

## GREETINGS – 2008 Happy New Year to our readers

We start the year with a bumper edition of Wungong Whispers and invite you to participate in this publication throughout the coming year. Any articles or areas of interest that you would like to share or seek information on, please email to [wungong@watercorporation.com.au](mailto:wungong@watercorporation.com.au) or see page 4 for more contact details.

Volume 5 – January 2008

ISSN 1834-3406

## Interim Silviculture Guidelines available

As stated in the previous edition of Wungong Whispers, the Interim Silviculture Guidelines are prepared to guide operational practice in the Wungong Catchment. The three documents were finalised during November and made available in December 2007.

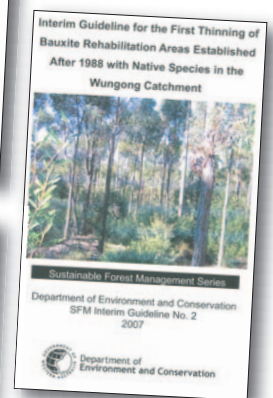
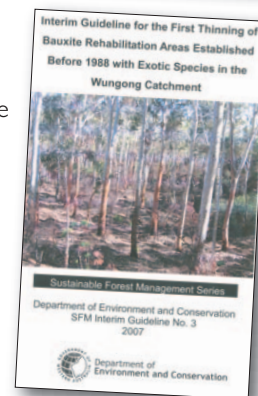
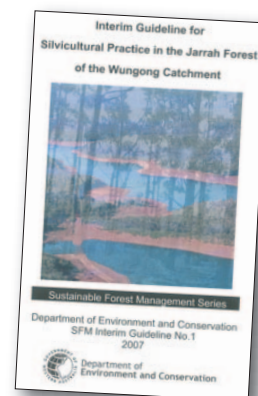
The Guidelines can be accessed at [www.watercorporation.com.au/wungong](http://www.watercorporation.com.au/wungong) and then click on *Project Publications*. Limited copies also may be available by emailing a request to [wungong@watercorporation.com.au](mailto:wungong@watercorporation.com.au)

The three documents include:

- Interim Guideline for Silvicultural Practice in the Jarrah Forest of the Wungong Catchment. SFM Interim Guideline No. 1 2007.
- Interim Guideline for the First Thinning of Bauxite Rehabilitation Areas Established After 1988 with Native Species in the Wungong Catchment. SFM Interim Guideline No. 2 2007.
- Interim Guideline for the First Thinning of Bauxite Rehabilitation Areas Established Before 1988 with Exotic Species in the Wungong Catchment. SFM Interim Guideline No. 3 2007.

Following an initial trial basis, the Water Corporation and the Department of Environment and Conservation (DEC) will review the interim guidelines. The review will consider experience from the trial and stakeholder and community feedback.

Further information regarding the Interim Silviculture Guidelines and the review period will be communicated widely, updated on the website and published in future editions of this newsletter.



## New members – boost the TRG

On the 20 November last year the Technical Reference Group welcomed four new members who bring considerable expertise to this advisory team.

“We are very pleased that Jonathan Majer (Curtin Uni), Jan Star (Peel-Harvey Catchment Council), Beth Schultz (Conservation Council), Don McFarlane (CSIRO) and Richard Hobbs (Murdoch Uni) have joined us to help develop the project, provide recommendations and review our integrated annual works program,” said Project Manager, Mr Chris Botica.

The Technical Reference Group meets bi-annually in accordance with the Terms of Reference. Broad areas addressed by the group include research, monitoring, silviculture treatment and evaluation.

“The Water Corporation is committed to using adaptive management during the Trial’s 12-year period and members of the TRG bring crucial expertise that will enable us to do that,” he added.

The Group will be working hard during the next six months on the long-term success indicators and reviewing some of our key performance targets.

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# Robbing the (water) bank

If household expenditure temporarily exceeds income, we sometimes need to draw on our savings or seek credit.

Similarly, when a forest's expenditure – through evaporation or transpiration – exceeds its rainfall income, it needs to draw on 'savings', from either the soil (the unsaturated zone) or the watertable (the saturated zone).

Rainfall over the forested catchment areas has been markedly reduced since 1975 – or at least for about the last 30 years. Winters now start later and there are fewer rain-days with less rain falling on average each rain-day. This is now being accepted as part of Climate Change.

## Has the forest started to dip into its 'savings'?

In the Helena catchment, data on depth to water table have been collected from several bores since 1975. These bores were re-measured in June 2004. All bores showed a fall in the watertable. Accurate data could not be collected in all bores because in some cases they are now dry and in others were blocked by tree roots. The maximum fall recorded was 9 metres and several bores had fallen more than 4 metres.

In the Cobiac research sub-catchment located in the Wungong catchment, Alcoa World Alumina established a very comprehensive system of monitoring bores and measured their water levels between 1992 and 1997. The Water Corporation then commenced re-measurement in 2006 and these are continuing. Data on changes in water level since the 1990s have recently been collated by Dr B Devkota and show that some of the upland bores have fallen between 3 and 5 metres in the past decade. As expected, bores located nearer the valleys show lesser change, about one metre.

