Two case studies of re-vegetation programs on farms in North East Victoria

J. L. Howard & S. McDonald

Acknowledgment

We appreciate the hospitality and openness of the landholders that allowed for us to wander through their properties and who answered a barrage of questions. We also acknowledge the assistance of staff from the Department of Natural Resources and Environment as well as Denis Martin of the Ovens Landcare Network. W. Robinson provided the pictures. J. Carmichael and L Price assisted with the text.

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A project in conjunction with the Department of Natural Resources and Environment

/ by Jonathon Howard and Simon McDonald

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Table of Contents

Summary

Funding for this project was provided through the North East Salinity Strategy as part of ongoing observation and monitoring of vegetation change and its impact on the catchment. Charles Sturt University was requested to map two revegetation schemes on three rural properties in North East Victoria. Part of the consultancy also asked the University to broadly document the benefits that have accrued from these schemes. As the farms involved in this study have changed enterprise over the years, benefits could only be assessed qualitatively by interviewing the landholders involved. Some quantitative assessment of the biodiversity benefits was undertaken by conducting bird surveys on these properties.

One re-vegetation scheme was located at Carboor. Planting started over twenty years ago and was initially undertaken to provide shelter for stock. When the owner saw other benefits such as increased biodiversity other areas were re-vegetated. Today networks of shelterbelts have been developed and the owner believes he has benefited from significant increases in biodiversity and soil health.

The other scheme was located at Springhurst on two farms: Avondale and neighbouring Winterfield. Like the farmer at Carboor, the owner of Avondale has been planting his property for some time. However at Avondale a night paddock was specifically created to shelter cattle and to reduce lateral water flows which were contributing to a salinity problem on neighbouring Winterfield. This paddock now provides a particularly good demonstration site for the region. The trees were planted in rows (alley farming) along the slope contour. The result has been an increase in biodiversity, an apparent stabilisation of the local water table, and increased soil health, while productivity has been maintained and stock losses reduced.

Introduction

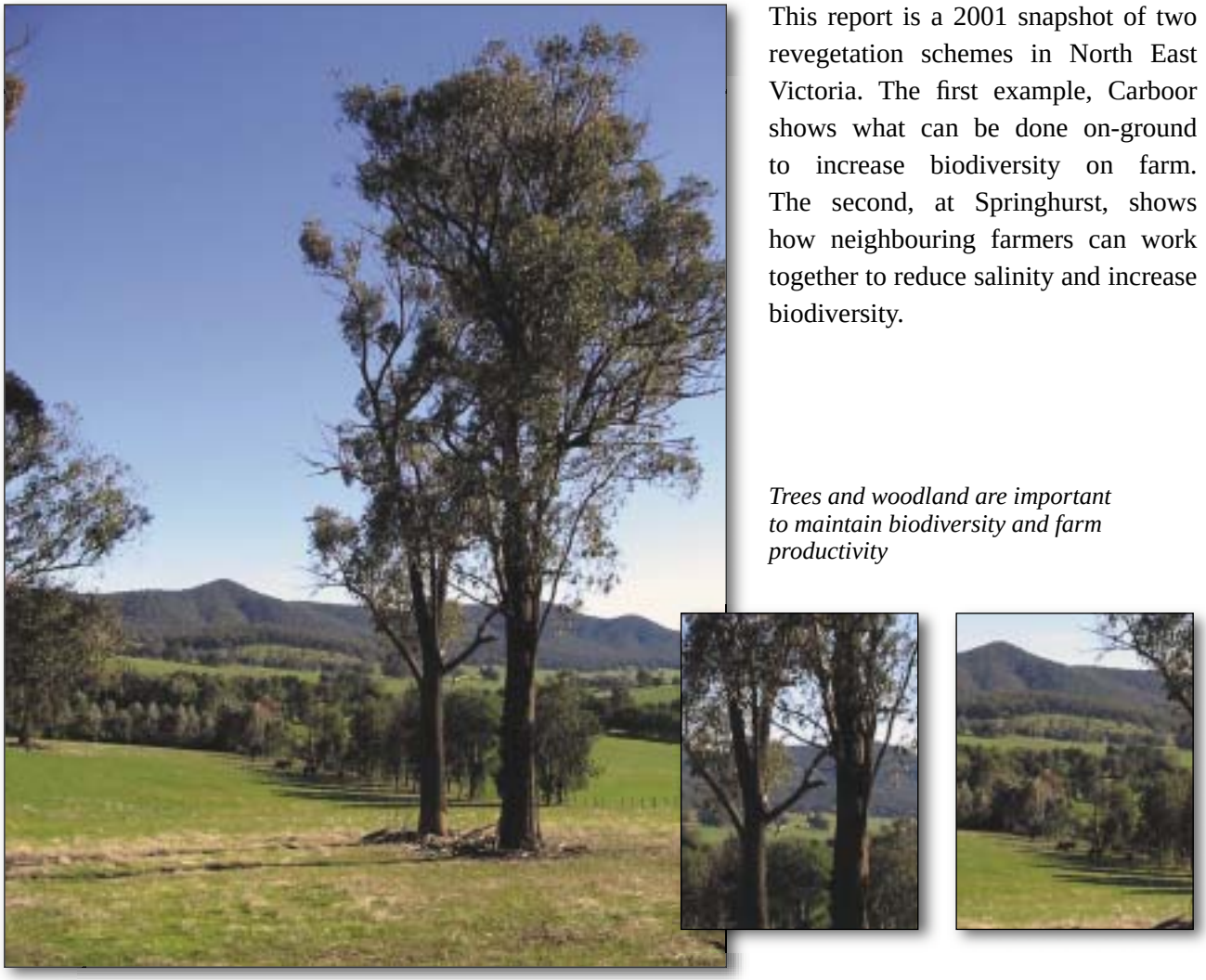
Clearing of trees and woodlands may cause groundwater levels to rise, which in turn can cause salinisation in the lower parts of the catchment. Dryland salinity results in reduced productivity of the soils and lowers farm profitability. Associated with the clearing of trees and woodland are significant losses of biodiversity.

Whole Farm Planning attempts to prevent such land degradation. It is based on the idea that to maintain profitability and land value, farmers need to be aware of the general status of the land and implement landscape change that will ensure long-term farm productivity on a regional basis.

The benefits obtained from Whole Farm Planning depends on the type of farm, what opportunities it presents to the owners, and how well informed the owner is about alternatives. However, it can mean:

- birds and wildlife are encouraged which then act as insect controls;
- trees intercept accessions to groundwater, which in turn reduces dryland salinity;
- windbreaks reduce stock losses, improve crop and pasture growth and as a result increase production; and
- soil loss from erosion by wind and water is reduced.

