



Alcoa's Hydrological Research

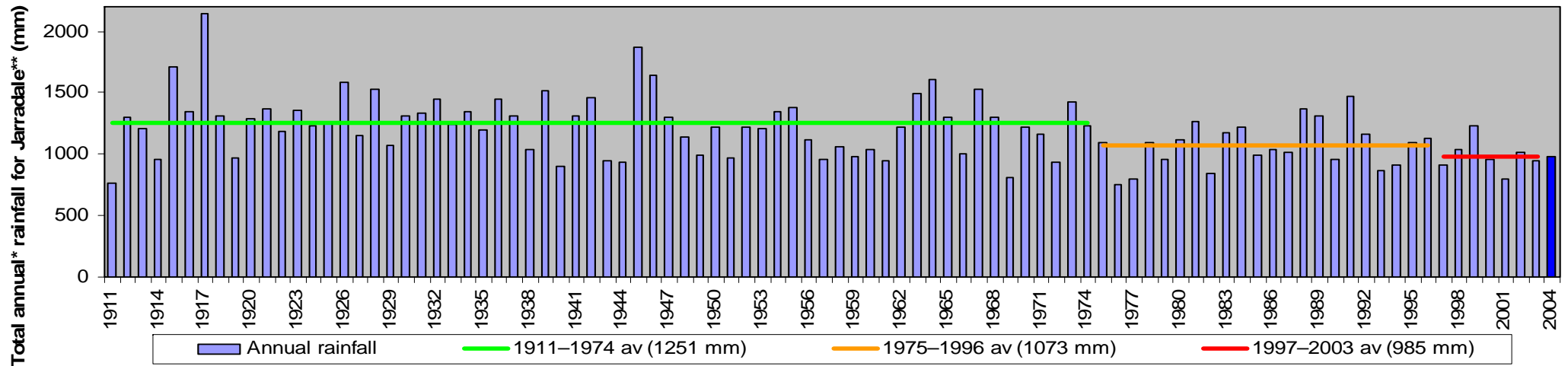
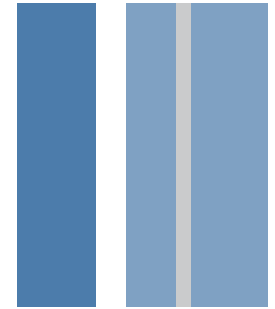


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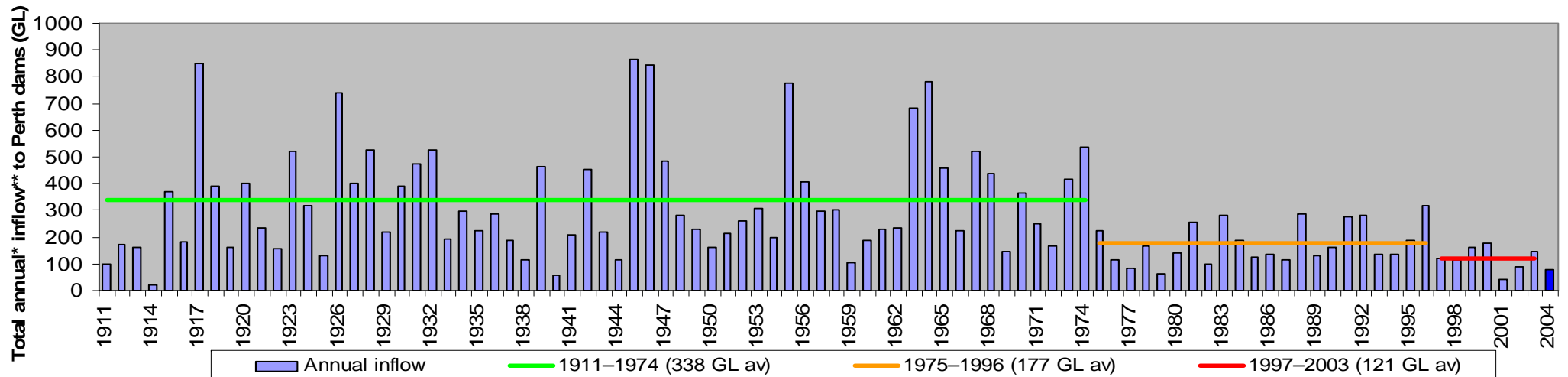
Alcoa's Monitoring in Wungong

- Alcoa established the Cobiac catchment in 1992: this includes stream monitoring and an extensive groundwater network.
- Alcoa continued groundwater monitoring on Cobiac until November 2006 (Water Corporation have now taken this over).
- Alcoa also funds the mined catchments of Seldom Seen and More Seldom Seen which were established in 1966.

