Wungong Catchment Environment and Water Management project

The Wungong Catchment Environment and Water Management project is one of a number of initiatives identified in the State Water Strategy and is an important element of the Water Corporation's approach to achieving water security through diversity. This approach has several projects which will increase supply and also reduce demand.

This project is expected to restore 4 to 6 billion litres of run-off water a year through culling of selected trees (thinning) and deliver environmental benefits to the catchment by helping move the current regrowth forest towards a mature forest. More importantly, this research project could lay the foundation for better management of all water catchments supplying Perth and the Integrated Water Supply Scheme.

This brochure features the key aspects of the project and provides a summary of the full Wungong Catchment Environment and Water Management project document, which has been provided to the Environmental Protection Authority. To view this document in full visit:
http://www.watercorporation.com.au/wungong
(under environment and community > environmental programs > Wungong Catchment project).

WATER CORPORATION

Foreword

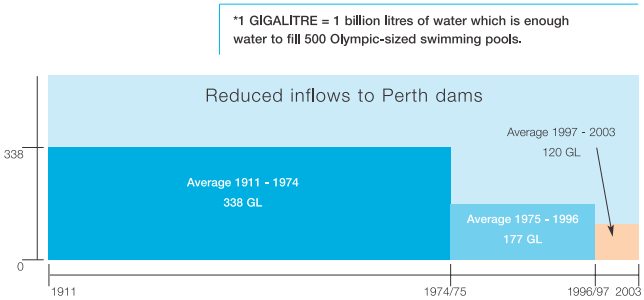
Climate change is a serious issue. It has contributed to a 10–20 per cent reduction in rainfall in the south-west of the state in recent years compared to the wetter climate before 1975. This has led to a massive two-thirds reduction in run-off to streams and into reservoirs supplying Perth and the Integrated Water Supply Scheme (see figure below).

Our dams are at critically low storage levels and the continuing run of dry winters means that a range of water supply initiatives must be pursued to secure our water future.

The Wungong Catchment Environment and Water Management project is one of a number of initiatives identified in the State Water Strategy and is an important element of the Water Corporation's approach to achieving water security through diversity.

The Wungong Catchment management project will restore 4 to 6 billion litres of run-off water a year through selective tree removal (thinning), which will make a worthwhile contribution to the water yield from the Wungong Dam.

More importantly, this research project could lay the foundation for better management of the water catchments supplying Perth and the Integrated Water Supply Scheme. If the community and regulators are comfortable with the environmental and water outcomes of this initiative, similar management could be applied to other catchments.



Jim Gill

The project has been designed in close consultation with stakeholders to ensure that it is consistent with the Conservation Commission of Western Australia's Forest Management Plan 2004–2013. This plan recognises the importance of water and is based on sustainability and biodiversity conservation principles. The Conservation Commission and Department of Conservation and Land Management (CALM) have both agreed the project is consistent with the Forest Management Plan.

The project involves an holistic approach to catchment management on an operational scale with emphasis on both restoring water production and delivering environmental benefits. Past research has provided understanding about streamflow increases from catchment thinning. However, the environmental benefits of this management activity are yet to be fully tested, which is why a staged approach starting with the Wungong Catchment is sensible.

The management of our forests is an important issue. As such, we expect and invite, close scrutiny of this project by the public, scientists and the conservation community. The Water Corporation has presented this project to the Environmental Protection Authority (EPA) who will provide advice on the project after a period of public review. In preparing this project, we have already conducted discussions with many interest groups and modified our plans to improve the project. The feedback has been encouraging and gives us confidence that we have a strong project that is environmentally sound, socially responsible and economically viable.

Jim Gill
Chief Executive Officer
Water Corporation

Sustainable Catchment Management

The Wungong Catchment Environment and Water Management project will restore water run-off in the Wungong Catchment and improve the catchment environment through selective removal or 'thinning' of crowded trees and the replacement of exotic trees with native trees.

