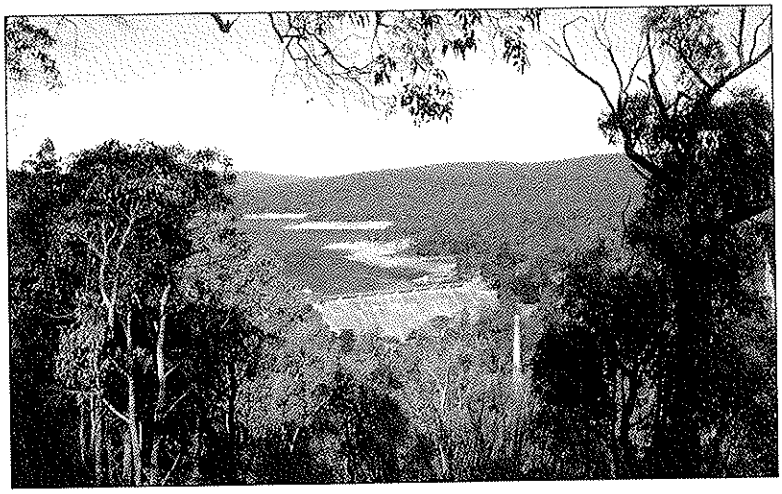
REVEGETATION

SALT IN LAKE C.Y. O'CONNOR



Damming the Helena River and pumping water to the Goldfields is a major event in WA history. Currently this system supplies water not just to the Goldfields but to much of the central and eastern wheatbelt as well. However, the system is teetering in the balance – firstly there's not enough water being collected and secondly the salinity is increasing - again. In the life of the scheme, this is the third time the salinity has risen, each time for exactly the same reason – clearing in the catchment. Twice it has been 'fixed' by revegetation, but every 30-40 years people ignore past experience and clear some more.

The desirable salt level for drinking water is set at less than 500 mg/L Total Dissolved Solids (TDS). In Mundaring Reservoir (named Lake C.Y. O'Connor since the centenary of construction) it is fairly stable at 510 mg/L. Top-ups from a second dam downstream and from the aquifer at Gnangarra both freshen the water and help to keep up with demand. But why is the Helena above Mundaring Weir going salt – the catchment is still covered in native vegetation, isn't it? Well, 97% is forested, 3% is cleared. It is from that 3% that the problems arise – such a small area to give such a big problem.

The Helena was fresh (290-370 mg/L) when the dam construction started in the 1900s but, in an attempt to increase run-off, about 20,000 acres of nearby forest was ringbarked and by 1908 the salinity had risen alarmingly to 550 mg/L. Water engineers clearly demonstrated the link between clearing and salinity. Much of the cleared areas were replanted with pines, the rest left to regrow and gradually the salinity stabilised at a lower level. This was the first example in WA of a 'salinity recovery catchment'.

Alas, not all lessons learnt are remembered. In the 1940s, 50s and 60s, land releases and significant further clearing for agriculture within the catchment was permitted and pushed reservoir inflow salinity upwards for the second time. The WA Government's response in the 1970s was to build a second dam downstream (whose water comes mainly from Pickering Brook and the eastern side of Kalamunda) and to purchase private property in the catchment including the block known as Flynn's Farm.

Since purchase, trees in monoculture blocks for forestry have been planted over most of the cleared area of Flynn's Farm. In addition, 40 monitoring bores have been installed. Gradually, over 30 years, these trees have lowered the watertable and so disconnected surface runoff from sub-surface salinity. In essence, revegetation has returned the surface soil and surface runoff to below the critical 500 mg/L (aided, of course, by the decrease in rainfall since 1975).

Lesson learnt: tree planting in sufficient quantity in the correct location will, given time, lower the salinity such that the streams and surface soil are no longer saline.

But while this revegetation was quietly working away to solve this second instance of clearing-caused salinity, from 1970 on more land release, clearing and sand-mining was permitted north of Flynn's Farm, and streams draining this area have reached salinities of 2500 mg/L. This year, agreements with the Forest Products Commission have seen pines planted over a portion of this area, but will it be enough? Will we ever learn?

[Data in this article has been extracted from the 'Helena River Salinity Situation Statement', Smith *et al*, Department of Water, Perth 2007. Available in hard copy, CD or on DoW website.]

Penny Hussey

Did you know ...?

'No living mammals eat *Hakea*'. This is a quote from 'Australia's Mammal Extinctions: a 50,000 year history' by Chris Johnson, pub. 2006.

He goes on to develop the theme that the thorny defences of many species (not just hakeas) developed to deter the megaherbivores, such as the 'hippo-sized wombat' *Diprotodon*, that went extinct around 45-40 thousand years ago. Fascinating stuff!