This report is a 2001 snapshot of two revegetation schemes in North East Victoria. The first example, Carboor shows what can be done on-ground to increase biodiversity on farm. The second, at Springhurst, shows how neighbouring farmers can work together to reduce salinity and increase biodiversity.



Trees and woodland are important to maintain biodiversity and farm productivity

Method

The aim of this study was to map changes in vegetation cover and to broadly assess improvements in farm viability, biodiversity, and water table levels arising from implementing property management plans at two sites covering three properties.

The first site at Carboor (owned by Stan and Mazie Enders) is 11km South-west of Myrtleford (Figure 1). The second study site is located within the North East Catchment Management Area at Springhurst, 17km North of Wangaratta on the Hume Freeway and includes the two neighbouring properties of Avondale (SP & PM Humphry & Sons) and Winterfield (Norm and Glenys Benton).

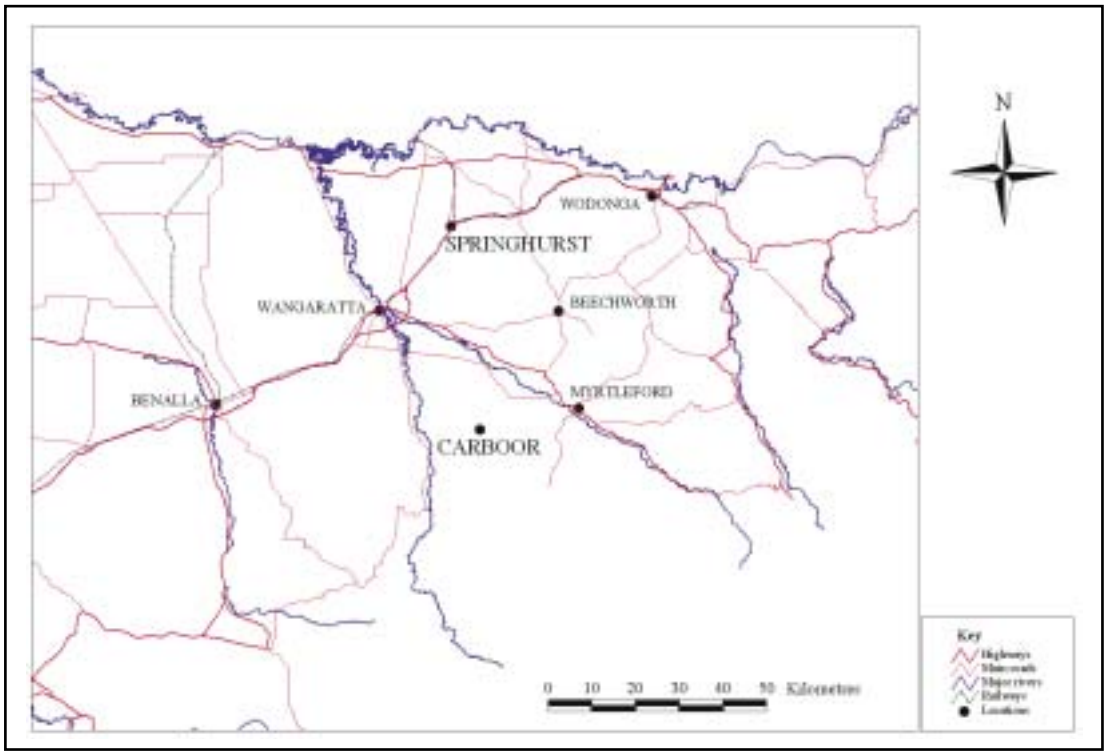
To document vegetation change, GIS datasets on property boundaries, recharge and discharge sites, remnant vegetation, and plantings undertaken in different years were developed using ARCview, aerial photographs, property maps, and topographic maps.

To assess improvements in farm viability, we interviewed the landholders, agency staff and staff from the Ovens landcare network. The interviews sought to determine the history of changes, the reason for on-ground works, the economic influences impacting on the property, and the practical realities faced by landholders in undertaking such works.

To assess biodiversity, bird species and densities were assessed by walking a series of line transects (400m long and 50m wide) at dawn and at dusk in September-November along different shelterbelts. Indices of biodiversity were calculated by using the Shannon-weaver index and using birds as the indicator. Bird lists were also developed for the two sites by recording all species observed or heard and adding these to the lists held by the local landholders.

Water tables were measured using existing data within the Department of Natural Resources. The Department has collected information from bores in the area since 1987.

Figure 1: The location of study sites



The Study Sites

Carboor

The first site is a property at Carboor and consists of 125ha of ridge tops and steeply sloping areas, grading into undulating hills and gently sloping valleys (Figure 2). The property rises to the south-west with the highest areas covered by remnant vegetation. The soil is generally shallow and stony on the ridge-tops, with deeper soils in the valleys. All soils exhibit extremely high acidity (<5pH) throughout their depths.

The first site at Carboor is a beef enterprise

The enterprise occurring on Carboor has changed with market fluctuations. Carboor originally (the property was bought in the 1950s) had sheep with a few dairy cows (Stan Enders, the owner, states the cows were *"pocket money really"*). The farm then moved into fattening pigs and later breeding pigs. In the 1970s the farm became a dairy. More recently Carboor has become focused on beef production.

The re-vegetation scheme

Stan Enders says, *"You seem to notice what is going on with your stock. They seem to tell you there is a problem...There was nothing in the paddock and we put them in anyway. They walked all around the paddock and came back up to the gate and bawled at me. I said, I don't know-but there is something wrong. If only animals could talk. They'd tell you to put more trees up, more trees. They'd tell you to change your fertiliser treatment. But they can't so you have got to watch what they are up to".*

The establishment of shelterbelts started about ten to fifteen years ago as part of the Land Protection Incentive Scheme (NRE Sponsored scheme). Under the Scheme, landholders were offered funds for fencing, trees and revegetation works. Stan Enders, with the help of the Department of Natural Resources and Environment (NRE) and his neighbour planted a row of trees to solve some erosion problems on the boundary of his property.

At that time, Stan was also concerned about stock losses due to exposure. He says cold wind and rainy weather would come in from the North-west during the second week of the lambing season and he would have to go and round up trailer loads of ewes in the morning and nurture them in the shed to avoid stock losses. To solve the problem he started planting a few cypress pines to provide shelter.

Having seen the benefits to his stock, Stan then began experimenting with different ways of creating shelterbelts. Initially several areas were direct seeded using local seed from stringybarks and wattles.