It will take 12 years to fully test the research and will cost the Water Corporation about $20 million. The initial thinning will take place over four to six years and if required this will be followed by regrowth control. There will be continued monitoring and research throughout the project.

Forests in our catchments have been commercially logged for over a century, with the largest changes occurring before 1920. Currently most of the catchments contain regrowth forests which are often too dense, and use more water than a mature or old-growth forest.

The Wungong Catchment Environment and Water Management project will build on three decades of hydrological and forest science related to catchment management on a number of small sub-catchments. These trials showed a positive impact on water quality and quantity with a sustainable increase in streamflow that was roughly equivalent to 1 billion litres of extra water for each 1 000 hectares thinned.

The Wungong Catchment is mainly State forest, but it is a disturbed environment that has been the subject of various impacts over the years, including farming, bauxite mining, dieback and commercial logging. It comprises an area of 12 845 hectares or about 130 square kilometres, and is a mosaic of different tree types, different tree age profiles and areas of varying environmental significance. There is no old-growth forest remaining within the Wungong Catchment.

About 7 900 ha or 62 per cent of the Wungong Catchment area, is to be targeted for environmental water management. Of this area, about 5 100 hectares is native regrowth forest (although some parts will be sufficiently open to not require thinning) and 2 800 hectares is bauxite mining rehabilitation and pine plantations. The remaining area (38 per cent) will not be touched, except by CALM's prescribed burning, and it will contain formal and informal reserves like stream buffers and rocky outcrops, a proposed national park, fauna habitat areas, and experimental controls.

The Water Corporation believes the new management activities in the Wungong Catchment will have a positive effect on the environment . The project will be conducted consistent with the Conservation Commission of Western Australia's Forest Management Plan 2004–2013, whose overall objective is *"for biodiversity to be conserved, the health, vitality and productive capacity of ecosystems to be sustained, and the social, cultural and economic benefits valued by the community to be produced in a manner taking into account of the principles of ecologically sustainable forest management"*.

The native forest thinning will be mainly non-commercial and this treatment will restore streamflows and increase growth rates in the retained trees. It may also have some long-term benefits for terrestrial and aquatic biodiversity by sustaining streamflow despite a drying climate.

The project also involves the staged conversion of areas planted with exotic tree species back to native forest. This will improve the environment and reduce further encroachment of exotic species into native forest areas.

The forest management activities will be approximately greenhouse neutral, as there will be a balance between the release of carbon from trees that are culled and the storing of carbon in the remaining trees, which will grow faster.

Tree hollows are a very important habitat for a range of fauna. Forest prescriptions will specially retain habit trees and allow prospective ones to grow faster.

Additional environmental projects will be incorporated into this project. Those being investigated include improved weed control, the control of feral honey bees that compete for fauna habitat and feral pig control.

Past studies to understand the impacts of different forest management techniques have led to current best practice. For this project, the Water Corporation has undertaken studies to confirm that current best practice could be successfully applied to the Wungong Catchment. Ongoing study is an integral part of this process.

Important element of security through diversity

The Wungong Reservoir is an important element of Western Australia's water supply system. It provides about 5 per cent of the water supplying Perth and the Integrated Water Supply Scheme.

Environment and water management activities in the Wungong Catchment will annually restore an average of 4 to 6 billion litres of run-off water over the 12 years of the project. This flow represents about 25 per cent of the average inflows.

More importantly, this research project could lay the foundation for better management of the water catchments supplying Perth and the Integrated Water Supply Scheme.

There are 4 460 square kilometres of State forest and timber reserves within the Integrated Water Supply Scheme's surface water catchments. About 94 per cent of all rainfall in this area is transpired by the vegetation and evaporates back into the atmosphere, without flowing into streams that are vital for the environment and contribute run-off into Perth's dams.

As well as being operationally significant and economically useful in terms of increased water production, the Wungong Catchment was selected for this research as it is in a high rainfall zone and is representative of the higher rainfall areas of other metropolitan water supply catchments. Past research has demonstrated there will not be any stream salinity issues due to this project.

