

Fire management in forested water catchments in WA

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The intelligent management of forested water catchments is an important and timely subject. Curiously, it is an issue that rarely makes it into the public arena.

We are all well aware of controversies over forest land-use issues such as timber cutting, bauxite mining, biodiversity protection, dwindling water supplies and so on but the subject of catchment management is never discussed. I regard this as curious because management of water catchments to promote fresh water yield and quality is the one land use that can integrate all the others.

Traditionally there are two approaches to managing native forests.

- You can select one, or maybe two priority end-use objectives and focus on them, knowing that this can mean sacrifice of other potential objectives; or
- you can decide to manage for multiple benefits, knowing that this might sometimes (but not necessarily) mean sub-optimal outcomes for all.

The best example of single-use forest management is bauxite mining, because this sacrifices all other forest values, at least in the short term. At the other end of the spectrum, managing the forest to optimise fresh water yield and quality is probably the best example of a goal that has multiple benefits. This is because in managing a forest for fresh water yield and quality, no other benefit need be sacrificed, while many others are simultaneously optimised. Such a forest will also be able to generate timber, protect biodiversity, provide recreation and present a beautiful landscape.

But all of this is an entirely theoretical discussion if one other factor is not taken into account. There is an old saying, once popular among foresters of my generation, one that was always trotted out in discussions about forest land-use planning: *If you don't get your bushfire management right, no other forest management objective can be achieved.*

This principle is the key to forest conservation in Australian eucalypt forests (and here I use the term conservation in its traditional sense - the protection of sustainable values). The primacy of bushfire management is one of the great tenets of professional forest management. Our first foresters realised that there are **Three Great Truths** about Western Australia's native forests:

- (i) we have a highly flammable forest in a bushfire-prone environment;
- (ii) bushfires cannot be prevented from starting; and
- (iii) the longer a forest is left unburnt, the greater the chance that the next fire will do serious damage.

These fundamental truths led foresters to dictate that the first priority of forest management must be to prevent bushfire damage. To put it another way, the first job of an Australian forest manager must be *to prepare the forest in the expectation of fire*, so that an inevitable fire can more easily

and safely extinguished before serious damage occurs. Sitting back and doing nothing until a fire starts is simply condemning the forest to periodic incineration and loss of all those precious benefits and values which our forests can provide.

And in no other forest is the primacy of good bushfire management so critical as in the forested water catchment.

I'll elaborate on this in a minute, but would like to pause here, briefly turn back the clock, and have a look at how the application of the principle of bushfire primacy has panned out over the years.

This is not the time for an extensive review of bushfire pre-history or bushfire management policy. Suffice it to say that our Aboriginal forebears understood to perfection the role of fire and its importance and management. They applied mild intensity, frequent burns to the forest for hundreds of generations. Unfortunately our first 1920s-era foresters, either coming from Europe, and under the influence of European-trained foresters working in India, were determined that fire must be completely expunged from WA forests. They had no appreciation of the thousands of years of burning by Aboriginal people, nor did they understand the fire adaptations of our native flora and fauna. The policy of fire exclusion that the first foresters attempted, as we know today but they did not know then, was doomed to failure. And it did fail, culminating in the massive wildfires of the 1950s and the great bushfire disaster of 1961.

It was not that the pioneering foresters did not understand the primacy of bushfire management.

In the words of Conservator of Forests Stephen Kessell, addressing a staff conference in 1923: "*Efficient fire control must be the basis of all forest work*". Writing in a paper presented to the same conference, forester George Brockway wrote: "*The first measure necessary for the successful practice of forestry is protection from forest fires ...*".

What they did not at first understand was the operation of the three Great Truths.

However, Kessell and Brockway were not slow-learners. Bitter experience taught them **The Great Reality**: if fires cannot be prevented then it would be better to have controlled fire, or as Kessell described it "creeping fire", than uncontrolled infernos.

The truth of this philosophy is graphically demonstrated to anybody who visits a forest in the wake of a high-intensity summer wildfire. The first thing you notice is the serried ranks of black, dead and defoliated trees. The second is the eerie silence: *The sedge is withered by the lake, and no birds sing*. The third will be the corpses, both of trees and of animals caught in the fire. These most obvious are the kangaroos, burnt to death in their hundreds, as we saw in the big jarrah forest fire at the Lower Hotham last year, the hundreds of dead birds swept out into the Southern Ocean and observed by fishermen, and the mass death of quokkas in the 2015 Northcliffe fire. Next you will notice the dark, baked soils, often rendered water-repellent, and utterly without life. Later when the winter rains arrive, muddy water is observed, carrying silt down into the streams and rivers, and ultimately into the reservoirs.



