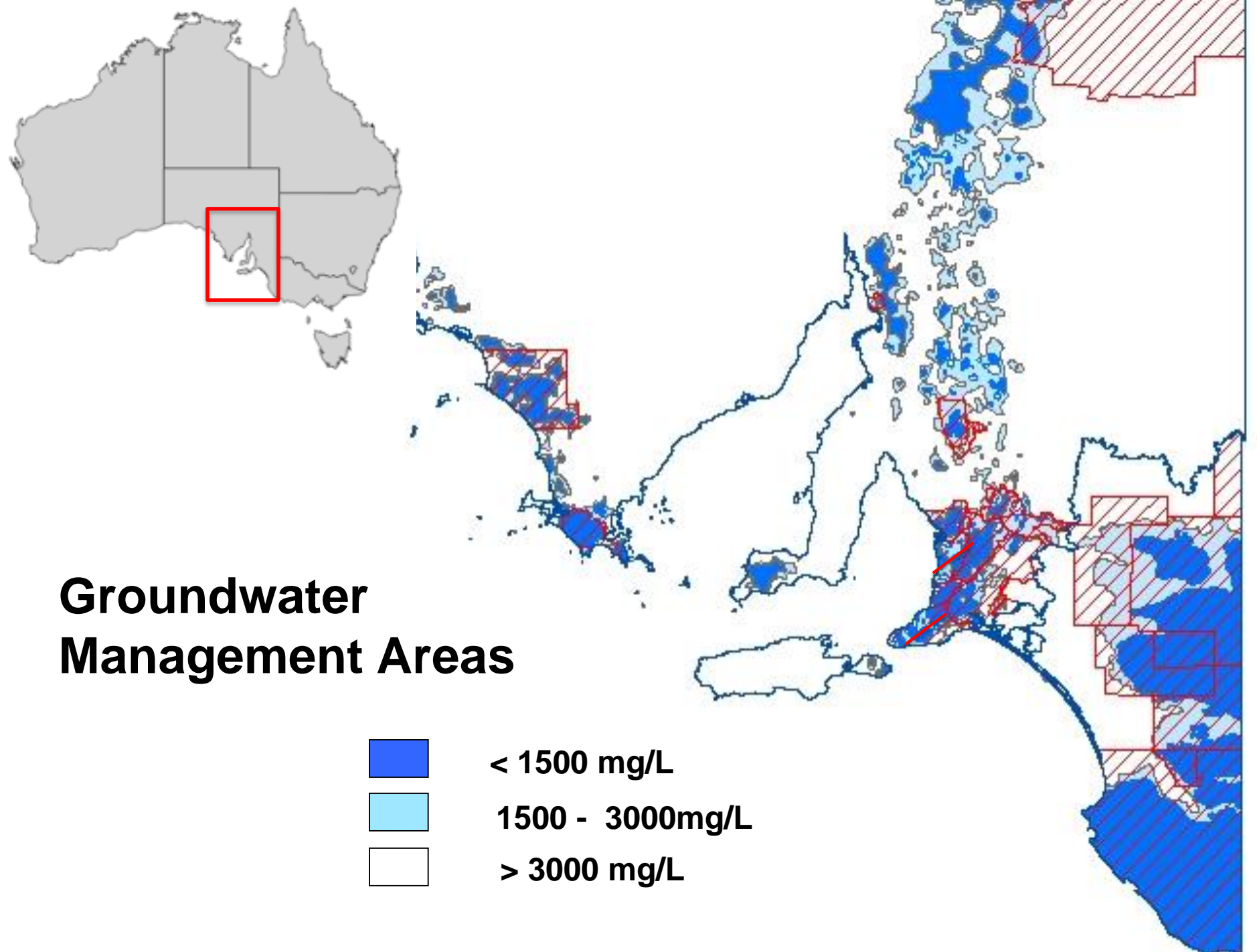
Virtually all the significant good quality groundwater resources (below 3000 mg/L) occur within Groundwater Management Areas (GMAs)



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# Management framework

Major components relevant are ;

1. Water Allocation Plan (a management plan for the groundwater resource)
2. Market instruments – water trading
3. Determination of sustainable yield



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# Question ?