To fund this work, Stan with the help of Alan Gibb, another local landholder, created one of the early Landcare groups in North East Catchment Management Area. In addition, Stan became interested in agroforestry in 1990 and created a few experimental plots with mountain ash and blue gums. These are located along the main lane at Carboor.

Since the direct seeding plots and agroforestry trial, Stan Enders has continued to experiment. This is why the shelterbelts on this property are so diverse. For example, the width of the shelterbelts has increased because he has found that if a tree dies in a thin shelterbelt, it creates a gap which results in less shelter. The understorey species have also changed to encourage wildlife and minimise maintenance. Stan says "*Unfortunately you don't live long enough to do what you find out as you go along*".

The network of shelterbelts at Carboor are of different ages and of various species.

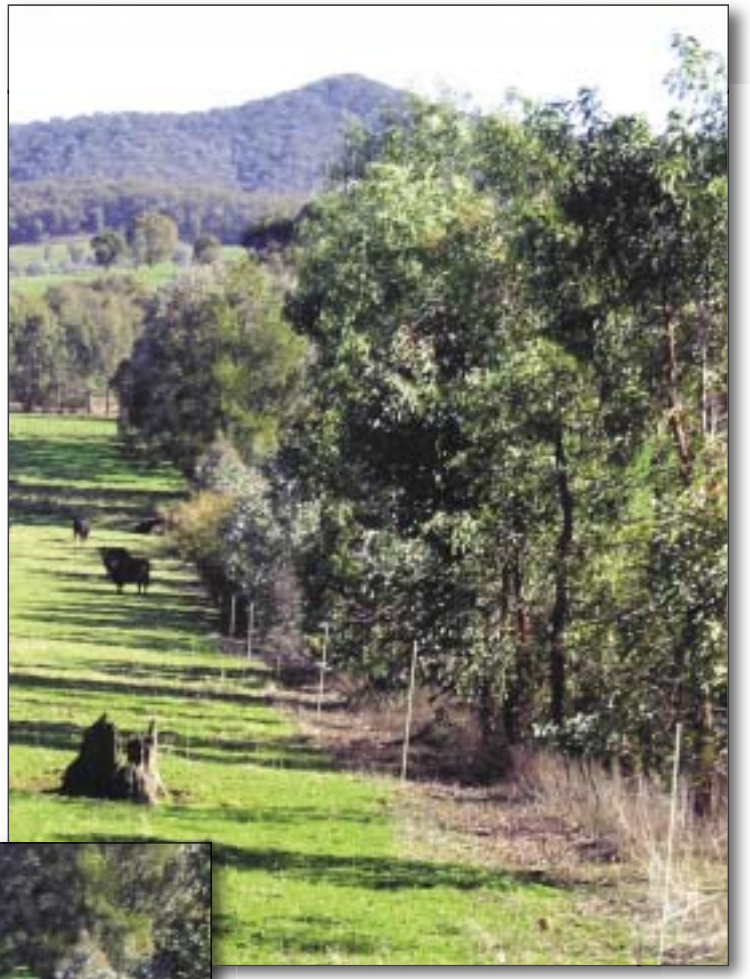


Figure 2: The farm at Carboor and the network of shelterbelts

Springhurst (Avondale and Winterfield)

The second site at Springhurst covers two farms: Avondale and Winterfield

The landscape over the properties at Springhurst consists of gently undulating hills with rocky steep crests (Figure 3). The country to the east is Devonian granite while in the west it is Ordovician mudstones and shales. Between these two areas are slates (metamorphic rocks) which are overlain by glacial derived soils. The soil types at Springhurst (on both Avondale and Winterfield) correspond fairly well with this geology. On granite the soils are yellow/duplex (yellow chromosols) while the soils on metamorphics are shallow stony gradationals (shallow gravelly dermosols or rudosols). Avondale (owned by S. P. &P. M. Humphry & Sons) covers just over 600 hectares, while Winterfield (owned by N. Benton) is about 60 hectares.

Avondale has been a dairy for over forty years. The grandfather of the current owners purchased 183 acres at Springhurst in 1914, and a further 640 acres were selected in 1925. Some improvements and clearing were carried out before selling part of it in 1956 to finance building a water storage. Dairying began on the farm this same year with a herd of 29 jersey cows. In 1959 a further 166 acres was purchased. By 1980, the property area had grown to 1109 acres running 180 cows, 100 replacements, 550 1st cross ewes, 200 merino wethers, and growing 200 acres of oats.

Winterfield has been a mixed sheep and cropping enterprise for over eighty years. The Benton family first bought the property in 1919 and has been passed down through two generations. The current owner is Norm Benton who runs 2800 sheep and grows oats, wheat and triticale.

Salinity has occurred on Winterfield since the 1950s. Prior to its occurrence, the paddock was able to grow crops, now the affected area is over 2 ha. in size. The salinity was caused when the region was cleared of timber in 1923 to provide fuel for the bakery and butter factory at Springhurst. Removing native vegetation and replacing it with shallow rooted annuals, altered the water balance. Reduced evaporation and transpiration from non-perennial pasture increased run-off, groundwater levels rose, and salt was mobilised.

The re-vegetation scheme

The Soil Conservation Authority (now Department of Natural Resources and Environment) started investigations into the salinity at Springhurst in 1982. Soil analysis and monitoring of water tables suggested that when there was excess rainfall, water moves through the soil into the groundwater system and flows towards the valley floor. On reaching the valley floor, the water table rises to bring saline groundwater close to the surface (Figure 4).