These horrible outcomes do nothing for anything or for anybody. Every sustainable value of the forest suffers. And I have not even touched upon the destruction and damage to assets such as neighboring houses and farms, bridges, walker's huts, signposts, roads, fences, power lines and pipelines, historic and heritage sites, to say nothing of human lives.

Nor have I mentioned the astronomical cost of large, high intensity bushfires with their armies of firefighters and air forces of water bombers, the loss of resources and the costs of restoration. You don't get much change out of \$100 million dollars for a good sized forest fire these days.

Nor should we forget that the long-term psychological damage on people whose lives have been devastated by bushfire. In 2011 when I was doing oral interviews for a book on the 1961 Dwellingup fire, I was shocked to observe survivors of the fires at their kitchen tables, fifty years on, with tears streaming down their cheeks, and their voices choked with emotion.

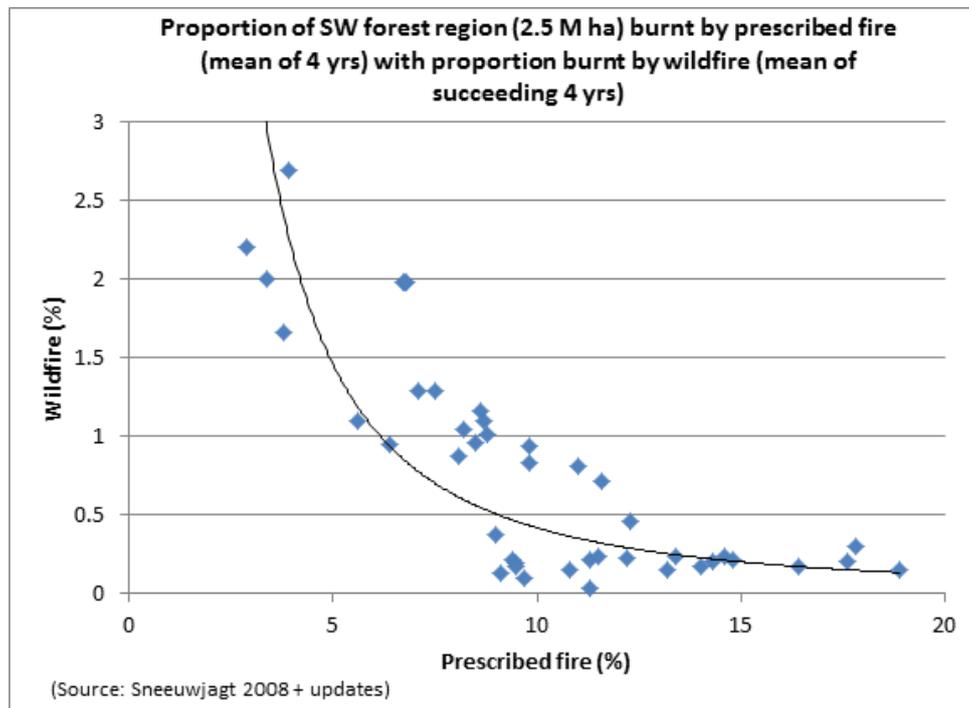
There is no sadder scene than that of the householder sifting through the ashes of his former home, seeing if he can recover any prized possession.

I feel the same way, sifting through the ashes of a forest destroyed by fire. All of the things that I valued are gone.

But there is an alternative. There is "good fire" as well as "bad fire". The impact of good fire (the mild-intensity fuel reduction burn) is completely ephemeral. Within months of a mild burn, sometimes weeks, the forest is back to where it was before the burn, but without the accumulations of fine fuels that allow a high intensity fire to break out and no damage done. And on top of that the forest subjected to periodic mild fire is healthier and more beautiful.