Rainfall and streamflow to Perth's dams



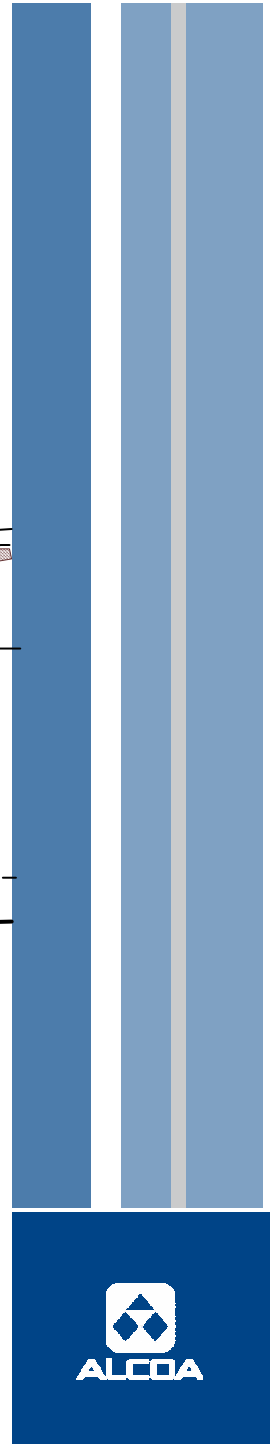
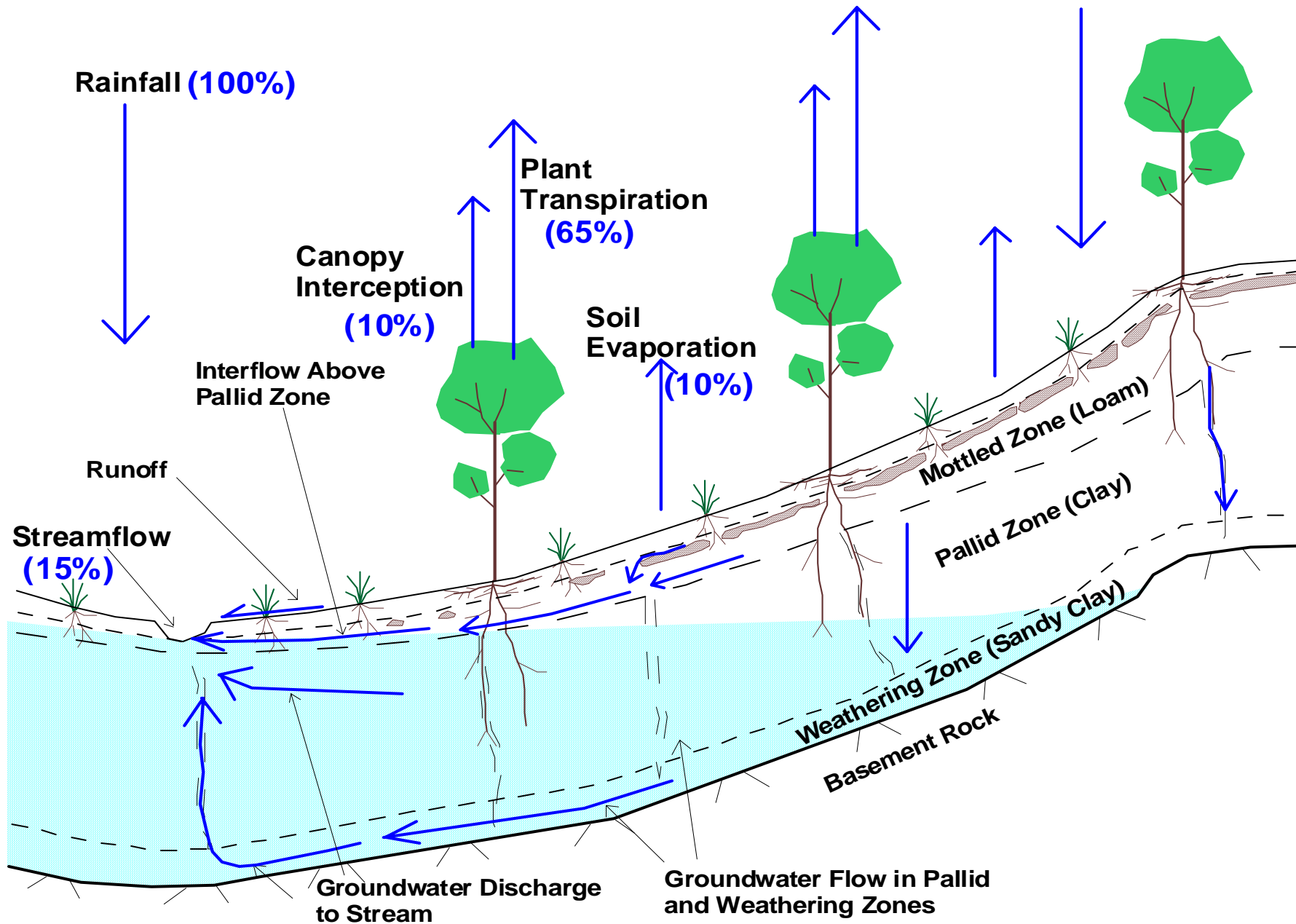
Notes: * year is taken as May to April and labelled year is beginning (winter) of year
 ** some rainfall filled from other stations, 2004 is an estimate