Is the current management framework flexible enough to facilitate additional sustainable groundwater development to meet the rising demand for food and wine ?

Or is this framework an impediment ?



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# 1. Water Allocation Plans

- Each GMA has a statutory Water Allocation Plan (WAP) – this is a legal document
- The WAP must seek a balance between economic, social and environmental water demands
- Water is allocated for the environment first, then the remainder is allocated to economic and social users



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- WAP is essentially a rule book for granting new allocations and for water trading, and sets an extraction limit (after environmental needs met)
- A licence is required for extraction which must be metered
- WAP produced with strong community involvement (not just the economic users)
- WAP should recognise the trade-offs between benefits and impacts of groundwater extraction





# Previously...

- Before 2010, WAPs were fairly rigid and doctrinaire



- They did not anticipate new knowledge of the resource or the impact of climate extremes



# Now...

- Recent WAPs (>2010) are more flexible



- They can consider new information or knowledge of the resource that may emerge during their 10 year life span (examples to follow)



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## 2. Market instruments

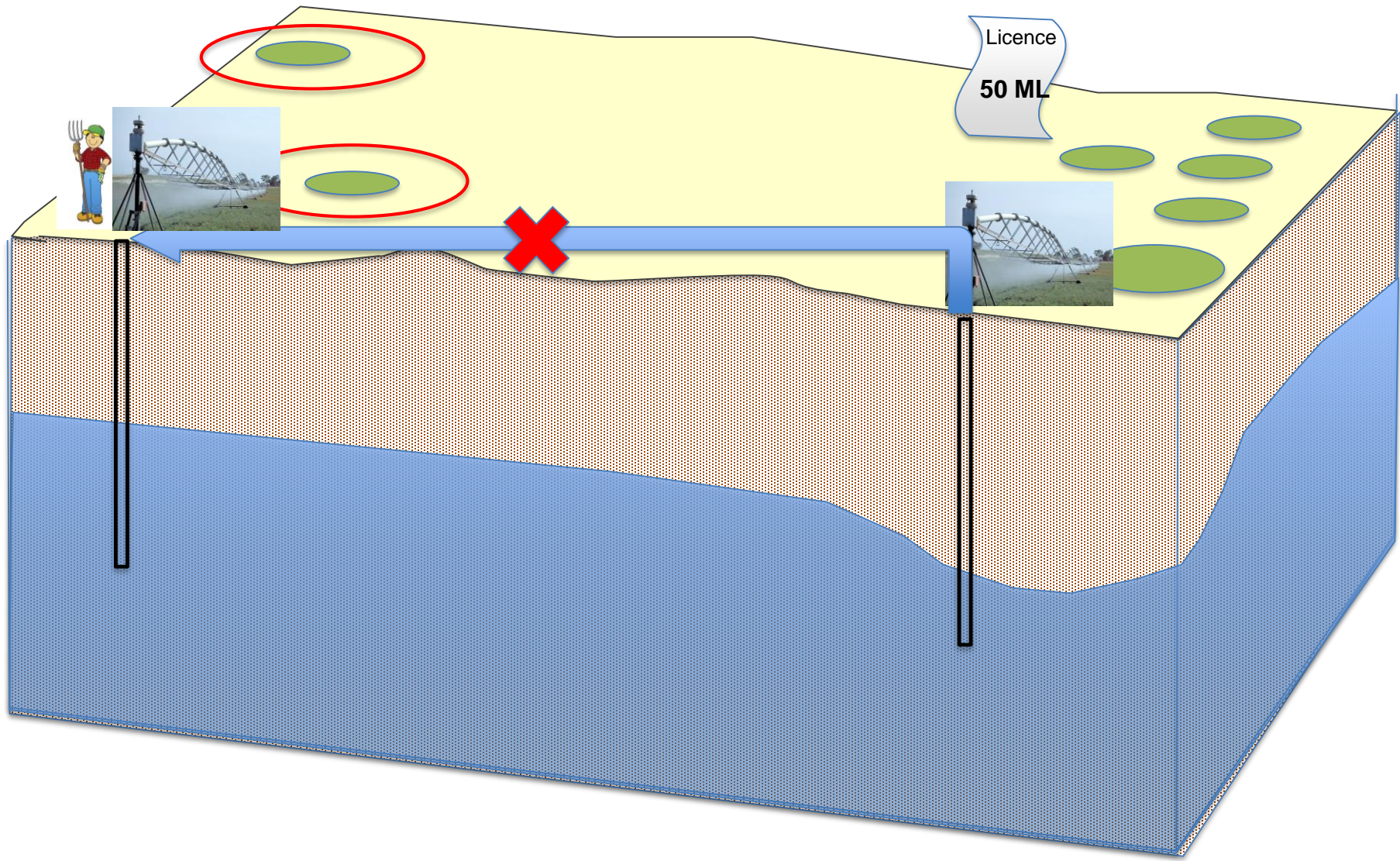
- In fully allocated areas, trading of water allocations can maximise the economic use of groundwater within the sustainable limits
- This has been occurring in SA for the past 30 years
- Trades can be permanent (sale of allocation) or temporary (lease for x years)