Figure 3: The two properties at Springhurst showing existing vegetation

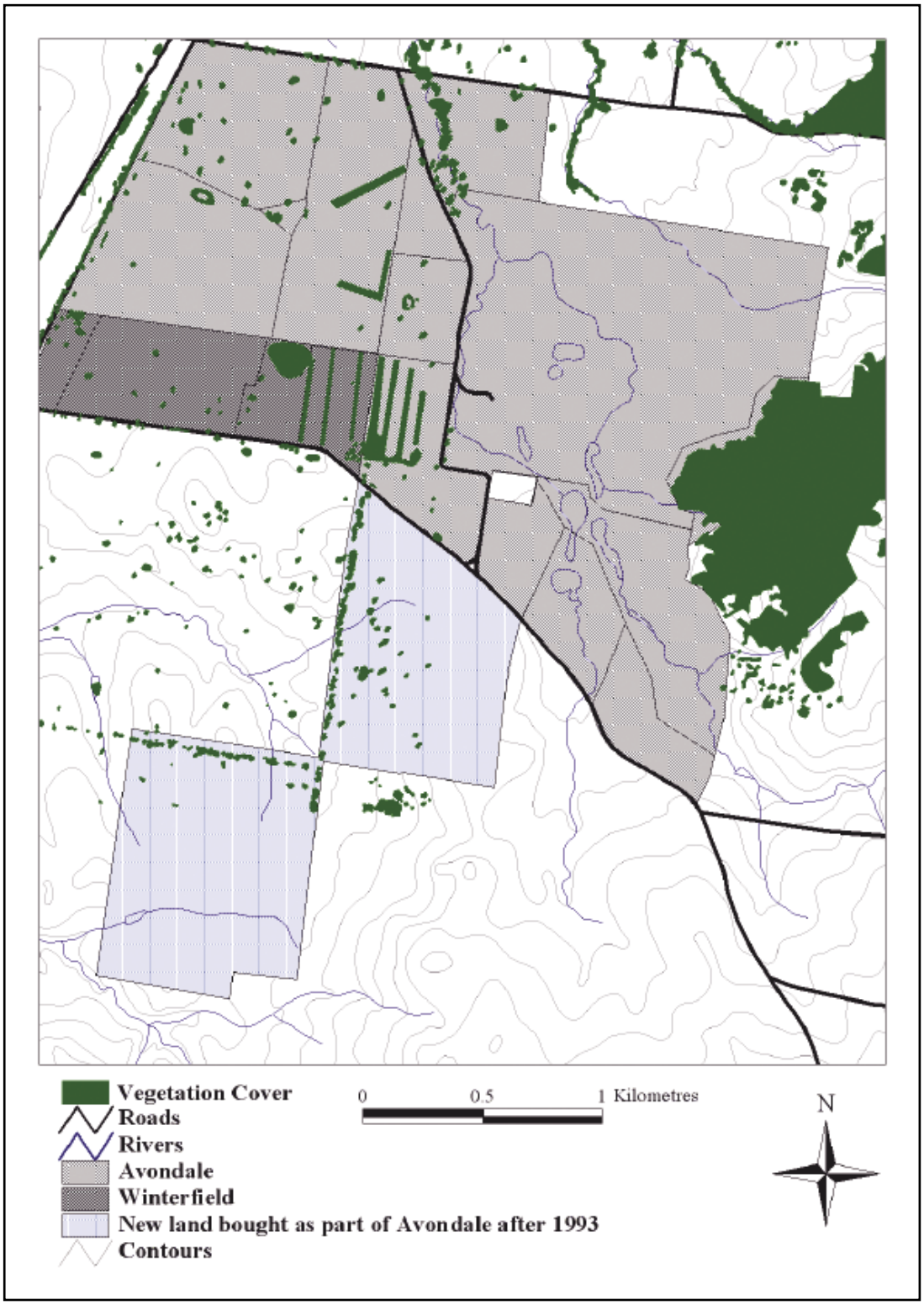
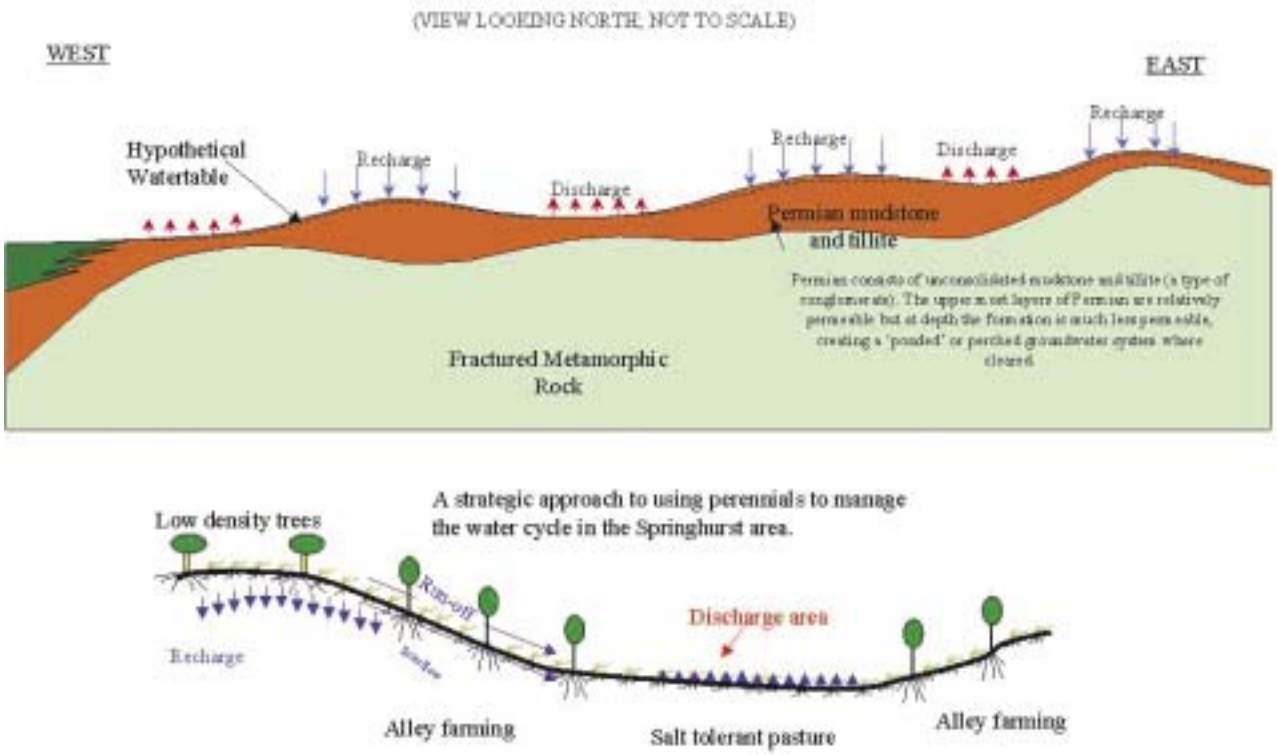


Figure 4: Simplified cross-section of Springhurst



To address the problem, the Department began working with the owners of Winterfield (N. Benton). The agreed solution involved a two pronged strategy: treating the site, and creating shelterbelts throughout the catchment. Actions initially focused on treating the site. The area was planted and cleanings from the Winterfield shearing shed were put on the bare patches. This met with limited success and the salt area continued to grow.

In 1988 shelterbelts were established on recharge areas in neighbouring Avondale (Humphry & Sons) and then in 1991 shelterbelts were created in Winterfield.

The shelterbelts at Avondale are part of a re-vegetation program with a long history. Trees were initially planted on the farm in the 1960s but most of these where exotic species such as poplars, willows and radiata pines. Many of these died or did not realise their full potential due to the climate. The owner then began planting natives. These natives were mainly gums dug up from other parts of the property and transplanted around the watercourses and dams. Lindsay Humphry then wanted to develop a night paddock to shelter the cattle. Lindsay did some research beforehand and with the help of the DNRE decided to trial a few different species.