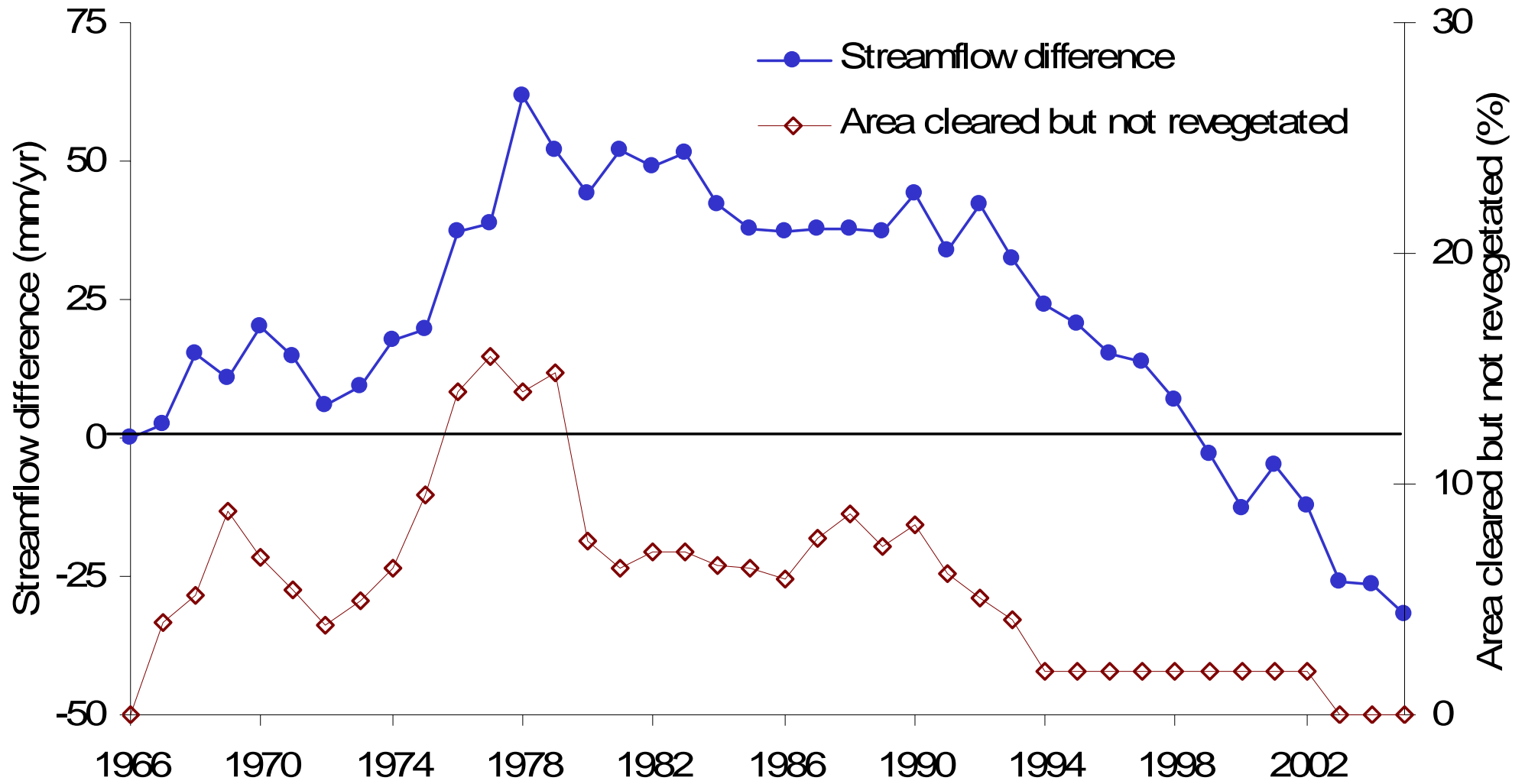
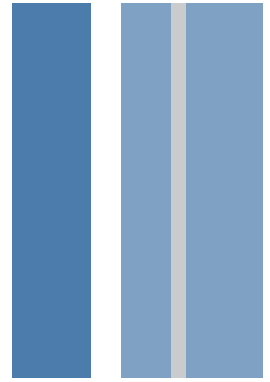
Notes: * year is taken as May to April and labelled year is beginning (winter) of year
 ** inflow is simulated based on Perth dams in 2001 and 2004 is an estimate



