

Biorich plantations: integrated commercial and environmental treescapes

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Introduction

The idea of restoring landscapes in Australia leads to asking the question, ‘What kind of landscapes do we want?’ The Ballarat Region Treegrowers (BRT) considers that if people want to see the large-scale reintroduction of native vegetation cover in our countryside, then we need to also think about how the revegetation process might be able to contribute to revitalising social and economic landscapes. Broader social and economic benefits will support the long-term survival of the new ecosystems. BRT promotes the ‘analogue’ forest/biorich plantation model of revegetation because it can provide financial and environmental benefits to landowners.

BRT and ‘biorich plantations’

BRT is the local branch of Australian Forest Growers, the national organisation representing private forestry interests. Since it was established in 1998, BRT has been promoting the integration of trees into agricultural areas for their potential socio-economic and environmental benefits to landowners and the wider community.

The term ‘biorich plantation’ was coined by BRT to represent the kind of tree/bush cover that could be created by applying the ‘Blueprint for Sustainability Score Sheet’ for landcare-type plantings developed by Teesdale nurseryman, Stephen Murphy (see Table 1). Stephen developed this index during the mid-late 1990s through his nursery and tree planting work. It provided a guiding ‘blueprint’ to overcome the deficiencies he saw in local landcare plantings.

The Score Sheet has 10 design principles grouped to address four issues important to the long-term ecological value of the plantings: Diversity, Structure, Species survival and Location. The physical and biological characteristics of a planting are weighted according to the points available for each design principle, so the higher the score, the more the planting is considered to have ‘ecological value’ and ‘survivability’. A landholder can use the index to modify a planting design in relation to the restrictions or opportunities generated by the surrounding landscape and so maximise the planting’s score and ‘sustainability’.

BRT felt this sustainability index should be more widely recognised and commissioned Stephen to turn the underlying ideas into a book, which came to be titled *Recreating the Country* (Murphy, 2009). Given the group’s interest in

providing conservation plantings with a commercial value to make them more attractive to farmers, an important component of *Recreating the Country* was showing how commercial wood production could be integrated into the planning framework. Locally indigenous or exotic timber trees can be included in different ways to create biologically rich ‘analogue’ forests and woodlands that more closely resemble a native forest than a commercial wood plantation.

Analogue forests and biorich plantations

An ‘analogue forest’ is basically a human-created, tree-dominated ecosystem that is analogous in structure and function to a site’s original climax or sub-climax forests. An analogue forest might be planted with species expected to be found in the forests of that area, or grown through ‘seral stages’ to reach a climax/sub-climax equivalent. However, in mimicking the role of the original forest and providing short- and long-term commercial value, analogue forests may use species exotic to that site (Duffy, undated).

“Analogue forestry is a response that seeks to address both the genetic and cultural issues of biological loss” (Senanayake and Jack, 1998). The concept was developed in Sri Lanka by modifying traditional village gardens. The originators wanted to tackle the social and environmental problems resulting from exploitative land management, including shifting cultivation and monocultural industrial agriculture. They wanted to recognise the value of lost ecosystems, restore productive capacity to the land, bring in genetic diversity, establish protective vegetation layers, and give local people more control over their way of life and natural resources – especially food and building materials.

The ImLal biorich plantation project

After publishing *Recreating the Country*, BRT decided to put words into practice and establish a model ‘biorich plantation’. We received a Commonwealth ‘Caring for Our Country’ grant and the project was implemented with the cooperation of several public and private organisations.

Imreys Minerals Australia provided 10 hectares of land in the buffer zone around an old clay mine pit near the town of Lal Lal, southeast of Ballarat. Central Highlands Water contributed to the cost of the plants. Australian Forest Growers provided administrative support. BRT members and local volunteers planted the first 5 ha site in 2010 and the second 5 ha site in 2011.



Basic design of second Imlal biorich plantation site.
Source: Stephen Murphy

The plantings were designed by Stephen Murphy in conjunction with farm foresters in BRT. Both sites contain a diverse mix of species predominantly endemic to the area, with as many layers as possible – grasses and shrubs through to larger understorey and canopy trees. Plant species were clumped to help pollination and create vegetation layers. Natural regeneration of local species is encouraged. Some kind of ‘environmental thinning’ may occur to help express particular values.

Both sites contain a proportion of commercial timber trees in different layouts. The first site has 12 native forestry species in large clumps along an access track. Forestry trees are in strips along, and branching off, the access track of the second site, and Californian Redwoods were planted as part of a larger long-term trial. Only the forestry trees in both sites will be harvested for some wood products. They will be managed through pruning and thinning to produce fuelwood after a few years, then hopefully good quality sawlogs after some decades or longer.

