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Trees in the Rural Landscape

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Trees in the Rural Landscape

The classic rural scene of the western slopes of NSW and other subhumid areas of Australia is large eucalypts in a grassland landscape. This scenery is ingrained in the Australian sense of identity and is celebrated in countless paintings and artworks old and new. Unfortunately the current land management practices mean that this scene will not be with us forever. It is a common sight in rural Australia to see old declining eucalypts in sheep paddocks with no young trees, no understorey, and little or no thought given to their care and attention. The early settlers left only the large stately specimens, if any tree cover at all, and those trees are now aging. A long lived species can suffer catastrophic and rapid decline if recruitment does not occur.

People admire this landscape without understanding that it is not stable ecologically and the extreme longevity of our Eucalypts belies the fact that this scenery is one of decay and senility. Is Australia's landscape memory to remain the sad sight of sheep lined up with their heads in the shade of a dead trunk on a Summer's day? Imagine a rural scene in western NSW in one hundred years. There will be no indigenous trees in paddocks, some remnants along roadsides, and large artificial plantings of shelter belts and windrows of native but not indigenous species in regularly shaped lines along fences and paddock boundaries. The landscape may be reminiscent of Europe or New Zealand but is not what we have grown used to as Australians.

The efforts of campaigns like Greening Australia and Landcare are often spent in planting highly degraded areas in critical need. Those shelter belts so created occasionally use non indigenous species and sometimes create an artificial tree spacing and geometry to the previously naturalistic remnant woodland. Trees do not grow at uniform intervals in nature and such planting gives a very different impression than a natural remnant woodland. Despite the educational efforts of these groups and various government bodies a trip in the country will show that there has been little progress in improving the general level of care of remnant trees by most traditional farmers. There are, of course, outstanding exceptions.

Rather than the expensive and rather artificial results of planting of trees in the rural landscapes priority should always be given to encouraging the remnants to set seed and renew themselves. This is more simple than it sounds and far cheaper than planting and caring for shelter belts. To understand the processes of rural tree decline is to see ways of allowing it to reverse its own decline. Trees in the rural landscape suffer from many antagonistic processes that prevent this renewal-

- destruction of understorey by grazers. Often remnant trees of groups become focal points for animal resting periods further destroying and trampling understorey
- elevation of soil nutrient levels due to pasture improvement and the concentration of animal droppings. Table 1 gives some very clear data that this occurs. This can be accompanied by soil acidification from pasture improvement programs further stressing trees,
- increased competition from the dense root mat of a sown pasture sod
- an increase in defoliating insect numbers due to elevated pasture fertility and ecological changes leading to a decline in predatory insect and bird numbers. Nutrients themselves are not necessarily harmful to trees, it is the massive proliferation of leaf eating insects, in part due to increased pasture fertility that leads to the classic "Eucalypt decline" syndrome.
- trampling of the topsoil compacting it, and destroying the litter layer which breaks the nutrient cycling process and destroys the living space for the many soil dwelling animals that make pasture and tree eating grubs their staple diet,
- chewing and rubbing by animals, causing removal of the cambium (bark) layer of older trees, by curious or dietary deficient animals. Horses are particularly destructive of the bark layer,
- constant suppression of recruitment of otherwise fecund eucalypts by grazers, fires, ploughing for crops and harrowing of pastures.
- destruction of nesting habitat for insect eating birds. Magpies will eat up to 40 pasture grubs per bird per day but they will not nest in isolated senile specimens.

Grazing and soil management is the key to helping remnant woodland renew itself at little cost to anyone. It is not uncommon to see properties where neglect or abandonment for even a few years has allowed a massive proliferation of new trees under the old gums. By the time the property changes hands and grazing returns the seedlings are old enough to resist direct grazing at least.