High Rainfall Zone hillslope water fluxes



Streamflow response to mining Seldom Seen Catchment



Streamflow response to mining

Catchment	Cleared Area (%)	Peak Increase		Decline 2001–2005	
		(mm/yr)	(% flow)	(mm/yr)	(% flow)
More Seldom Seen	62	247	136	40	38
Seldom Seen	34	230	113	4	5
Del Park	32	98	49	31	29
Warren	40	200	81	66	58
Bennetts	48	252	78	67	54
Lewis	51	163	135	-	-

Studies:

More Seldom Seen and Seldom Seen – Croton et al. (2005)

Del Park – Croton (2004)

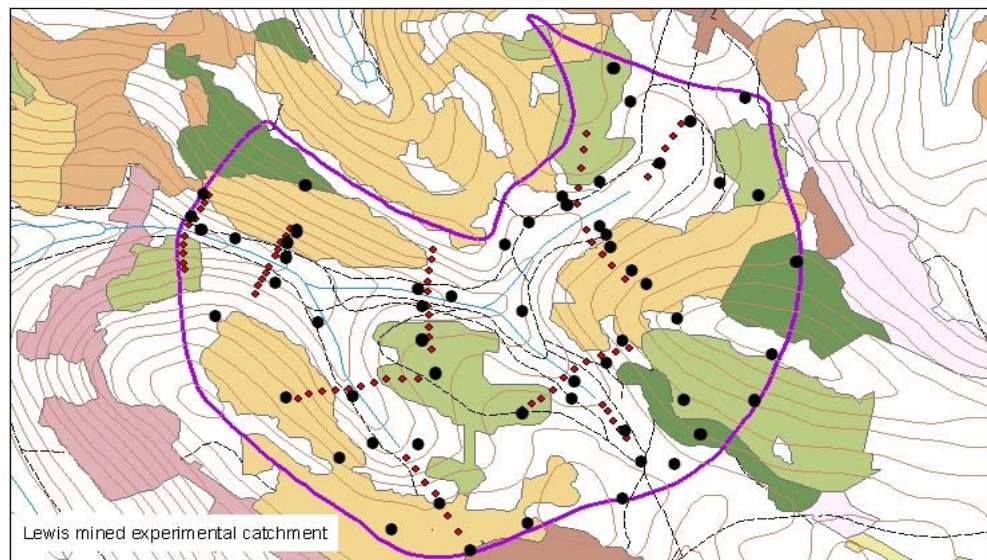
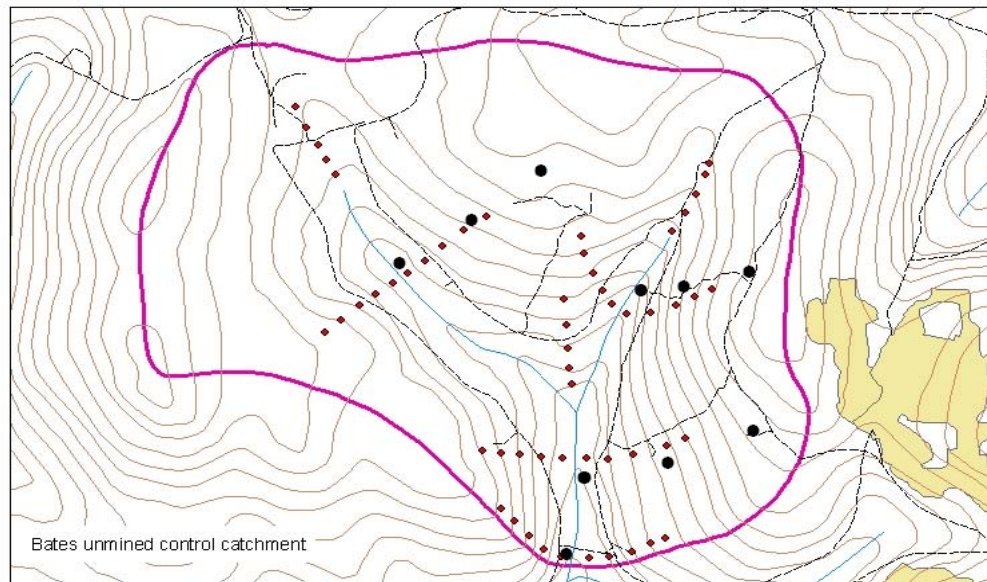
Warren and Bennetts – Using Vardi Rd as control

