RADIATA PINE

IN THE BLACKWOOD VALLEY

A LANDSCAPE IN CHANGE

An Outline of the History and the Issues

The Department of Conservation and Land Management
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1. INTRODUCTION

The Blackwood River is the longest river in the southwest of Western Australia. Its headwaters rise in the wheatbelt, from where it meanders down through the southern extension of the Darling Scarp on to the coastal plain and into an estuary at Augusta.

In the 150 or so years since European settlement the character of the valley of the Blackwood has changed markedly due to clearing for agriculture and mining.

Land use changes inevitably result in conflict between those wishing to maintain the "status quo" and those promoting the change. Clearing of the forest for agricultural development brought farmers into conflict with the Aboriginal people, the native animals and later the timber industry, which also opposed the agricultural clearing. On a small scale this process is now being repeated, as a developing forestry industry based on radiata pine replaces traditional farming crops in that section of the Blackwood Valley where it intersects the Darling Scarp, essentially in the triangle formed by the towns Balingup, Bridgetown and Nannup.

The conversion of the valley from forest to farming land resulted in a lifestyle loss for the Aboriginal inhabitants, significant losses to the environment through salination of the river, loss of native flora and fauna and loss of a rich timber resource. It did, however, provide immense wealth to the State through agricultural production. The current land use change is also resulting in a change of lifestyle for some inhabitants but just as assuredly it is providing great wealth for the State and a degree of amelioration of the environmental problems resulting from clearing. This paper points out these benefits and changes.

2. HISTORY OF AGRICULTURAL DEVELOPMENT

Settlement of the valley for farming commenced in about 1857 near Bridgetown but it was not until late in the century with the coming of the railway and the discovery of tin near Greenbushes that the population of the valley escalated dramatically. The previously small timber industry also expanded to become a major employer in the valley with numerous large and small operations taking advantage of the abundance of high quality native forest.

By the end of the century agricultural settlers had opened up enormous tracts of land, clearing remaining scrub and ringbarking trees to improve pasture. Introduced pasture species competed with and dominated native flora.
As the farmers and miners continued their encroachment through the valley, the forest, which had been seemingly unending, was replaced with a pastoral landscape.

The effects of agricultural overclearing in the valley and in the eastern catchment of the Blackwood River had become evident well before the 1920s, when the first large tracts of land in the southwest were dedicated as State forest. In the 100 years following European settlement, 85% of the Blackwood's catchment had been cleared and Western Australia's longest southwest river system had become saline. The river has an average salinity of 2192 mg/l, and is increasing at 58 mg/l/year.

3. PINES IN THE VALLEY, 1950 ONWARDS

Although some pines had been planted at Grimwade during the Depression, the major pine afforestation of the valley did not begin until the 1950s.

WA has no native softwood and the pine afforestation program helped to lessen the reliance on imports.

The Blackwood Valley is well suited to pine plantation establishment and the Government began to buy, on the open market, cleared properties for that purpose.

The beginning of the pine afforestation program coincided with a general agricultural slump, but particularly in dairying, in the valley. Farmers with a large proportion of low productivity steep land suffered most and some responded to the slump by overstocking, which resulted in serious land degradation.

Many farmers welcomed the opportunity to sell part or all of their holdings, hence the area of pines gradually increased.

Subsequent Governments endorsed and maintained that afforestation program.

In early 1988 the Burke Labor Government again endorsed the program when it released the Central Forest Region Management Plan and Timber Strategy.

That strategy allows for statewide planting of 2000 ha per year with 500 ha per year being in the Central Forest Region, which includes the Blackwood Valley.

The area of State-owned pine plantation in the Blackwood Valley is currently about 10 000 ha. Some private afforestation companies have also purchased properties and planted radiata pine.

The timber now coming on stream from the early 1950 plantings has enabled the Government to sustain the total timber industry, whilst withdrawing large areas of native forest from production for conservation purposes.

This change to the character of the valley with pasture being replaced by pines, has been of concern to landholders wishing to preserve the status quo. Criticisms have centred around the following issues:

- *loss of aesthetic appeal;*
- *increased fire hazard;*
- *drought will make the pines an inappropriate species;*
- *pines are an unstable monoculture which ruin the soil;*
- *herbicide treatment needed to establish pines is unsafe.*

4. ISSUES OF CONCERN

Landscape

The introduction of pines to the Blackwood Valley gave it a new appearance. Bracken covered hillsides, too steep to cultivate with modern machinery, began to disappear under an undulating green carpet of pines.