Much research has focussed on the causes and reversal of tree decline but the simple fact is that the level of grazing pressure often due to pasture improvement programs is main cause of decline and failure to regenerate. Reducing grazing pressure is the only solution but many farmers assume that this translates into isolating large areas of their property for non income generating purposes with no grazing at all. This is not so. Grazing can be integrated into a program of natural regeneration with no loss of income, quite the reverse. The research has shown-

- an unexpected number of understorey and tree specimens will quickly recover when grazing is reduced due not only to seedling growth but the fact that many native species produced surprisingly long lived ligno tubers. This is an adaptation to fire but also a preadaptation to the new agro-ecology of these areas. Even two years of grazing exclusion can be enough to produce a more stable mixed age community.
- the ideal tree cover level is probably around 20% with 30% considered a good cover and 5-30% a fair level of cover (Walker and Reuter 1996). Animal productivity is actually higher at this level than at lower tree cover ratios. This happens because of a complex of factors including less stress on sheltered animals, protection of crops from mechanical damage, more water infiltration and lower flood peaks. A cow exposed to cold wind can consume up to twice as much feed a day just to maintain its metabolic rate (ABC 1986).
- after understorey has re-established spiders and other predatory insects, and nesting birds reduce leaf eating insect numbers markedly benefiting the pasture as well as the trees,
- Once partially regenerated that area can be grazed without severe decline provided that grazing is either controlled and for short periods, or used as occasional drought forage sources.
- reduction of reversal of dryland salinity through tree management leads to increased productivity.

Fencing using double fencing along remnant tree lines, corners of paddocks containing an old tree, and grazing control in semi wooded paddocks is the key to low cost natural regeneration. Some general principles are to fence toward the downwind side to capture seeds, make fenced areas large enough to function ecologically, and consider not only the degree of tree cover but the connectivity of that cover. Planting is sometimes necessary where the landscape has declined too far for remnants to regenerate or where encouraging the regeneration of particularly rare trees. For an excellent succinct text on developing property tree plans see ABC (1986).

Soil amelioration can be an important management tool. Acidified land may need liming, eroded land may need gypsum and fertiliser if topsoil has been truncated. On the other side do not allow dairy effluent or enriched runoff flow into remnant tree areas, not only the increased nutrient load but the increased wetness can affect them.

It is frustrating at times to see wealthy property owners and their landscape architects lavish attention on the acre or two around the homestead and totally neglect the wider issue of tree decline on the property as a whole. As educators landscape architects can do much to influence a client's view of landscape and open their eyes sufficiently to allow a budget for this more ecologically important issue which, incidentally, has such an important aesthetic impact.

The landscape architect is well equipped to conduct site analysis and help develop whole farm plans that consider the aesthetics, type, degree, and connectivity of the woodland remnants on the property in a program integrated with the commercial needs of the farmer. A wide range of professional agriculturalists, soil scientists and ecologists is there to assist this process and help you integrate the plan with agricultural necessities.

If we are to preserve the quintessential Australian scene of the savanna woodland urgent attention is required to the development of a mature and stable agro-ecology as distinct from the exploitative phase of Australia's modern development the reminders of which stand in sad groups or isolated specimens in every rural scene.

References and reading.

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Case Study: Eucalyptus maculata in the lower Hunter Valley NSW. Research by Penny Kater of the University of New England into dieback of remnant Spotted Gum (*E. maculata*) forest showed clearly that increased Christmas beetle attack, severe Armillaria fungal infection, and consequent decline of new and old trees was associated with higher nutrient levels under trees with no understorey associated with frequent cattle camping. In control areas with low P, and intact understorey Christmas beetle was only a seasonal problem and Armillaria was absent. Penny is of the view that without change and better management practices the entire *E. maculata* forest on farms in the lower Hunter is endangered. The data below show a significantly increased salinity (EC) due to salt and nutrients from cattle urine and dung, (not to be confused with dryland salinity and unrelated) and a very significantly increased available phosphorus level stimulating Christmas Beetle larvae and Armillaria root rot.

Table 1. EC and available P levels in Soils of Healthy and Dieback affected *E. maculata*.

Control Forest Mean of 12 observations		Dieback affected Mean of 12 observations	
Mean EC 1:2 dS/m	Available P mg/kg	EC 1:2 dS/m	Available P mg/kg
0.14	0.52	0.34	12.0

Source: Kater, Penny. (2000) *Dieback now appearing in the Lower Hunter Valley*. Unpublished research University of New England.

Caption to photo: A typical Australian woodland scene: ravaged old eucalypts in improved pasture.