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Licence  
50 ML



- Trades must be controlled by rules in the WAP to minimise the impacts on the resource, other users and ecosystems
- BUT do the current rules unnecessarily constrain development ?

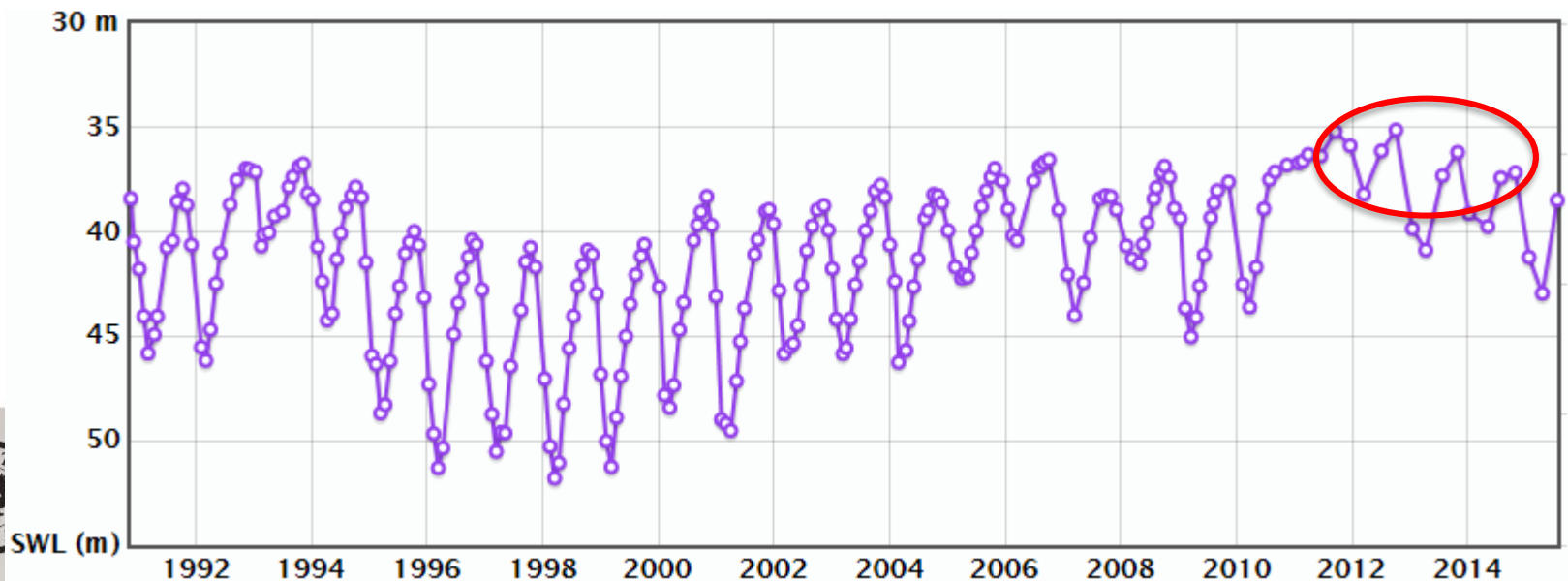


# Previously...

Older WAPs (<2010) have rigid rules such as..