Those farmers and their families who had toiled to clear the valley of forest viewed the regrowing trees with mixed feelings.

The straight trunks, pointed crowns, dense foliage and orderly spacing contrasted with the indigenous forest. As planting areas increased, concern was expressed that pines would extend along all major scenic routes and obliterate the valley landscape.

In response to this the Forests Department undertook a landscape management plan for the Blackwood in the early 1970s.

This concept has been carried through to the present day with each additional property purchased being assessed by landscape architects to soften the landscape impact of planting. This process usually includes the retention, or planting of buffers, of hardwood tree species.

Fire

Pines are much more sensitive to fire than native hardwood and must be protected.

There is only limited opportunity to do fuel reduction burning in pine hence the fire protection strategy is based on an alternative system. Low fuel buffer areas placed to counter known high fire risk areas, an efficient detection system based on towers and aircraft and a suppression force capable of fast initial attack is the basis of that system.

This strategy has proved highly successful in the past with only about 200 ha, out of the 10 000 ha of pines, being lost through wildfire.

The bulk of this (195 ha) occurred in one deliberately lit fire in 1988. All other fires have been limited to one or two hectares by the rapid detection and attack.

Drought

Drought deaths in the 1970s and over the last two years have led to claims that radiata pine cannot survive in the Blackwood Valley.

Earlier deaths were largely attributed to overstocked stands due to the poor economics of thinning plantations because of the absence of a residue market.

The construction of the Wesfi particle board plant has solved that problem and thinning is up to silvicultural specifications.

The most recent drought, which led to deaths in already thinned stands and in the adjoining native vegetation, was a particularly severe one. It showed there was still more fine tuning required in the relationship between the site and the number of trees it can support.

A research program has been undertaken and is now nearing completion. The results of this are leading to the development of a relationship between aspect, soil type and soil depth and the number and size of trees that the site can support. It is not that the areas are unsuitable for pine forests, but different areas have different carrying capacities. Using previous standards it has been found that some sites, even after thinning, still contained too many trees.

In the near future these results will be used to map the plantations and thinning schedules will be modified to match the number and size of trees with the site's carrying capacity.

Pines as a Monoculture

A monoculture is a forest whose overstorey comprises only one tree species. The claim is often made that because pine forests are artificial monocultures this renders them susceptible to collapse as a forest.

This ignores the fact that there are many examples of natural forest monocultures. The karri forest, for example, forms monocultures on its most productive sites, as do Pinus species in the Northern hemisphere. The fact that a forest stand is all the one species does not mean that it is genetically homogenous.

Extensive genetic variation within a species ensures a range of resistance to insects and fungi.

There have been extensive pine forests in Australia since early this century. In that time there have been tree losses due mainly to insects, drought and occasionally fungi. At no time however has there been total collapse of any plantation, nor is there any reason why this should happen given proper breeding and genetic selection procedures.

It is theoretically possible for such an event to happen if a plantation is created from a very narrow genetic base using extensive cloning. Such a practice would be contrary to well understood and accepted forestry practices however.

In the Blackwood Valley it is worth noting that pine forests have replaced another monoculture, grass.

The claim is also often made that pine forests ruin the soil, particularly through acidification.

Acidification of soil can occur under any intensive agriculture or forestry system. This results from the breakdown of the litter layer, particularly in humid climates, the use by the crop of natural soil ph buffer elements, such as potassium, and fertiliser practice.

The breakdown of the litter layer and the incorporation into the soil of the organic matter is nonetheless vital to sustaining its fertility and moisture holding ability.

These effects are as much associated with agricultural crops and other tree species as they are with pines. In 1986 a study was conducted in WA on the effect of pines on soil properties. That study found marginal acidification, 0.1 - 0.5 ph units, but no change to any of the structural elements of the soil profile, after 50 years of pines.

Acidification can easily be corrected, if required, by liming, as is frequently done in agricultural situations.

Trees have the additional advantage that their roots penetrate the subsoil, aerating compacted layers and introducing soil organic matter deep into the soil profile.

Herbicide Use

It is essential, for the establishment of pines, that in the early stages they are free from competition for nutrients and water.

Therefore, in all pine growing areas of Australia it is accepted that pasture and weeds must be killed before pine establishment. The use of herbicides is the most effective way to achieve this and spraying has been used in the establishment of plantations for 20 years with no adverse effects. The herbicides predominantly used are Vorox, which contains the active ingredients atrazine and amitrole, and Velpar, which contains hexazinone.