If we accept an average fall is 400 mm/annum with a pore space of 10 per cent, this represents an **additional annual draw by the forest** of 40 mm of water, or 40 litres for each square metre, or 400 000 litres for each hectare of upland forest.

This additional water loss from the forest ecosystem has been going on for at least 10 years and, based on the Helena data, probably since 1975.

## How much longer can the forest continue to draw on its 'water-bank'?

Possible solutions to this imbalance will be discussed in future editions.



## Effects of thinning on understorey

Concern has been expressed that thinning the jarrah forest might be detrimental to the composition of the understorey. There has also been some concern at the possible effects of thinning on orchids. The Water Corporation asked Matisse and Associates to investigate and report. The study was done in 2003 at Inglehope, east of Dwellingup where thinning treatments were established in 1964 and the plots re-thinned in 1986, covering a range from 5.5 to 28.5 square metres basal area. This is a high quality jarrah site, type T (Havel) and 121 individual species were recorded. Target basal area for the Wungong trial is 15 square metres, about the middle of this range.

The data collected show

- Some individual plants e.g. *Styloidium amoenum* were only found in the more open plot, others e.g. *Acacia pulchella* only in the densest plot.
- Whereas only one or two plants were found of some species, more common species such as jarrah and bracken fern recorded 413 and 274 individual plants

- The differences within a treatment were often greater than between treatments indicating that local site conditions may be more significant than the thinning treatment in determining understorey composition.
- Differences within a treatment area were more pronounced at the lower thinning densities
- Of the 11 species (190 individual plants) of orchid recorded, 10 were present in the 16 square metres plot. Three species appeared to favour the more open plots and four favoured the higher density.
- A comparison of treatment means show no consistent differences or trends between treatments in the
  - Total number of species per plot (range 31–45)
  - Average number of species per quadrat (range 9–11)
  - Density of plants per quadrat (range 27–40) and
  - Percentage foliage cover per quadrat (range 50–70)

This report and other research work will be uploaded to the website during 2008.

# Fire and Water – using them wisely

In the last issue of Wungong Whispers we considered the effects of the 2005 Perth Hills wildfire that burnt out about 27 700 hectares in the Mundaring catchment.

The main concern was the possibility of fine silt, ash and plant debris that was expected to be flushed into Mundaring Weir during winter. The article is available at [www.watercorporation.com.au/wungong](http://www.watercorporation.com.au/wungong) (see Newsletter #3).

Results of research demonstrate that areas that were prescribed burnt have less negative impact on flora and fauna as well as water quality than areas that are subjected to large, intense wildfire.

This article presents the latest monitoring results on Land, Water and Biodiversity values in the wake of the Hills wildfire.

The work is being done by staff from the Water Corporation, DEC, DoW, UWA and consultants.

The main study areas have been in the Little Darkin and Pickering Brook catchments. The former was severely affected by fire and the latter was prescribed burnt by DEC 12-18 months before the wildfire

Baseline rainfall, water quality and yield data were available for these two catchments for several years before the fire. The two v-notch gauging stations were re-opened by the Water Corporation after the fire and data on flow, quality and rainfall were collected.

Three months after the fire, 15 plots were established, nine in the burnt areas stratified by burn severity as classified by DEC and six in unburnt areas as controls. At each site data were collected on damage and recovery of the overstorey trees, on understorey density, structure, dominant species, litter, slope and soil. These plots were then remeasured 14 months later.

Data on invertebrate terrestrial fauna were collected by Ms C Jackson (UWA) at various sites in both catchments.

Data on aquatic biodiversity were collected from several streams during

the 2005 winter by DEC's Science division.

## Land

- **Soils** – about 12% of the soil surface in wildfire areas was visibly 'baked' and altered, thus allowing for increased water-shedding, with 80% of plots showing evidence of surface flows. There was no evidence of surface flows in prescribed areas.
- **Tree deaths** – overall it is estimated that between 1.5 and 2.3 million trees were killed in this wildfire. In areas that were fully defoliated about one-third of all trees were killed. Many of these were large, habitat trees. Most other trees were severely damaged.
- **Regrowth** – 18 months after the fire, the understorey density had recovered to pre-fire levels. Density of tree crowns had recovered well in areas that were scorched. Defoliated areas showed a lot of epicormic growth but were still below pre-fire levels.

## Water

- **Water quality** – following a rainfall event in March and April 2005 when 40 mm and then 60 mm fell on these catchments, there was evidence of surface flows and very large quantities of silt were deposited within the stream bed and its pools. Subsequently, in the stilling pond at the Little Darkin v-notch weir, a total of 350 cubic metres of soil was removed during winter 2005 to keep it operational. Large amounts of fine silt flowed over the v-notch and into the Mundaring Weir. By winter 2006, which was very dry, the soil was stabilised by regrowth and much less silt was deposited in the stream-bed.
- **Water yield** – in the first winter after the fire, the catchment burnt by wildfire yielded a flow that was 2.2 times higher than expected. This catchment reacted swiftly to rainfall when the ground was bare and the soils were water-shedding.



