

Wungong

Whispers



Volume 13 – November 2011



Promising Trial results as groundwater bounces back

In a preliminary investigation to gauge the degree of groundwater recovery following this winter, Cobiac catchment has seen promising recovery levels.

Cobiac was thinned in 2008 and this year so far groundwater levels are similar to (and in a couple of cases, better than) the levels during the equivalent 2009 period.

At one location on the western side of the Cobiac swamp-zone, groundwater has risen from its lowest ever reading of 4.5m below the surface (during the March drought) to just above ground level at the end of August.

Groundwater is actively contributing to the surface water hydrology at

this point. A groundwater rise of that magnitude has never been observed in this location since records began in 1992.

The analysis does not include the rains we have had in the last three months. A full review will be provided in January 2012.



Better decisions with LAI maps

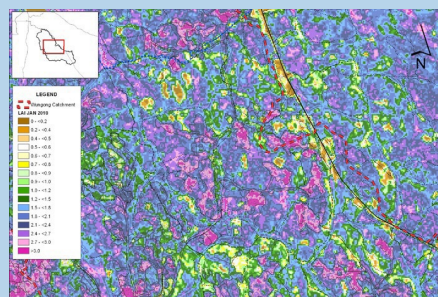
With the help of Leaf Area Index (LAI) mapping, the project team has been able to better locate areas of interest more effectively.

As the Trial's objective is to restore the forest back to a more water-efficient structure, the recommended water prescription density for the jarrah forest is an LAI of 0.6-0.8 (yellow to pale green).

As seen in the LAI image, the rehabilitated forest is mostly well above this (blue to pink).

By seeking out high LAI areas we are able to develop treatment recommendations more effectively.

LAI maps have also aiding researchers identify tree death areas, allowing for more thorough pathology analysis.



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Mature trees use half the water: more proof

CSIRO scientists have investigated the implications of transpiration and forest age as part of a WA Water Foundation project.

Over the last 150 years, management of the forest, through commercial harvesting, mining and fire, has shaped it to its current structure and condition.

The forest overall has become younger and more dense with the added stress of diminishing groundwater and drying streams.

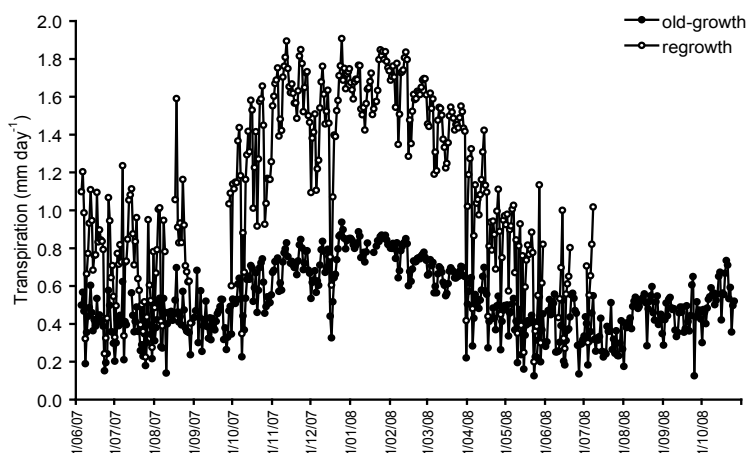
According to data from last year CSIRO found only three out of thirteen monitored perennial streams continue to flow all year round.

The team have been studying water use of old growth and younger regrowth stands.

What they found is that in the old-growth forest stands, the daily transpiration is about 0.5mm/day in winter and up to about 0.9 mm/day in spring to summer.



Photo taken 4 November, 2011. Thinned plot appears to be thriving. Treated to the water prescription, here a mature forest is promoted.



Daily overstorey transpiration over time, calculated from sap velocity and sapwood area at the Dwellingup old-growth and regrowth stands. Missing data indicate periods of power supply or instrument failures

This is approximately half the rate of stands at the younger regrowth site (see graph).

Old-growth transpiration accounted for 20% of the average annual rainfall for the site, in contrast to 40% for regrowth.

This complemented CSIRO's findings into sapwood area and water use in old and regrowth trees presented at last year's Research Forum.

Sapwood depth, the water-conducting part of a tree, has been an effective way of measuring tree water use.