The Wungong Catchment is well understood. There are a number of rainfall and stream gauging stations in or near the catchment and historical information is available on soil, landforms and biodiversity. There is also research data on water and forest management.

The area is a discrete catchment and is of sufficient size for the research to be significant and measurable. The area is also far from pristine. It has no old-growth forest remaining as it has been disturbed in the past by farming, logging, pine plantations, dieback and mining.

The Wungong Catchment is close to Perth and is accessible by major roads. This is an advantage for monitoring, research and educational tours by stakeholders and the public.

While the techniques to be implemented as part of this project are based on current best practice, improvements in methods will be sought through monitoring, research and auditing.

The Water Corporation will fund research, collection of baseline data and monitoring by independent individuals and organisations to provide unbiased scrutiny of results. The review organisations will include the Department of the Environment, the Conservation Commission of Western Australia, the Department of Conservation and Land Management, the Environmental Protection Authority and consultants. Also, the technical reference group formed to develop the project will continue to review the integrated annual works and research program.

Catchment thinning changes forest structure towards that of a mature forest

Mature forest (c. 1895)
Good run-off

Regrowth forest
Poor run-off

Actively managed
Improved run-off

Catchment thinning produces a mature forest earlier and extra run-off as shown by these photos of a northern jarrah forest.

Dense jarrah forest with low shrub in the Wungong Catchment.

Catchment thinning

There are two environmentally acceptable and equally effective thinning methods being considered for the Wungong Catchment Environment and Water Management project.

The 'cut-stump' method involves felling the tree and immediately spraying or painting the stump with herbicide. The 'stem-injection' method involves directly injecting a notch cut in the standing tree with herbicide.

The stem-injection method is the preferred main option. It is three times cheaper than the cut-stump method and leaves the tree standing. This makes it easier to carry out a burn after the thinning as there is less accumulated ground fuel.

With the stem-injection method, the dead leaves on the tree may initially stand out, but after a few weeks the leaves will fall and the bare tree trunks will blend in with the forest. Cut-stump thinning will be selectively used for aesthetic and safety reasons around fire breaks, picnic areas and walk trails.

The herbicide to be used is 'Roundup', which is approved for use within water supply catchments by the Health Department. Roundup is a non-selective, contact herbicide registered for use in Western Australia and has a low toxicity to humans and animals. It breaks down quickly in the organic parts of soil.

The herbicide will be used in small controlled volumes and will not be used close to water bodies or near flowing streams or creeks. Water quality in the Wungong Reservoir is of paramount importance to the Water Corporation and it undertakes regular monitoring to ensure compliance with the Australian Drinking Water Guidelines.

In the areas treated, the focus will be on non-commercial thinning. A small volume of higher-value products such as small jarrah sawlogs and poles may be available for sale through the Forest Products Commission as provided for under the Forest Management Plan.

Non-commercial thinning in the native forest will have a low environmental impact as it leaves the larger trees, shrubs and ground cover intact. No substantial road network is needed as it only requires foot and light vehicle access. As such, there will be no habitat fragmentation and the risk of dieback spread will be minimal. Within the areas to be non-commercially thinned, the retained trees will be about 5–6 metres apart, whereas currently the spacing between trees is about half this.

In older bauxite mining rehabilitation areas, the project anticipates the removal and sale of small volumes of chip, sawlog and firewood in addition to non-commercial thinning. All these treatments would be part of the staged conversion of exotic trees to natives.