**Prescribed burn John Forest NP Nov 07 [Courtesy Richard Reid (DEC)]**

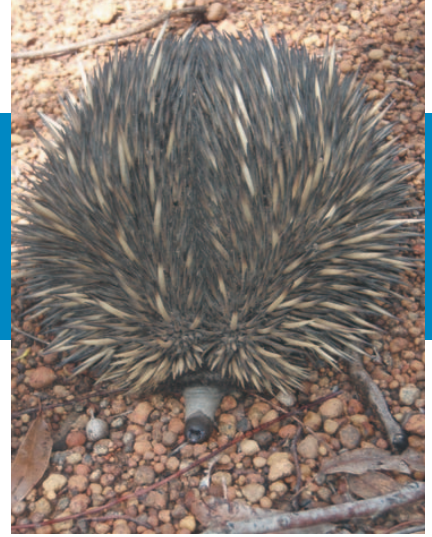
There was little flow in the very dry winter of 2006. In 2007 flow was 20% higher than expected – due to the wildfire. Monitoring is planned to continue for 5-8 years, since flows in the wildfire areas are likely to decrease substantially.

## Biodiversity

- **Aquatic biodiversity** – during the 2005 winter, sampling by DEC showed that the aquatic biodiversity in the Little Darkin stream was significantly impaired (DEC 2006).
- **Terrestrial invertebrates** – data which Ms Jackson collected in winter 2006 show that the wildfire areas were less diverse and contained only a sub-set of the insect species found in the prescribed burnt areas.
- **Birds and mammals** – in contrast to the areas prescribed burnt, there were no frog-calls or birdsong and few mammal tracks in areas burnt by wildfire.

This very large wildfire in January 2005 detrimentally affected water quality. In subsequent years it is expected to impact negatively on water yield. Streams and pools were filled with silt that significantly impaired aquatic fauna. Many habitat trees were killed and other trees were damaged. The terrestrial ecosystem was more simplistic and less diverse after the wildfire. However, after 18 months, the forest, understorey and terrestrial ecosystem were beginning to recover.

# Up close and personal with the pointy end



**Short-beaked Echidna  
(*Tachyglossus aculeatus*)**

September is a great month to get out in the forest — especially just after rain when you can smell the eucalypts and hear the busy sounds of spring in the air.

Tuesday 18 September was just one of those days.

The Wungong Project Team took the opportunity to explain the Catchment Trial to Vanessa Ugle and Lindsay Haji Ali of the Water Corporation's Indigenous Resources Section.

What a bonus when an echidna wandered onto the track in front of our vehicle and began fossicking in the gravel. It was not at all shy and didn't appear in a hurry to dash for cover.

The Team had spent the morning delivering a presentation on the Wungong Catchment Trial to forest employees at the Department of Environment and Conservation's (DECs) Jarrahdale office.

On-ground work continues in the catchment in accordance with the approved interim guideline for Jarrah forest within the Wungong catchment.

This includes tree marking and thinning activities. Dieback interpretation of operational areas has been completed ready for access. Several areas had prescribed burns undertaken including one of the demonstration sites.

Project Manager Chris Botica said that the 12-year trial is due to be audited by the Conservation Commission at the end of 2008 and reviewed by the Board in 2009.

"We have recently had an influx of enquiries being sparked by the wider community's interest in Perth's drinking water sources"

"During August team members provided presentations on the project to Rotary groups and the Shire of Armadale with a special request to have a presence at the next Jarrahdale Wood Chop and Country fair," said Chris.

Preparation of the Project's Implementation plan and a Research report is well underway. These documents will include a report on the research and monitoring programs that

have been established with partners including DEC, CSIRO, Mattiske consulting, UWA, WA Museum, Murdoch University, Alcoa, Department of Water and Hydrosmart.

The website [www.watercorporation.com.au/wungong](http://www.watercorporation.com.au/wungong) also will be updated to reflect the increased level of activity in the Trial.



**L to R Lindsay Haji Ali and Vanessa Ugle Water Corporation listen intently as Richard Boykett DEC project coordinator explains the benefits of various thinning regimes.**



This new look icon will be used together with the Water Corporation's logo to identify the Wungong Catchment Trial. It will appear in this newsletter; on signage and relevant project material to provide identity and recognition. The blue and green waves represent the relationship of the leaves making way for the water to flow. The text is a bold typeface and it is intended that the branding will build on the project's strong reputation.

## Contact details

This newsletter is produced by the Water Corporation and is also available electronically at [www.watercorporation.com.au/wungong](http://www.watercorporation.com.au/wungong). To subscribe or unsubscribe to this newsletter, please contact Margaret Wilke, Communications Officer on **9420 3662** or email [margaret.wilke@watercorporation.com.au](mailto:margaret.wilke@watercorporation.com.au). For technical enquiries, please contact Bishnu Devkota on **9420 2042** or email [bishnu.devkota@watercorporation.com.au](mailto:bishnu.devkota@watercorporation.com.au).



January 2008