Streamflow Declines - Causes

- Higher Vegetation Transpiration ? Higher potential transpiration for rehabilitation simply due to increased leaf area and vegetation density.
- Soil Profile Changes? The cause of higher evapotranspiration could be related to changes in the soil profile, which results in more water available to vegetation or loss by soil evaporation.

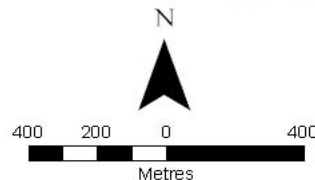
Processes Research

- What are the mechanics of streamflow generation?
- How this is different on mined hillslopes?
- What is the effect of the rehabilitation?
- Interflow dynamics
- Soil moisture
- Interception
- Plant water use

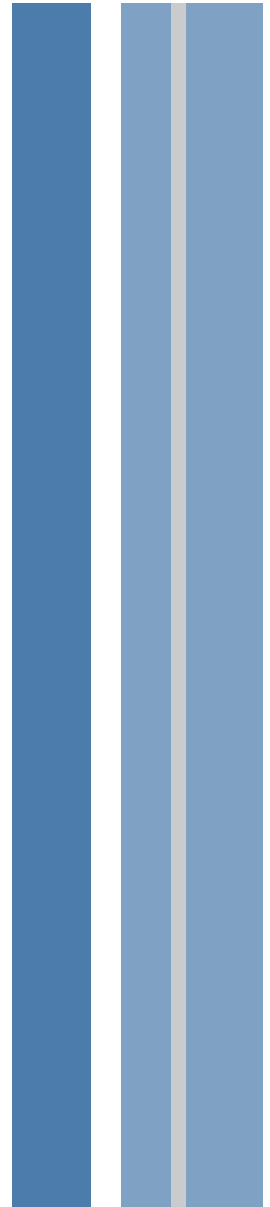


Legend

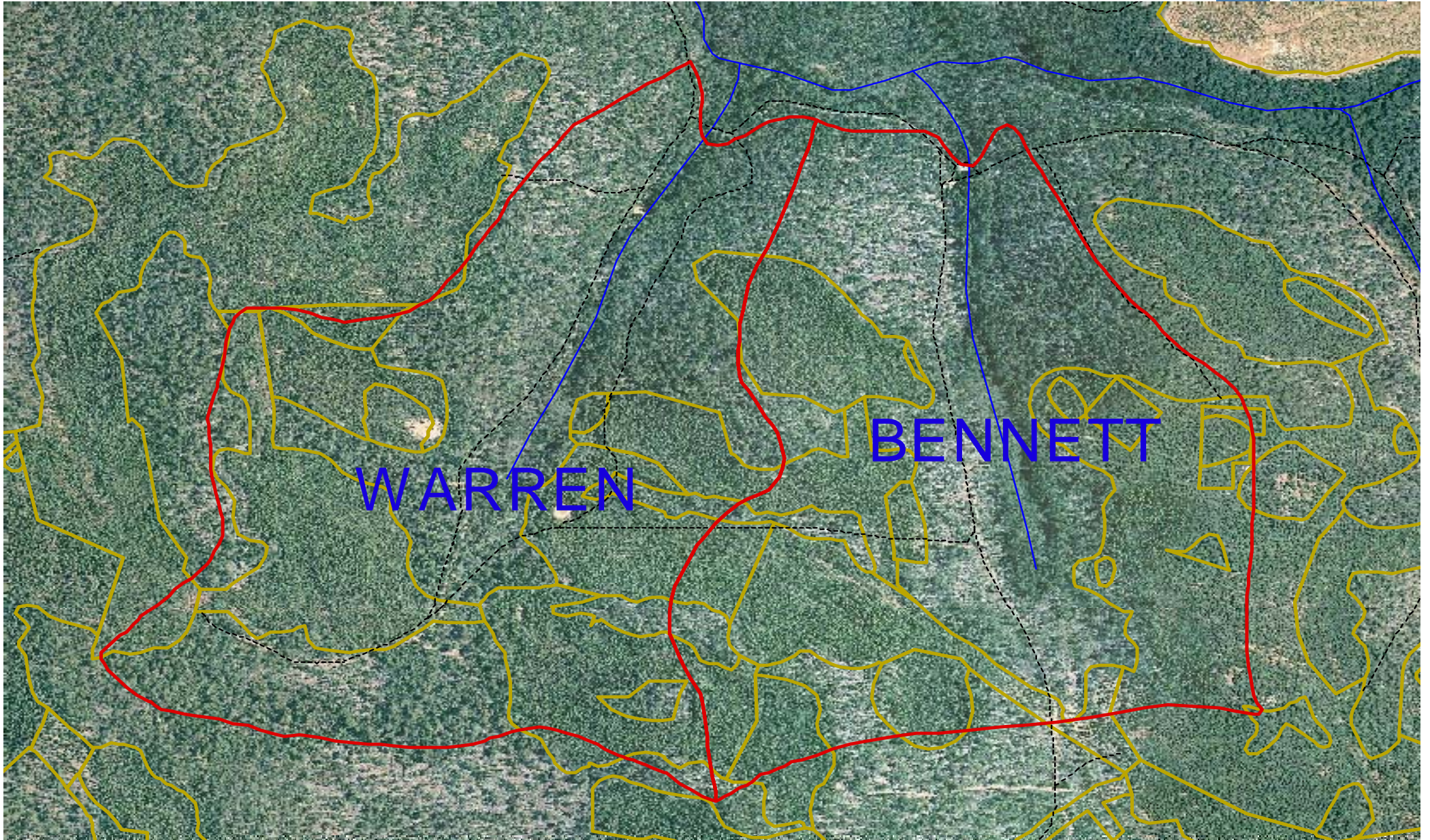
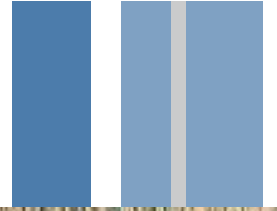
- Deep piezometer (existing)
 - Shallow piezometer (indicative)
 - Road
 - Stream
 - 5m contour
- | Mining rehabilitation year | |
|----------------------------|------|
| 1998 | 2002 |
| 1999 | 2003 |
| 2000 | 2004 |
| 2001 | |







Warren Bennetts thinning trial



Thinning by notching



1 month after notching



Thinning by felling



WEC-C Modelling

- We are presently re-modelling Vardi Rd and most research catchments on the Darling Plateau.
- The intention is to understand the catchment responses to mining and revegetation, logging and climate variation.
- This modelling is primarily funded by Alcoa, with support from DoW, DEC and Water Corporation.

Questions ?

