

**Greening Waipara:
a ‘grape roots’ project to include biodiversity in the wine experience**

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Out of the land

It is no secret that New Zealand’s developed landscapes have lost most of their biodiversity - indigenous plants, habitats and wildlife. Biodiversity is a defining element in a district’s sense of place and there seems to be a growing sense of this in the Waipara wine-growing area of North Canterbury. This is a land of rich, sometimes boney soils and dry summers, but it includes microclimates that avoid the worst of the drought and frost.

Like much of eastern Canterbury, the deeper or moist soils were originally clothed in tall totara, matai, lacebark, kowhai, lancewood and broadleaf forest. The lighter soils would have supported kanuka-kowhai woodland. Matagouri, small-leaved divaricating shrubs and native grasses would have clung to rocky ridges, steep scarps and young terraces. Moa and a myriad of other endemic birds, reptiles, bats and large insects scratched around in these rich wooded ecosystems, oblivious to the intense predation, browsing and competition going on in other (continental) parts of the globe.

Inevitably, this Garden of Eden was discovered. Fire and, for the first time, land mammals and the most competitive plants from around the world have been progressively introduced over the past millennium. Extinctions in the fauna and massive changes to the prevailing vegetation have taken place over this time. Land use has been transformed from hunting and gathering by the Tangata Whenua as well as their cultivation of kumara and other crops, to extensive and intensive sheep grazing and mixed farming and then to forestry or horticulture - including viticulture.

‘Greening Waipara’

Out of this rich environmental and human history, there seems to have been an almost spontaneous enthusiasm from the Waipara district as a whole to do something special, not only in terms of quality of their produce but to recognise the history of the land and to use this as a symbol of their regional identity and commitment to ‘clean green New Zealand’. And that is what it’s all about – not just resting on the country’s rather faded pastel green laurels, but to walk the talk. And we are seeing that in Waipara in spade fulls.

This initiative has to some extent been foreshadowed by discussion and policy documents that followed the somewhat bald statements regarding New Zealand’s natural environment in the *NZ Biodiversity Strategy*. Subsequent documents included *Biowhat?*, and *Weaving Resilience*. These recognised the general desire to protect our species and

heritage, but for the strategy to be successful, landowners across the country would need to be empowered with information and incentives to assist in this vital task. This was especially so in the lowland districts – what might be called the cultural landscape – where 150 years of development has enhanced the productive capacity of the land, but eliminated or displaced much of the original character. Consequently there is this groundswell, expressed most recently in the Waipara Valley, to do something and repair the damage or restore some of the heritage to its rightful and prominent place. Furthermore, there is a commercial opportunity to project a clean green image for Waipara to satisfy the demand for quality and sustainability from an increasingly discerning market – quality in the bottle and in the vineyard.

Partnerships

Successful actions come about through partnerships and the sharing of knowledge and skills. The Greening Waipara project stems from initiatives by Lincoln University, local wine growers, the Hurunui District Council and Landcare Research. Lincoln University is running a public good research programme funded by FRST called Biodiversity, ecosystem services and sustainable agriculture; LINX 0303. This programme is calculating the value of ecosystem (nature's) services in the arable, pastoral and horticultural sectors and enhancing it by using what is sometimes called 'ecological engineering'. The former approach is telling us such things as 'what a worm's worth' – i.e., the value of earthworms in Canterbury arable agriculture, while the 'engineering' approach is increasing the contribution of nature's services, and their associated dollar value. The Greening Waipara project has always been supported and underpinned by research. Most of the vineyard companies and other operators in the district have now joined the project.

This is a win-win situation where research on ecosystem services provides added value through biocontrol and other environmentally-friendly practices, including reduced reliance on herbicides and pesticides, creation of swales and wetlands with native species to filter contaminated stormwater and vineyard effluent – all done via the restoration of habitat using species once common. These practices enhance the natural character and resilience of the district. Shelter belts, entranceways, stream and pond edges, vineyard borders and even the vine rows themselves are all receiving an ecological 'make over'.