***No trade will be allowed if..***

*".....the aquifer is being stressed....if the water level has fallen a total of 500 mm or more over the three years ..."*



SWL (m)



# Now...

In newer flexible WAPS (>2010), additional rules are added...

***A trade will be allowed if...***

*"..... it can be proven to the satisfaction of the Minister that no detrimental impacts on the resource as a result of that trade will occur..."*

The onus is on the applicant to provide the evidence that no detrimental impacts will occur



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# 3. Sustainable yield (SY)

- Sustainable development can be restrained by inappropriate methods used to estimate SY
- For example, the use of recharge – it cannot be measured directly, is highly variable over time and space, and estimates are +/- 30 %



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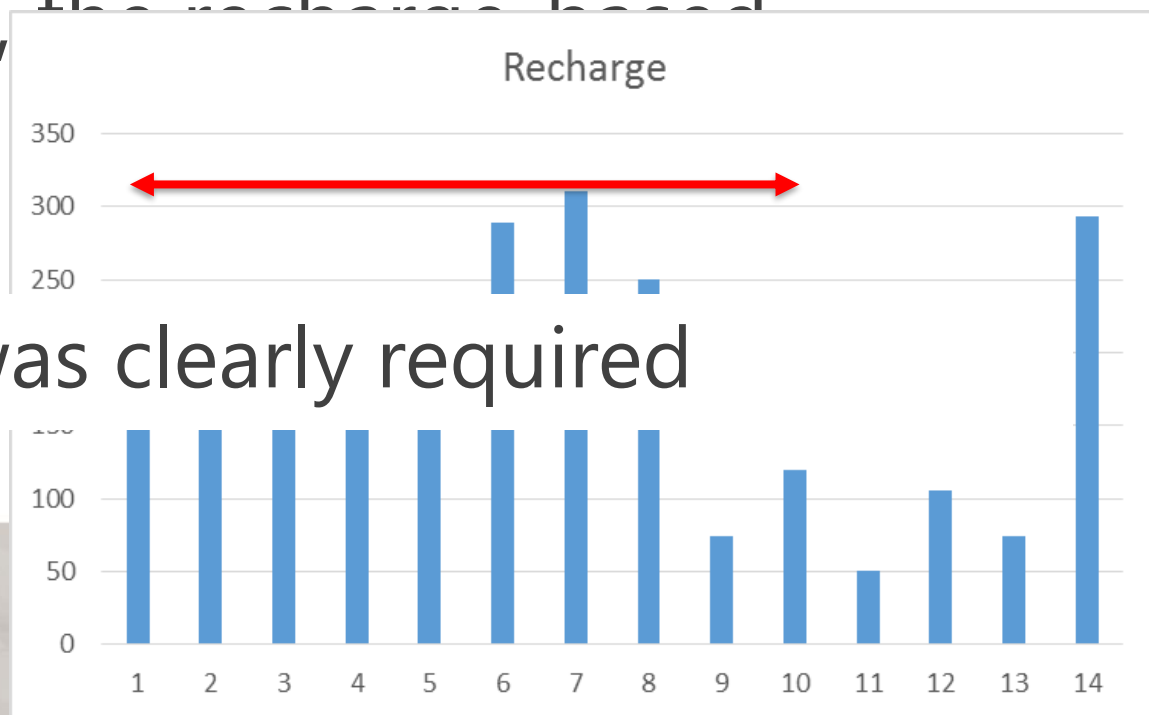