Monitoring the plantation’s growth and the changing fauna are important activities to help understand the changing relationships between the soil, water, plants and animals, and so direct management activities. Students from the University of Ballarat began monitoring plant growth and survival on the first site in late 2010, finding an 88% survival rate over the first year - aided by a very wet summer. In contrast, much of the second site will need replanting because of a dry summer and failed site preparation.

Twelve bird surveys have been conducted through the buffer zone and plantation sites since before planting in 2010, and more are planned. These surveys are led by Tanya Loos, environmental consultant and Vice President of BirdLife Ballarat. A total of 60 species have been observed so far. Birds have been seen using trees in the first biorich plantation site since October 2011. More information on the monitoring can be found on the *biorich plantation website* (Biorich 2012).

Overview

The analogue forest/biorich plantation concepts extend and expand the potential of our old tree planting mentalities and technologies. They help open up new ways of thinking about the kind of rural landscapes we want, and can create.

Adopting this approach requires an intergenerational commitment to the revegetation and management activities. While some kind of legal protection, such as a covenant, can protect forest/plantations on private land where ownership can change, the desire for landscape restoration needs to come out of local communities and have their long-term support.

The ‘Imlal biorich plantation project’ is still in its early stages, but the *Recreating the Country* book and film (on YouTube and accessible via the *biorich plantation website*) have generated a lot of interest in the concept, and BRT is now discussing with other organisations the potential for establishing new biorich plantations in the Ballarat area. BRT welcomes contact about its activities through the *biorich plantation website* email.

References

- Biorich (2012) *Biorich plantations – mimicking nature to integrate conservation & production*, <http://www.biorichplantations.com/index.html>.
- Duffy, A. (undated) *Analogue forestry: a sustainable production system*. Chapter 14: Revegetation Guide for the Goulburn Broken Catchment from <http://www.gbcma.vic.gov.au/revegetation/1/Index5.html>.
- Murphy, S. (2009) *Recreating the Country: A blueprint for the design of sustainable landscapes*. Ballarat Region Treegrowers/ Australian Forest Growers, Canberra, pp. 142.
- Senanayake, R. and Jack, J. (1998). *Analogue Forestry: An Introduction*. Department of Geography and Environmental Studies, Monash University, Clayton, pp. 145.



BRT members and supporters at the Imlal biorich plantation sign near Lal Lal. Photo: Gib Wettenhall

Table 1: Blueprint for Sustainability Score Sheet. Source: Stephen Murphy

Design factors	Score	
	Maximum possible	For typical three row plantation
<i>DIVERSITY</i>		
1. The number of species planted (one point for each species)	20*	5
2. The number of genera planted (two points for each genus)	20*	3
3. Food source potential and times available (up to 3 months nectar – 2 points; 3 - 6 months nectar – 4 points; 6 - 9 months nectar – 7 points; 9 -12 months nectar – 10 points)	10	4
<i>STRUCTURE</i>		
4. Plantation width (Over 25 m = 20 points; 20 – 24 m = 16 points; 15 –19 m = 12 points; 10 – 14 m = 8 points; 5 – 9 m = 4 points; less than 5 m = zero points)	20*	4
5. Number of structural layers (2 points for each layer)	10	6
6. Habitat potential and diversity (long lived hollow forming species – 4 points; short lived tall species – 2 points; short lived bushy species – 2 points; ground habitat potential – 2 points)	10	6
<i>REPRODUCTIVE POTENTIAL</i>		
7. Species grouping at planting (one point for average number of plants in each species grouping)	10	1
8. Genetic viability (2 points for each seed tree, in the seed collection. Averaged for each species)	20*	2
TOTAL OF FACTORS 1 - 8	120	31
<i>LOCATION</i>		
9. Connectedness to remnant vegetation (RVF) (add 25% of total score, if 0 – 50 m.; 20% if 50 – 100 m distant; 15% if 100 – 500 m; 10% if 500 – 1 km; 5% if 1 – 5 km distant)	25% of total of factors 1 - 8 30 points max.	1.5
10. Proximity of permanent water (PW) (add 25% of total score if water is insitue; 20% for permanent water with vegetation within 50 m; 15% for PW with veg. 50 – 100 m, or insitu PW with no veg.; 10% for PW with no veg. within 50 m; 5% for PW with no veg. 50 – 100 m distant)	25% of total of factors 1 – 8 30 points max.	1.5
TOTAL	180 points	34 points

Note: Shading indicates a minimum of 50% of the maximum possible score must be achieved for these factors. The ‘Sustainability Potential’ is downgraded one level for each Critical Factor scoring less than 50%. E.g. An initial score of ‘likely’ is downgraded to ‘marginal’, if one Critical Factor scores less than 50% or ‘unlikely’ for two poor scores.

Sustainability assessment

Sustainability index score	Sustainability potential
111 – 180 points	Highly likely
81 – 110 points	Likely
71 – 80 points	Marginal
61 – 70 points	Unlikely
Less than 60 points	Highly unlikely