The original planting of red ironbark (*E. sideroxylon*) was done in one corner on a hill. This eventuated in planting a series shelterbelts on that hill in 1988. The aim of this work was to get the maximum benefit from the trees. The trees

were located on recharge areas, planted on less productive slopes, and planted in wide strips to maximise the effects of shade and shelter. These vegetation strips consist of red box *(Eucalyptus polyanthemos)*, yellow box *(E. melliodora)*, grey box *(E. microcarpa)*, white box *(E. albens)* and red ironbark *(E. sideroxylon)*. Understorey species were included in the shelterbelt on the western or windward side of each shelterbelt.

Fencing used at Avondale (S. P. &P. M. Humphry & Sons) is fairly robust, as it has to cope with both sheep and cattle. It is a hinge joint with an electric fence as an outrigger. The posts are spaced at about 7 metres with concrete posts at the end of each belt. Lindsay now has eight eucalypt and 15 acacia species in various shelterbelts throughout his property. More recently he has been collecting seed from his existing trees. Lindsay says *"One thing leads to another and if you don't try them out for yourself you won't see the benefits"*.

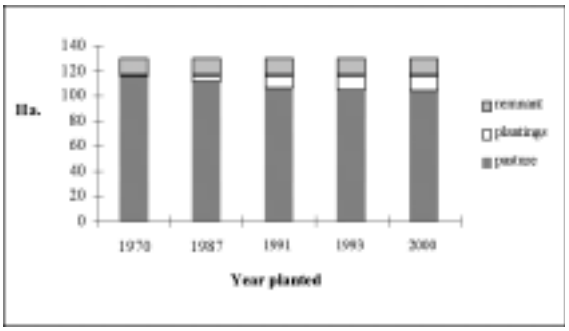
The network of shelterbelts created as part of a night paddock to shelter the cattle.

Change in Vegetation Cover

Creating shelterbelts increases the area of native vegetation within a property. All landholders involved in this study were most active between the years 1987 and 1991.

Between the years of 1987 and 1991, Stan Enders re-planted 4% of his property at Carboor (Figure 5). He has continued to increase the area of native vegetation on this property and at present 9% of the total area under shelterbelts.

Figure 5: Change in vegetation cover at Carboor



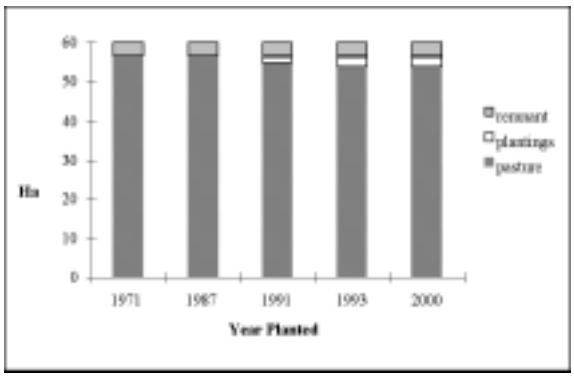
Between the years of 1987 and 1991 Winterfield (N. Benton) planted 2%, and Avondale (S. P. & P. M. Humphry & Sons) planted 1.0%. While no more plantings have occurred at Winterfield, SP &PM Humphry & Sons have continued re-vegetating Avondale.

Table 1: Percentage change in cover

	Carboor	Winterfield	Avondale
1971-87	+3.7%	0	0
1987-91	+4%	+2 %	+1.0 % (33 ha)
1991-93	+0.4%	0	+0.2%
1993-00	+0.9%	0	+3.2%*

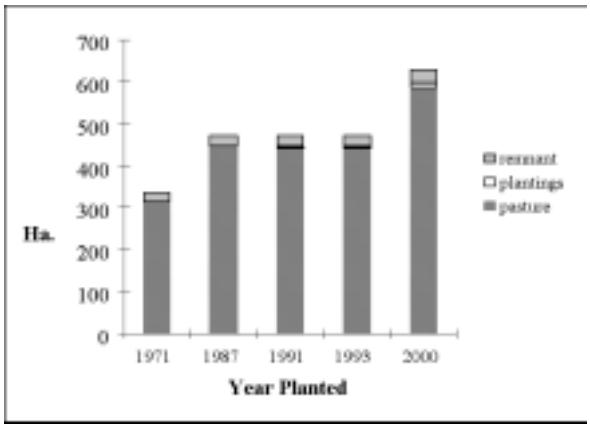
** does not include recent land aquistions*

Figure 6: Change in vegetation cover at Winterfield



At first glance the percentage of area devoted to shelterbelts on Avondale (S. P. & P. M. Humphry & Sons) appears small (Figure 7). However, this figure does not accurately reflect the true situation as new land was purchased during this period. Excluding this new acquisition of land from the analysis, 3.2% of the main Avondale property is now re-vegetated (Table 1). So while it appears only 1% percent of Avondale was planted between 1987 and 1991, this is actually over 30 hectares of land.

Figure 7: Change in vegetation cover and property area at Avondale



In terms of the hillslope on Avondale, the focus of the re-vegetation scheme to create a night paddock while helping to address the salinity problem on neighbouring Winterfield, the night paddock has 28% of the total paddock area re-vegetated (including remnants and shelterbelts) (Table 2). The next paddock downslope which is on Winterfield (N. Benton) has 14% of the total area planted to shelterbelts. The paddock which is effected by the salinity has 7% of the total paddock area planted to shelterbelts.