Buckwheat in flower down the vineyard rows at Canterbury House Winery.

A key part of the research is based on the work of a recent Lincoln University PhD student, Don Vattala, whose research at Lincoln in collaboration with AgResearch and PGG Wrightson showed that particular sugar ratios in plant nectar can predict its suitability for the ‘good’ insects – those which become better predators and parasitoids of pests when they have a ‘feed’ of nectar and/or pollen. Nectar is used by the insects to prolong life and the pollen provides protein for more eggs. It has already been demonstrated that some introduced herbs such as buckwheat and phacelia provide the right type of high energy nectar for such beneficial insects.



Hoverfly feeding from the nectar of a buckwheat flower

The search is now on to see if any of the native plants can also provide these ‘services’. New Zealand jasmine (kaihua) is showing some promise and could become a companion

vine to the grapes; similarly, some of the leptinellas (cotula button daisies) have a strong honey scent that may be advertising something special and now we have seen that a New Zealand aniseed is often smothered in insects in the spring. Some of these plants have Maori taonga (treasured) status and support Maori cultural practices such as mahinga kai (food gathering) and rongoa maori (using plants for their medicinal values). This gives an extra added value to the programme and restoration efforts. Many plants will have ‘stacked’ biodiversity values in that they may aid in the biocontrol of pests, add aesthetic values to the area, provide food for locally rare endemic birds, reptiles and insects, produce mahinga kai or rongoa kai that have the potential to be marketed commercially, increase the level of uniqueness of the region for marketing purposes and many others. Our research team involves Maori scientists, and runanga associated with the Waipara region are also helping us with the work (see Box).



Stacked kaitiakitanga – the case of the Maori jasmine.

The richness of the kaitiakitanga represented by native NZ plants is exemplified by Maori jasmine;

- a high sugar ratio in the nectar, of potential high benefit to beneficial insects
- leaves contain caterpillar anti-feedant chemicals
- has taonga status for some iwi
- has rongoa maori status
- can replace rose bushes at the end of vine rows
- has a distinctive odour which may have value in cosmetics
- aesthetic value
- Maori name kaihua suggests that plants attract birds and that Maori may have used it as a snaring tree

A beautiful native flower, (*Parsonsia heterophylla* – Maori jasmine). This flower has been investigated for its nectar sugar ratios.



Extracting nectar from the native *Muehlenbeckia astonii* flower.

How we are doing it?

Within our research and extension team we have a range of expertise and experience, including knowledge of the historic ecological patterns and plant growth potential or constraints across the region. Land owners of the district have been working the land for decades, sometimes generations. All have their own knowledge and experience essential to making any land management plan work on the ground – and they are now seeking specific ecological help for this new enterprise.

Our approach has been to engage individually with the more than 20 property owners in the district who have already pledged support to the Greening Waipara project. We discuss with them their own vision for different microsites within their properties, and then share our ecological knowledge to help them achieve their goals. Through this exchange, collective understanding increases and partnerships are forged which strengthen the project.

The critical aspect of the exchange is that it is carried out where most farmers prefer to be – in the field, on site. We are getting to know State Highway One very well (we'd prefer a good train service!) and we don't mind 'getting down and dirty' to engage with growers. We dig a hole in the ground to see what the soil looks and feels like; we discuss the dryness and frostiness of the site – something that only the residents' experience can tell us about. This ensures that some reality tempers desk-bound theory. We find out what individual companies and vineyards want to achieve with respect to landscaping and biodiversity, what areas, how big, how they want it to look, what constraints (e.g. views, waxeyes, etc.), and what time frame.