Herbicides or pesticides are not required after establishment to maintain the plantation.

The chemicals, application rates and methods have been cleared by the State Pesticide Advisory Committee. The Principal Medical Officer, Public Health, of the Health Department has given CALM unequivocal advice that none of those chemicals represent any risk to the public or users if applied in the prescribed manner.

It should be noted that both these herbicides are readily available in suburban retail outlets for home use.

They are also extensively used in the agricultural community to control grass along fencelines and for firebreaks where cultivation would cause erosion problems.

CALM is not in a position to evaluate research on the toxicological effects of chemicals. It has and will continue to be advised by the relevant State Health body.

An Example

A recent controversy has surrounded the planting of pines on two properties located on the western slope of the Blackwood River, 11 km upstream from Nannup, formerly known as Brockman and Quilty but to be renamed Gilchrist plantation.

The two properties purchased in 1987 comprise a total of 968 ha. Prior to the purchase, approval was obtained from the Nannup Shire. Shortly before settlement a caveat was placed on the Quilty property by a party who claimed he had the timber rights to the native forest on the property.

It was subsequently found that the vendor of Quilty's had previously sold the timber rights to a neighbour, Mr Greg Mader, who had taken the mature trees then on sold the rights to the areas of jarrah and marri regrowth to a third party. Subsequently, the original caveat was lifted but the third party then placed a caveat on the property to protect his interests.

This claim was legally valid and CALM was obliged to honour it. The third party then cleared the regrowth, took the timber and agreed to remove the caveat.

A group, "Friends of the Blackwood", led by a neighbour of the proposed Gilchrist plantation objected to the planting. The objections were based on the visual impact of pines, increased fire risk, risk of increased flooding due to planting on the floodplain and pines as a monoculture.

The final management plan took account of the objections by:

- *landscaping to ameliorate the visual impact of plantings;*
- *amenity plantings to be carried out on the floodplain visible from the road;*
- *water engineering advice to ensure the proposed floodplain plantings would not influence flood levels;*
- *fuel reduced fire buffers.*

In the end, the management plan provided for:

pine to be planted	*590 ha*
Eucalypt to be planted	*92 ha*
retained as native forest	*239 ha*
roads, fire breaks, tracks	*47 ha*
	968 ha

Friends of the Blackwood were still not happy with this and proposed an alternative plan incorporating more eucalypts and reducing the area of pine to under 300 ha. This would have made the purchase of the property economically unviable, hence it was rejected by the Government.

5. BENEFITS OF PINES

As well as resulting in the development of a whole new industry for the southwest, pine planting in the Blackwood Valley has assured an ongoing supply of competitively priced softwood to the State's building industry.

The softwood industry has a current capital value of $11 million in harvesting equipment and $65 million in processing plant. Over the next ten years, as the harvest increases, an additional $85 million will be spent on harvesting and processing plant.

Direct employment in harvesting and processing has created 530 jobs with indirect, subsidiary or dependant employment being responsible for an additional 940 jobs.

Additionally, as harvesting of mature trees increases it is expected that direct employment will be increased by 470 and indirect employment by 790, leading to a total of 2730 jobs generated from this resource.

In direct economic terms the value of logs harvested each year is $11.5 million with payments to contractors, and thereby effectively into local communities, of $5.5 million per year. The present day expectation value of plantations currently standing in the Blackwood Valley is $100 million. The processed value of its logs is estimated to be worth $81 million dollars annually.

	Volume of Log Produced	Stumpage Value to State	Payments to Logging Contractors	Capital Value of Processing Plant	Capital Value of Logging Equipment	Direct Employment in Logging	Direct Employment in Processing	Total Direct and Indirect Employment	Total Processed Value of Process
Existing Situation	300 000	$11.5m	$5.5m	$65m	$11m	120	410	1 470	$81m
In 10 years Time	500 000	$19m	$9m	$125m	$36m	270	730	2 730	$200m

SUMMARY

Pine establishment in the Blackwood Valley has altered some of the landscape characteristics and this has been judged a loss by some people, but a gain by others.

It has, however, rehabilitated a number of degraded farms and provided the resource for a valuable new industry in the southwest.

The provision of this additional timber resource has enabled the Government to set aside considerable areas of native forest as national parks, while at the same time ensuring the maintenance of a healthy and stable timber industry.

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