

# The Cobiac Catchment Trial

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# Cobiac Catchment

- Sub-catchment of Wungong catchment
- 360 ha in size
- Nominally in intermediate rainfall (900-1100 mm)
- Has a stream gauging station, rainfall gauge, many shallow and deep boreholes to measure groundwater tables
- Pre-treatment data were available for several years.

# Silvicultural Treatment

- 120 hectares were left untreated
- These include the stream reserve, three small pods that were mined for bauxite and then rehabilitated and a 200 metre wide strip from stream to crest
- The remaining 240 hectares were thinned in 2008 from a basal area of 34 to 18 square metres/ ha ( a reduction of 47 percent)
- Leaf area was reduced by 37 percent and stem numbers by 66 percent

# Hydrology

- In the four years following thinning which included the major drought in 2010
  - The deeper groundwater stopped falling
  - The shallower groundwater rose and intersected the ground surface
  - The “wetted area” adjacent to the stream increased in size
- Stream-flow increased, by 75 mm/ha over the four years of measurement

# Tree health

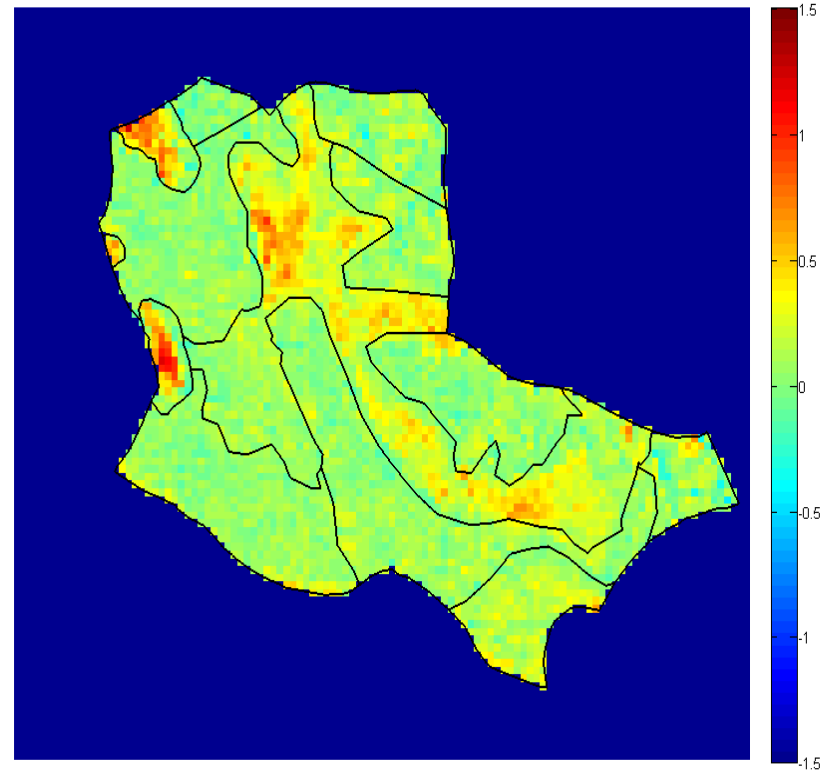
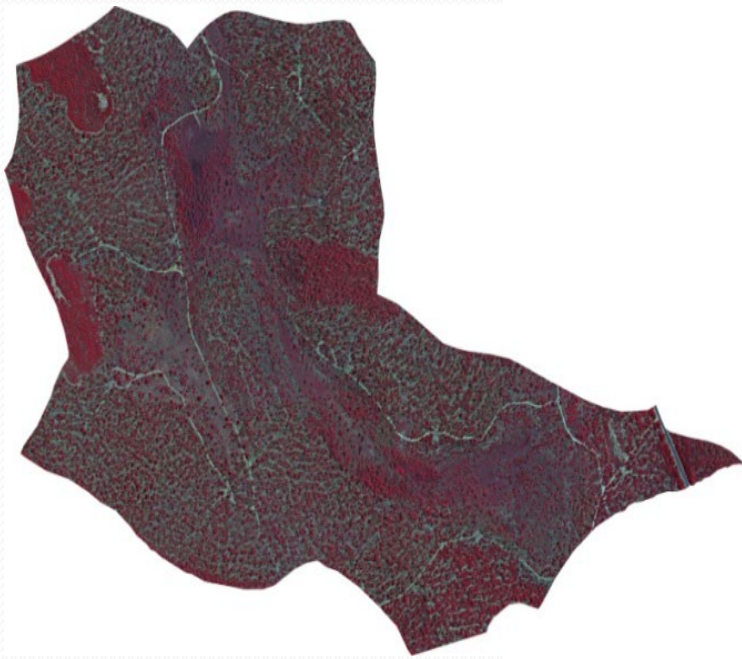
- Rainfall in 2010 was extremely low
- As a result, crown scorch and some tree deaths were observed in March 2011
- These occurred within the untreated stream reserve, the rehabilitated bauxite pits and the unthinned “control” strip
- Over time most of the affected trees recovered by epicormic shoots or by coppicing from the base
- No scorch or mortality was seen within the thinned area

Tree crowns in rehabilitated bauxite pit (left) and the unthinned control strip. March 2011





# Canopy density post thinning (left) and changes in leaf area 2010-2011 ( red and yellow=decline)



# Phytophthora Disease

- Short-term, peer-reviewed studies on a few artificially inoculated trees had suggested that thinning may increase susceptibility to Phytophthora disease.
- The health of tree crowns within the thinned area were assessed 4 and 12 years after the thinning
- Thinning improved tree crowns after four and also twelve years
- Tree crowns improved in unaffected areas as well as those interpreted as “affected by Phytophthora”
- Value of field trials over short-term results



# Tree crowns 12 years after thinning, in an area affected by Phytophthora disease



# Cost/Benefit of Thinning

- Thinning costs were \$ 500/ha with an additional \$200 follow-up to control coppice from stumps =  $700 \times 240 = \$168000$
- Water benefits were  $360 \times 10000 \times 75/1000 = 270000$  cubic metres
- Desalination costs \$2 to \$4 per cubic metre = \$810000
- B/C ratio  $810000/168000 = 4.8$
- Benefits of the extra water to the soil and stream ecosystems or on tree health are not included