It was found that the sapwood area of young regrowth, also, was double that of the old stands.

The report suggested the use of silviculture to promote the retention of larger trees may be a viable means of delivering multiple water and conservation benefits.

Drought tree death update

In the last issue of Whispers, drought deaths plaguing the unthinned areas of Wungong as well as other catchments around the Darling Scarp was reported.

Since then we have been out observing how the forest has progressed and research bodies have undertaken further analysis of the phenomena.

Dr George Matusick from Murdoch University estimated 16,000 ha of the northern jarrah forest had died.

This is about 1.7%, with an additional 5% showing signs of severe stress.

These figures are staggering given the forest experiences and estimated annual mortality rate of about 0.05%.

The trees were found to die in patches which covered 0.3 to over 50 ha in size.

Following this winter only 35% of dead stems are showing signs of re-sprouting.



A comparative look at the deaths of bauxite rehab areas in April 2011 (bottom left) and this month (above).

Burst of nutrients measured in thinned plots



Tools to measure decomposition and organic litter



On October 13, 2011 Doctors Qiu Song, Richard Bell, Richard Hobbs and Arthur McComb from Murdoch University and the University of Western Australia, published their latest findings on nutrient budgets for the thinned areas of Wungong.

One of the Trial's key performance indicators is the effect of thinning on nutrient cycling as well as comparing two different thinning methods, notching and cutting.

A nutrient budget provides insight into the nutrient condition, a key driver of the nutrient-poor jarrah forest ecosystem.

It was found that thinning residues from notched trees contained fivefold more nutrients than ground litter.

This provides a burst of nutrients compensating the poor nutrient availability in top soil.

This is important as top soil, while the primary nutrient store only has 1 to 2% of total nitrogen (N) and phosphorus (P) in available forms.

Comparative to notching, cut branches and dead stems from thinning stored large amounts of nutrients for the long term, 176kg of N and 7 kg of P per hectare, which would decompose and provide nourishment over many decades.

It was apparent that N and P pools would be sufficient for the short, medium and long term.

The nutrients will become available through different processes including leaching over the rainy months.

From the results, both thinning strategies of the Trial would increase nutrient cycling and were viewed as interventions that promote an increased nutrient supply.

Along with an assumed improvement in soil moisture, the strategies were seen to alleviate growth constraints in the post thinning forest environment.



True forest giant: a shining example

The photos here are of a very large blackbutt (Eucalyptus patens Benth) growing close to a stream within the Cobiac Forest Block, about 60 Km south-east of Perth.

The tree has an excellent and healthy crown diameter of 29 metres. It is 42 metres tall with a 186 cm diameter which indicates that the tree is over 300 and possibly as much as 400 years old.

It may have been a seedling in the 17th Century during the English Civil War, the Dutch Golden Age (Rembrandt van Rijn), the Baroque period (Archangelo Corelli); the European conquest of the Americas, the building of the palace of Versailles and the Scientific Revolution (Newton, telescopes, microscopes, logarithms and calculus!).

Forest Trees of Australia, published in 1957, records that Blackbutt trees may grow to 24-30m in height and 90-150cm in diameter.



This makes the Cobiac tree truly a giant among blackbutts, especially for one so close to Perth.

Blackbutts have a pale yellow wood that can be used in construction and sleepers.

However the timber is less durable than jarrah, has a tendency to check when drying and is also subject to "water-shakes" that make it less suitable for sawmilling.

This is probably why this tree survived the very early and uncontrolled logging that occurred in Cobiac Block before 1920, as evidenced by the old stumps that can be seen near-by.

The tree will now be nominated for inclusion in DEC's Register of

Significant Forest Trees and is a true marvel of the mature forest the Trial envisions for the future.



Can you see Natasha's white helmet?

Project update

June-August 2011	UWA Wungong Catchment tour Silviculture review panel presentation
September 2011	CSIRO Land and Water Seminar CSIRO Seminar with Dr Richard Silberstein CSIRO Seminar with Dr Jeremy Wallace
October 2011	CSIRO Seminar with Dr Craig Macfarlane CoE Forest Health Symposium
November 2011	CoE Wungong Catchment tour Darling Range Community Advisory Committee meeting Technical Reference Group meeting

Contact details

This newsletter is produced by Water Corporation and can be viewed online at www.watercorporation.com.au/wungong

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