As in all things, so in bushfire management the pendulum swings. The sensible strategies adopted by the Aboriginal people were replaced by the wrong-headed approach of the pioneer foresters. This in turn gave way to the high water mark of bushfire management in WA, from the 1960s to the 1990s when a highly effective system was applied and large nasty bushfires became a thing of the past. Unfortunately the pendulum swung again, and this system was itself largely abandoned by people who should have known better. There has been an inevitable outcome : ghastly fires, loss of lives

and assets, destruction of glorious forests and damage to water yield and quality on forested catchments.



Data courtesy of Neil Burrows and Rick Sneeuwjagt

Fortunately, the pendulum continues to swing and I am hopeful that the lessons learned after the 1961 fires will be learned again after the 2015 and 2016 fires. This will, once again, see the focus shifting from suppression to prevention, from bushfire fighting to bushfire mitigation, and to the winning formula developed 50 years ago.

The Winning Formula for bushfire management has three elements:

- (i) The first is a focus on reducing bushfire intensity. This makes fires easier, safer and cheaper to control. The key is a systematic program of fuel reduction burning under mild weather conditions, producing a mosaic of light fuels throughout the forest;
- (ii) Second is an aggressive approach to fire detection and fire suppression, led by experienced fire-fighters and using heavy earth-moving machinery backed by well-trained crews stationed in district headquarters all through the forest; plus
- (iii) Strong leadership coupled to investment in research and monitoring to ensure the system is continuously reviewed and updated in the light of outcomes.

The beauty of this approach is not simply that it reduces the risk of large, angry and damaging bushfires. *It also provides a secure and safe background environment in which all the other forest benefits become available.*

A well-managed fuel reduction program takes the large, damaging wildfire right out of the equation. This leaves forest managers freedom to concentrate on other things, like water quality and yield,

timber production, protecting beautiful landscapes and valuable heritage, wildlife programs and providing recreation facilities.

Fuel reduction burning also helps to optimise water yield and quality from the forest, because heavy fuels intercept and capture rainfall, preventing infiltration to aquifers or restricting overland flow to streams and reservoirs. High intensity wildfires might increase water yield in the short term, but at the expense of water quality, and in the long term they result in a declining yield due to the impact of regeneration.

There are people who reject fuel reduction burning, either because they fear that it is "destroying the biodiversity", or because they believe that it has no value in wildfire control. The trouble is, no alternative is available that will have the same beneficial outcomes in terms of freedom from wildfire, catchment protection, promotion of forest health and biodiversity. Nor is there an alternative that is remotely realistic in terms of cost.

I am delighted that the government has now accepted in full the recommendations from the Ferguson Inquiry into the 2016 bushfires. Ferguson resoundingly endorsed a bushfire management strategy that incorporated fuel reduction burning. It was, he concluded the key to saving lives and protecting the environment and community assets; and, he pointed out, it will generate huge cost savings.

This forum is about integrated management of forested catchments so as to optimise their multiple values. But I must emphasise again that a Great Truth must underpin all discussion: ***without effective bushfire management, no other forest objective can be achieved.*** Ironically these is even true of the most objectionable land-use, bauxite mining, because the whole mining enterprise is politically acceptable only on the premise that another forest can be grown in its wake. To date this does not look promising, mainly because the regrowth areas are so difficult to protect from fire.

So It is fine to talk about all the many values of a forested catchment and to discuss how they can be optimised, but these values can only be realised in the absence of large, high-intensity bushfires. It is with the prevention of this scourge that every catchment management program must start.

I have a dream.

I have a fantasy for the water catchments in the northern jarrah forest: I imagine our forest managers focusing on the production of fresh water to fill the reservoirs. The catchments are protected by mild intensity fuel reduction burning on about a 6-8 year rotation, which at the same time results in a healthy, biodiverse and beautiful forest. From time to time, I see a commercial thinning operation, leaving the best trees standing while generating a useful product and revenue from the thinnings. I see wildlife programs controlling feral animals. I see well-managed recreation pursuits like bushwalking, picnicking, and nature appreciation. There are active research and monitoring programs and there are professional staff and rangers to oversee operations, control illegal uses and monitor the outcomes of management.

Best of all I see a forest free from the scourge of the large, high-intensity bushfire, with its damaging impacts on catchments and all other forest values and the terrible threat to neighbouring residential communities. And I see, once more, WA leading the world in forest catchment protection and Western Australians enjoy the multiple benefits that will flow from it.

I share this fantasy with you in the hope that it will provide a blueprint for intelligent management of our forested catchments, a blueprint that this forum can adopt and promote.