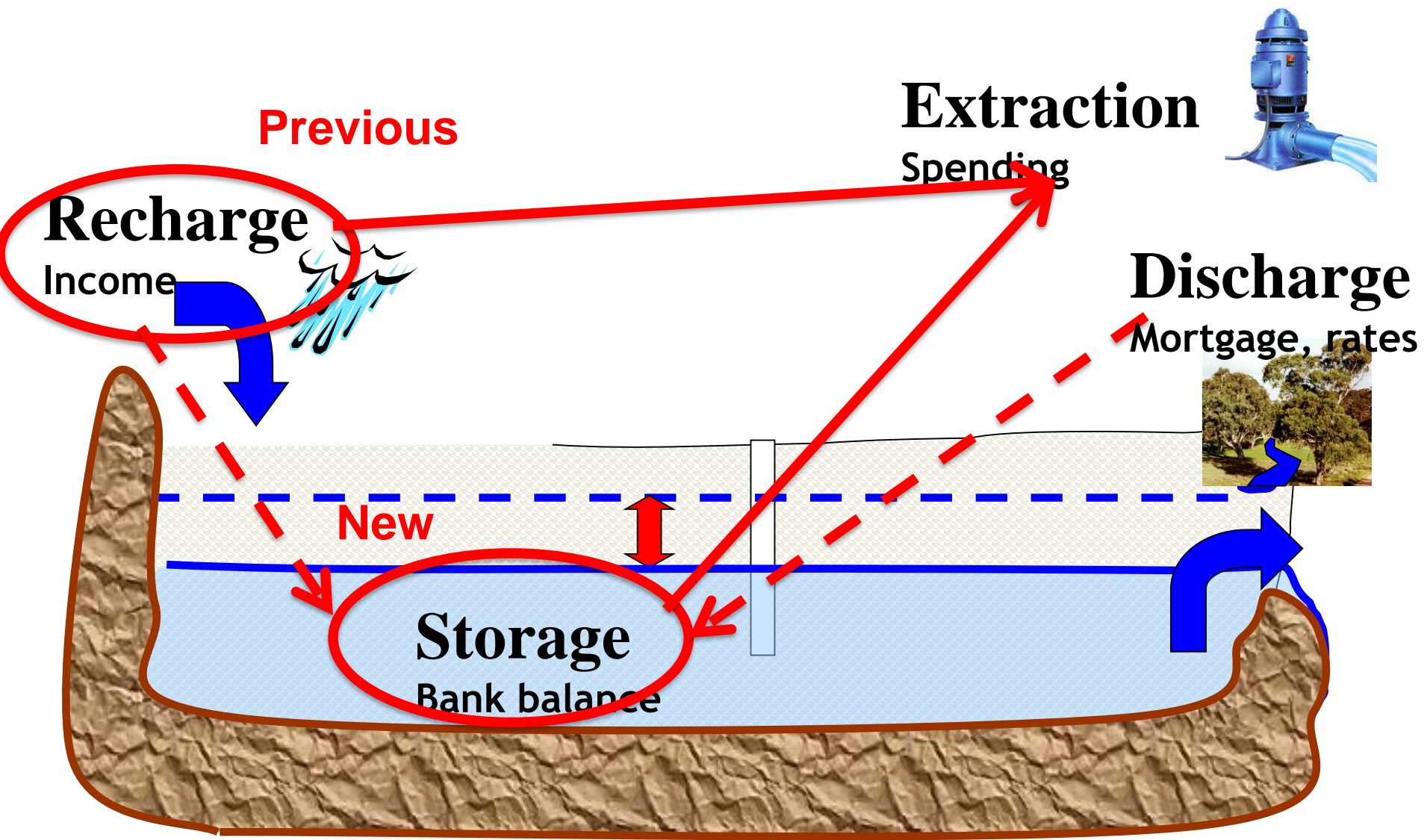
# Case study

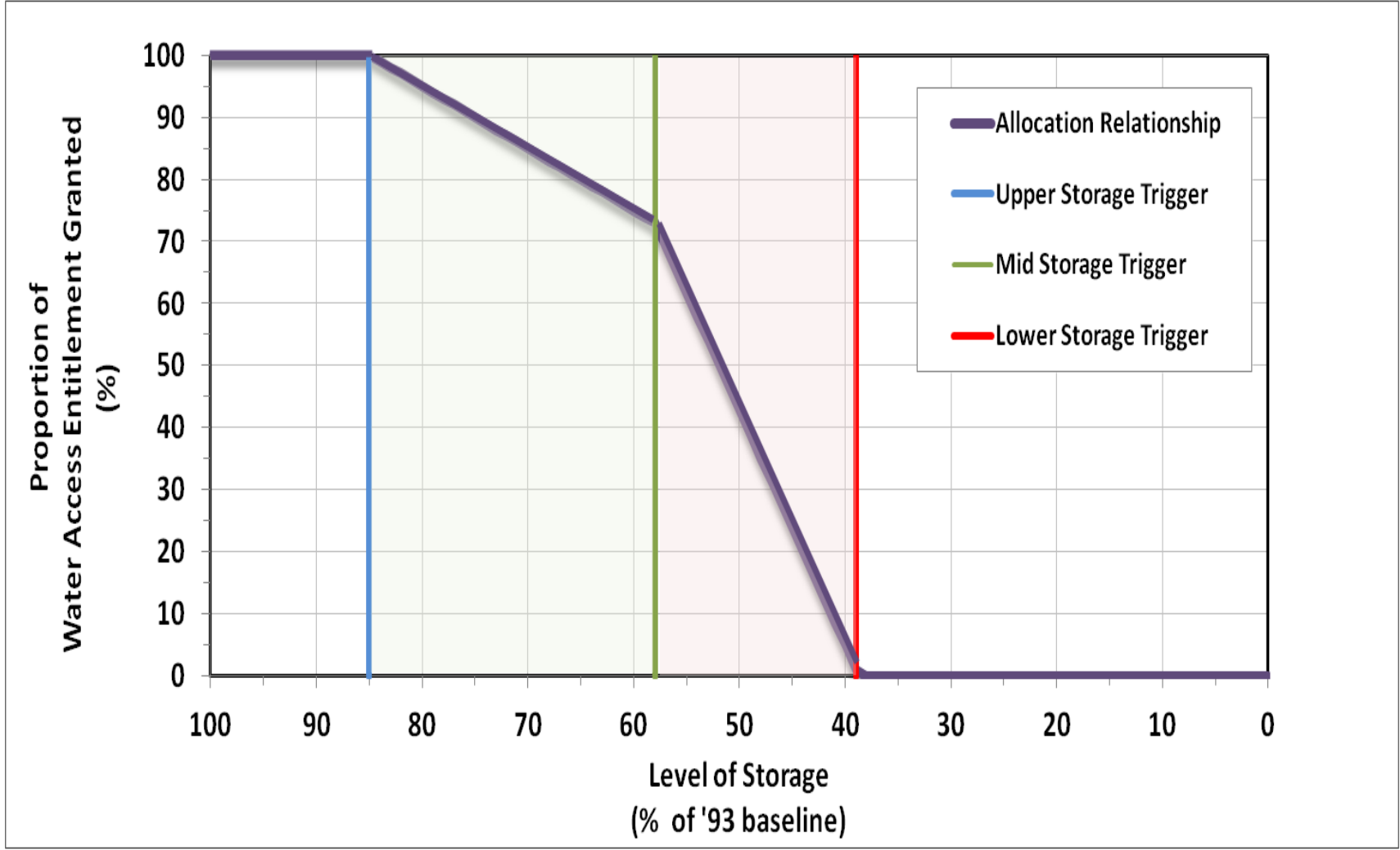
- A shallow limestone aquifer with limited storage is used for public water supply
- Allocations were determined annually by a 10 year rolling average of recharge estimates based on the annual watertable rise
- This approach was considered innovative adaptive management at the time (2000)



- However, this method does not take into account the impacts of natural discharge
- During a recent drought, discharge processes dominated, leading to parts of the aquifer becoming completely unsaturated
- During this time, the recharge-based allocations were reduction
- A new method was clearly required







- Sustainable development can be restrained by over-conservative estimates of SY
- Traditional methods of determining SY often do not consider the fact that some aquifers are very robust (ie may have large storage)
- Controlled depletion has been applied in SA for one GMA where the aquifer is  $> 100\text{m}$  thick and recharge low ( $< 1 \text{ mm/yr}$ )
- Modelling and monitoring essential



# Summary

Our goal is to achieve adaptive and flexible management supported by extensive monitoring, which can significantly contribute to further economic development through sustainable groundwater extraction

In SA, about half of our WAPs achieve this goal – we still have more work to do over the next 5–10 years when the older WAPs are due for review



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# Thought for the day

Whilst it is relatively easy for a humble hydrogeologist to identify the barriers to optimise sustainable groundwater development, the challenge is to overcome the barriers to implementing the changes that are necessary



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