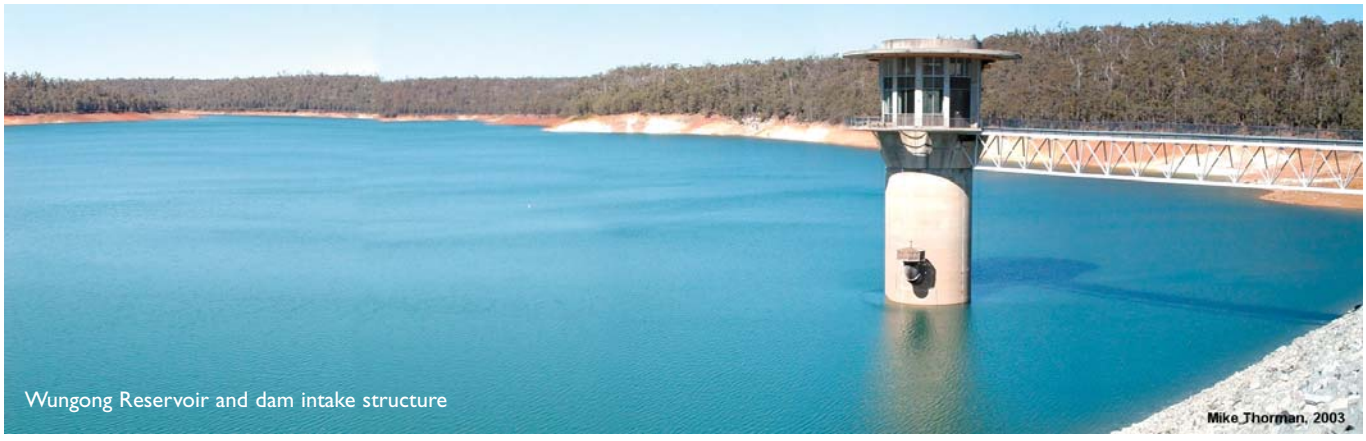
Performance indicators will be developed by the Water Corporation and its contractors in consultation with stakeholders and will be part of the project's management plan. The performance indicators will provide a framework for monitoring project success and determining where improvements can be made.

The project in brief

- The Wungong Catchment Environment and Water Management project will involve the culling of selected trees (thinning) in crowded native regrowth forests and forest that have been rehabilitated after mining. It will also include the staged replacement of exotic trees with native species.
- The project will run for 12 years and will cost about $20 million, which is a unit cost of approximately $0.25 per thousand litres. The initial thinning will take place over four to six years.
- If the outcomes of this research project were applied to selected areas within the high rainfall zone of the metropolitan surface water catchments, it could eventually restore 40 billion litres of streamflow per year into the reservoirs.
- The project focus is on non-commercial thinning, but there could be a small amount of commercial harvesting – in particular within the older stands of exotic trees within the areas rehabilitated after mining. The thinning will recover streamflow and increase the growth rate of the retained trees.
- It will restore on average, 4 to 6 billion litres of run-off water a year. This represents about 25 per cent of the average streamflow into the Wungong Reservoir. Currently Wungong Reservoir provides 5 per cent of the water supplying Perth and the Integrated Water Supply Scheme.
- The Wungong Catchment comprises an area of 12 845 hectares or about 130 square kilometres. It has been disturbed by many uses and it contains no old-growth forest. The area that is proposed for environment and water management is about 62 per cent (7 900 hectares). Of this area, about 5 100 hectares will be from the native forest. The remaining 38 per cent of the catchment will not be touched, except by CALM's prescribed burning.
- As well as being operationally significant and economically useful in terms of increased water production, the Wungong Catchment was selected for this research as it is in a high rainfall zone and is representative of the high rainfall areas of other metropolitan water supply catchments.
- Selective tree thinning is part of the Conservation Commission of Western Australia's Forest Management Plan 2004–2013, which recognises the importance of water and is based on sustainability and biodiversity principles.
- The project includes converting exotic plantations and plots, and bauxite mining rehabilitation areas planted with exotic species back to native forest. This will improve the environment and reduce further encroachment of exotic species into native forest areas.
- The forest management activities will be approximately greenhouse neutral. There will be a balance between the release of carbon from the thinned trees and the storing of carbon from the remaining trees, which will grow faster.
- The Water Corporation will fund appropriate research, collection of baseline data and monitoring by independent individuals and organisations.

Community information:

If you require further information on this project, please contact Project Officer Steve Mackenzie on **9420 3057** or e-mail **steven.mackenzie@watercorporation.com.au**



Wungong Reservoir and dam intake structure

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