Table 2: Percentage area of each paddock changed to shelterbelts at Springhurst

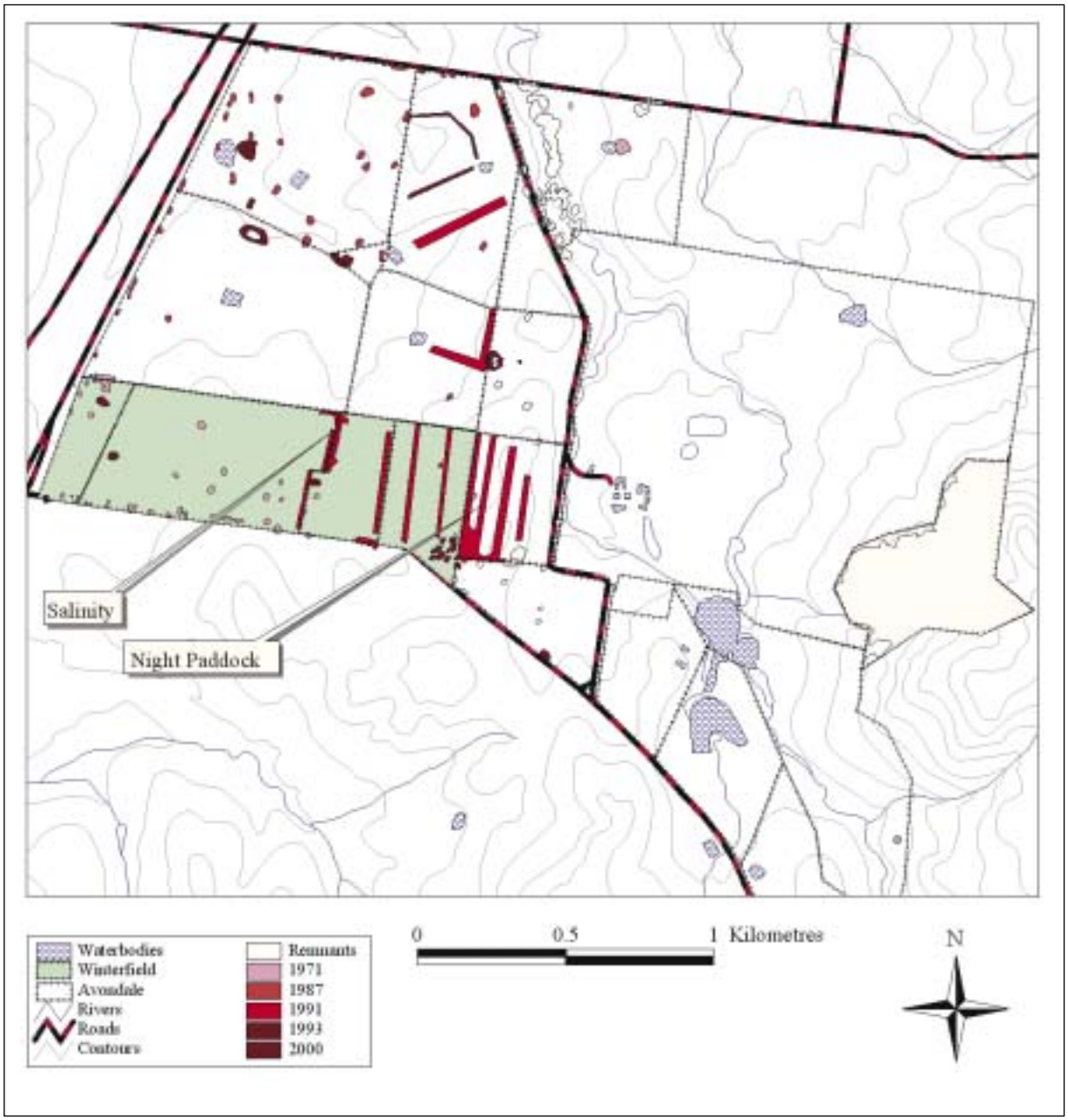
	Salt effected paddock	**Mid-slope paddock**	**Night paddock Avondale**
area	9.5ha	12.7ha	14ha
% planted	7	14	28
%pasture	92	84	69
%remnant	1	2	3

Note: These figures are for 2000 only.

Newly established shelterbelts on Avondale

Shelterbelts planted ten years ago on Avondale

Figure 8: Change in vegetation cover on Winterfield and Avondale (excluding new land acquistions)



Site Management

Carboor (Stan Enders)

Stan believes re-vegetation schemes need to be implemented in partnership with good soil management. Stan says "*They all go hand in hand. The shelterbelts protect your assets: the grass and stock, while treating the soil improves productivity*".

The paddocks at Carboor are treated with 50% lime/super-phosphate. Stan Enders found that without lime, super was being locked up in the soil. Now the growing season is longer and he is using less fertiliser. Stan provides anecdotes about when he first started applying lime and it resulting in the paddocks being "*a crawling mass of worms*".

Molybdenum and encouraging native grasses have also been important to Carboor. Some paddocks could only sustain 20 wethers, but when treated with molybdenum, stocking rates increased to 100 wethers. Stan also encourages native grass (microlina) growth because "*it is a good summer grass and tolerates the acidity*".

Pesticides have not been used at Carboor since the early 1960s. Stan has found that the increased wildlife is enough to keep pests down, especially the red earth mite. He only sprays for weeds to get rid of the weeds that would interfere with the electric fences.

Avondale (Humphry & Sons)

Lindsay Humphry believes soil and land capability are critical to good farm management. The regular use of phosphate had created a range of animal health problems. So now they only use lime and aerate the soil to help release the nutrients. He says it takes a few years to see benefits but after seven years the benefits become really obvious - the natural system began to return with frogs and dung beetles appearing. So the focus of soil management at Avondale is getting the pH right, the calcium and magnesium right, and the potassium and sodium in balance.

S. P. & P. M. Humphry & Sons also rotationally graze rather than set stocking, Lindsay says *"If you want pasture to be sustainable you can't afford to be nipping off the fresh part of the plant day after day, so we graze for no more than four days."* The sheep are sent in after the cows to clean up paddocks, and they also find such rotational grazing reduces the number parasites.

Like Carboor, no pesticides are used on Avondale, however, Roundup® is used when sites need to be prepared for planting or to control weeds around shelterbelts.

The Benefits

Biodiversity

The three properties have bird species common to most farms across the region such as magpies, white-plumed honeyeaters, superb fairy wrens, willy wagtails, and noisy miners. However, these species are more abundant than other farms in the region. Birds such as the superb fairy-wren, which are significant predators of pasture pests, become more abundant when additional shelter is provided.

Five threatened or near threatened species were seen on these farms. The black chinned-honeyeater, white-winged triller and speckled warbler were seen at Avondale (S. P. & P. M. Humphry & Sons) and the turquoise parrot and grey-crowned babbler at Carboor (Stan Enders property).

When the number of bird abundance and species diversity is used as a crude indicator of overall biodiversity, it shows that the oldest re-vegetation schemes have the greatest the biodiversity (Figures 9 & 10). The study also found that the bird community in open paddocks is much lower than those communities around remnant trees or of older shelterbelts (Table 3). For example, the presence of large remnant trees in a cleared paddock tripled the number of bird species commonly found. Younger shelterbelts attracted shelter-loving species such as superb fairy wren, whereas older shelterbelts attracted more species but the species composition changed. This suggests that the most complex habitat is likely to provide for a range of different bird species.

Table 3: Species commonly observed (>50% of the time) in different remnants at Avondale

Transect Unit	**Species commonly seen**
Open paddock	Magpie, pipit
Remnant tree in open paddock	Eastern rosella, magpie, noisy miner, pardalote, yellow-rumped thornbill, red-rumped parrot
New Shelterbelt (less than 10 years old)	Magpie, noisy miner, yellow-rumped thornbill, red-rumped parrot, white plumed honeyeater, superb fairy wren
Older Shelterbelt (greater than 10 years old)	Magpie, yellow-rumped thornbill, red-rumped parrot, white-plumed honeyeater, superb fairy wren, songlark, welcome swallow, grey-shrike thrush,
Wetland with plantation	Magpie, noisy miner, white plumed honeyeater, welcome swallow, grebe, black duck, wood duck, masked lapwing, willy wagtail, black faced cuckoo-shrike, eastern shrike tit, mudlark, eastern rosella
Natural Area	Magpie, mudlark, rainbow bee eater, superb fairy wren, black-faced cuckoo shrike, kookaburra, peaceful dove, pardalote, eastern yellow robin, jacky winter, rufous whistler, grey fantail, noisy miner, mistletoe bird, brown treecreeper, leaden flycatcher, welcome swallow, grey-shrike thrush, yellow-rumped thornbill, brown thornbill, western gerygone

Figure 9:Changes in biodiversity at Carboor

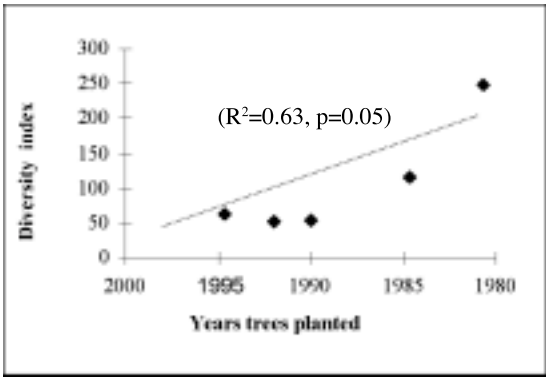
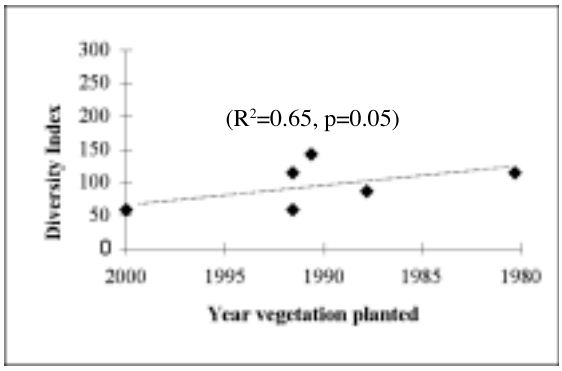
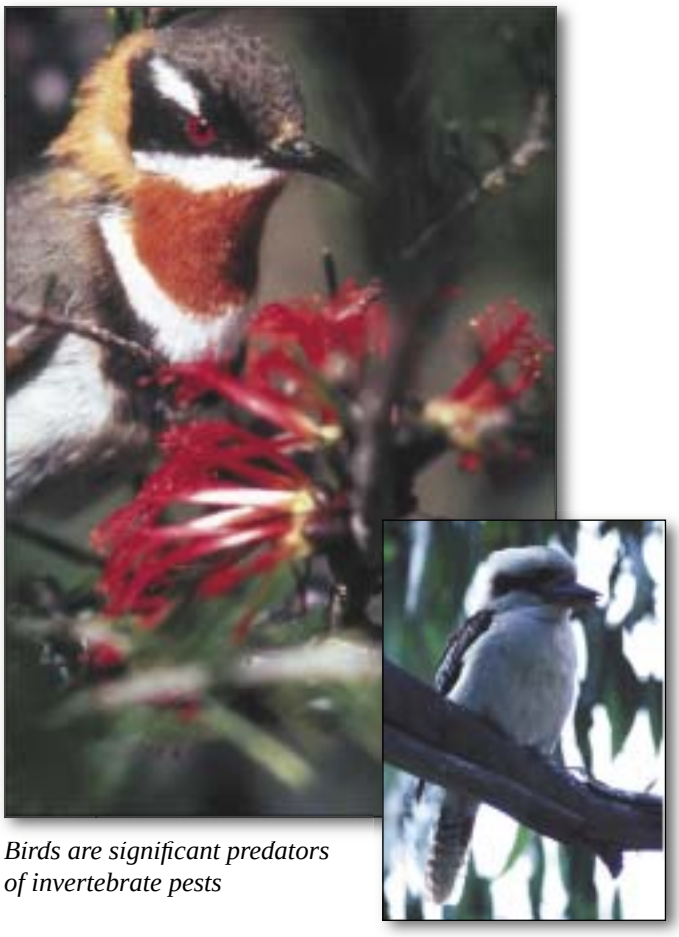


Figure 10: Changes in biodiversity at Springhurst (both Winterfield and Avondale)





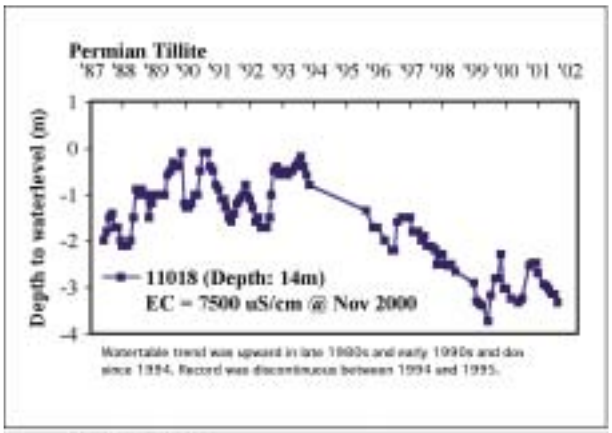
Birds are significant predators of invertebrate pests

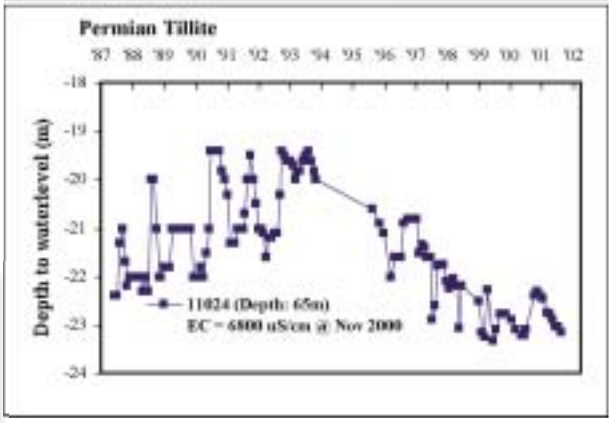
Water Tables/Salinity

Groundwater monitoring has been undertaken at Springhurst (on both Avondale and Winterfield). Since the 1980s, the hydrographs of (Figures 11 and 12) bores 11018 and 11024 show that water tables vary with climatic conditions.

Both hydrographs generally show peaks occurring in winter/spring as a result of recharge. The general downward trend since 1994 is attributed to dry conditions during that period. More information is available from DNRE in their "Understanding salinity" and "Groundwater monitoring summary North East Salinity Strategy – Year 2000" pamphlets.

Figures 11& 12: Water levels from bores at Springhurst





Economic

It was not possible to quantify the economic benefits from the re-vegetation works at both Carboor (Stan Enders) and Avondale (S. P. & P. M. Humphry & Sons) because of the many changes in enterprise, management and market prices. Carboor started with sheep, then pigs, then dairy and finally cattle. By contrast Avondale has bought and sold property throughout the years and brings in feed from off the farm. Lindsay Humphrys believes he gets *"around 3 and 4 dry sheep equivalent per acre, but they're ball park figures*".

All the owners believe the paddocks with shelterbelts are warmer. The owner of Carboor (Stan Enders) suggests that the wind may be *'howling'* and the temperature freezing, but the trees keep the paddocks warm. The owner of Avondale (Lindsay Humphry) believes that in the two cold months of winter there is a 90% increase in pasture growth in the sheltered paddock because of the warmth. For example, he states in 1998 the paddock on the hill was *"strip grazed five times and the pasture would grow overnight"*.

This warmth also seems to extend the growing period. At Avondale Lindsay believes the pastures between the shelterbelts grow throughout the year whereas other areas have hardly any growth at all during the winter months. On Carboor, Stan has found that when the autumn and spring breaks come the pasture will keep green and grow a bit longer.

All owners also believe there has been no reduction in productivity. Lindsay Humphry at Avondale believes his cattle don't eat as much because they don't need as much energy to try to keep dry and warm. The owner of Winerfield (N. Benton) says: "*When a storm is brewing the cattle know it and the big dairy mob at Avondale go into the plantations and hide behind it. On Winterfield, I'd bring a mob of sheep down and they get right amongst it* [the shelter belts] *and some nights you would have 10 to a dozen lambs born there under the trees*". Whereas in 1970 before the shelterbelts were established *"I picked up 300 dead lambs one morning after a dreadful night of rain, wind and frost*". Lindsay, the owner of Avondale, states *"Every year that goes by there are more benefits stockwise in terms of shelter effects and increased pasture growth"*.

Shelterbelts provides shade and shelter

Work Environment

Shelterbelts provide scenic amenity

How do you value a feeling? While it may not have been the initial reason for starting both planting schemes, aesthetics quickly become an important part of the process. Lindsay Humphry one of the owners of Avondale says "*there is nothing more enjoyable than seeing the bird life and variety*". Lindsay frequently finds waterbirds he had never seen before and gets fascinated at simple things such as the way shrike tits play amongst the trees. Stan Enders at Carboor is similar. He keeps a bird list and has noticed changes in the birds over the years. "*We like to see waterbirds and we've got other things. We like the frogs- they are beautiful- they are the best*". Sometimes he sees some unusual species such as the turquoise parrots on his property.

This does not mean both farmers are just interested in the birds, "*I like vegetation belts as they sub-divide the paddocks and to me an empty paddock does not stimulate the senses,*" Lindsay says. Norm Benton the owner of Winterfield says *"He does enjoy working with nature, Lindsay does. "I think we all do. Otherwise we wouldn't be farming."* These feelings are all genuine, but it is hard to measure them. How do you put a value on lifestyle?

Advice by these Landholders to Others

Lindsay Humphry, the owner of Avondale, has learnt a few lessons in doing these re-vegetation schemes that may help others planning to undertake similar work.

- Make individual paddock plans before starting, but being prepared to deviate from this plan when it comes to implementation. The Humphrys have had to deviate from plans because of fencing costs, livestock, and ease of management.
- Be prepared to change paddock shapes. Where the most recent plantings have occurred one paddock was planned to be a triangle, but they changed it to a rectangle for ease of other operations such as cutting hay or cropping.
- Be practical about stock management. You plan your shelterbelts and paddock size according to the herd size, although "*the main consideration is the length of electric tape which is about 200 metres- so it will reach from one point to another"* Lindsay says.
- Adapting design with each paddock and position in the landscape. If you want to put half a dozen belts in the one paddock the costs are doubled because of fencing. The cost of works also increases the higher up the hill you go. To rip up a hill will cost you 30% more than what it would on the flat. Fencing also cost about 25% more on hills. "*You have got to work out the location of plantings. If it was in the flat you might be able to have narrower rows but closer together*" he says.
- Increase the width of shelterbelts. The trees at Avondale were originally planted in rows of three but are now planted in rows of five. Shrubs were also once planted on the windward side, but now the rows and species are mixed. *"If you're in a windy area you have got to plant the shelterbelts wider. I would not go less than three rows wide"* Lindsay says.

Conclusion

Both case studies demonstrate that there are many good reasons for devoting a proportion of farmland to native vegetation. The farmers involved in the schemes at Carboor and Avondale believe there is:

- increased pasture growing periods, particularly in winter;
- increased stock survival rates and increased reproduction from the shelter and shade;
- less expenditure on pesticides as an increase in native predators helps control pests such a earth mites;
- a more aesthetically pleasing work environment.

This study has quantified the increase in biodiversity. For example at Avondale (S. P. & P. M. Humphry & Sons) devoting 28% of a paddock to native vegetation by fencing remnants or creating shelterbelts increased bird numbers six-fold.

The night paddock at Avondale (S.P. & P. M. Humphry & Sons) may provide a model for other re-vegetation schemes. The goal of increasing vegetation cover to 30 percent may seem unrealistic to some farmers, but this research indicates such measures are necessary to increase biodiversity, reduce salinity and soil deterioration, reduce seasonal fluctuations in pasture growth, and maintain optimum long term productivity.

It is suggested the following strategies be adopted in developing these shelterbelts

- Protect existing remnant vegetation, plant native, locally occurring trees and shrubs;
- Recreate local conditions;
- Develop corridors throughout the property. Corridors can follow fence lines so that they shelter stock and or crops. Corridors may also follow contours of a property to reduce degree of run-off and erosion within paddocks;
- Maintain a range of grazing regimes across the property and avoid heavy continuous grazing, so that pasture productivity is kept high.

Useful Resources

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Example of shelterbelts created along an existing fenceline three rows wide

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