We are also targeting the local schools, the general public and even the Waipara railway station! As the number of visitors attracted to the region grows (you've heard of wine trails but how about 'biodiversity trails'), many of our vineyards are planning such trails near their winery/restaurants. It will be a good place to stroll after one-too-many lunchtime tipples! There are even plans for pétanque areas near the winery plantings. The Waipara School plantings will have interpretative signage – and there will be a strong indigenous presence at the railway station where many of the region's visitors will get a first 'taste' of Waipara's new and distinctive biodiversity character. Those arriving by road, or racing along State Highway One, won't be ignored – roadside signage has been approved by Transit New Zealand and the Waipara Promotions Association has 'joined the party' by raising funding for these. The project was even featured on TVNZ One News.

Knowledge of the soil type is crucial; is it deep, shallow, limey, stoney, well-drained or on a sunny or shady slope? Only when we have this information can we be confident about what indigenous species can grow on these sites immediately or later in the succession. We have a list of about 300 plant species for the district, but only a bit over a hundred are suitable or realistic in the context of these vineyards or are currently available from nurseries. Others may be used for later planting, when there is some cover and shelter. The widespread use of native plants for utility, landscaping and amenity is still in its infancy, and many of the hundreds of species that could be used in cultivated or semi-natural settings are still to be brought into mass production. The interest and

demand is, however, increasing dramatically in cities and the countryside, so it will only be a matter of time before supply catches up with demand. In fact, we have conducted recent ‘plant forays’ to seek out shoots and fruits of often-neglected native plants in Waipara’s valleys, creeks and river terraces – many of these could have ‘functional biodiversity’ value but, to date, have not been investigated for their ‘FAB’ value – Functional Agricultural Biodiversity – we have some being nurtured in warm greenhouses at Lincoln to induce flowering for nectar analysis.

There are always some challenges and potential resistance to these ideas – that’s human – some wine growers are fearful of feathered marauders, especially waxeyes, being attracted by more fruit-bearing native trees. It appears that most native birds prefer native fruits and vice versa. But the recently self-introduced waxeye is an exception; it just loves to fly down a row of grapes, pecking a hole and lapping up the oozing juice. In the short term, netting must remain the answer.

Of course, everyone wants to know how much it will cost – then they can start matching the plants needed to available financial and labour resources. Our first advice to anyone contemplating a major restoration project is “don’t bite off more than you can chew”. No matter how experienced one is, a new site always presents new challenges, so it is important to test the idea in small plantings, rather than risk a ‘block buster’ that goes bust and demoralises everyone concerned. And no two seasons will be the same. Staging an ambitious project over one or more years is the obvious way to overcome an immediate shortfall in plant supply; and some hardy species can be planted in autumn while others will need to be planted during the ‘spring window’ – between the last frosts and the onset of summer drought. Patience is a virtue – after a couple of years of carefully planned, executed and cared for planting, the rewards will come. If this advice is not heeded, there is a danger of becoming overwhelmed with the maintenance of weeds and pest control – and losing much of the initial investment in plants, as well as the enthusiasm. Better to plant a few plants well that can be nurtured through to canopy closure and a real functioning plant community, than to plant many, most of which succumb to grass competition, rabbit or hare damage.

Once the aspirations, tempered with practical realism, have been agreed to, we provide advice on the suitable native species, numbers and layout according to existing soil variation and shelter - by way of a species list, sketch map, and a perspective drawing. An example of the species lists are those generated for Ecological Regions and soil types in the NZ Ecological Restoration Network (www.bush.org.nz/planterguide). Enter Canterbury Plains Region then the species list for Pallic Soils (the old Yellow Grey Earths).

We then must order the plants from a nursery in the area that knows their native plants and provides locally sourced stock. Site preparation – in plenty of time, and the necessary labour, mulch, animal repellent and an iron-clad commitment to subsequent maintenance for the next two years all need to be organised. The free ECan booklet *Establishing Shelter in Canterbury with Nature Conservation in Mind* provides useful information and hints to ensure a successful planting of indigenous species in your area.

We are also making a Waipara-specific booklet for the locals, including sections on Waipara's vegetation history and lots of detail on the 'how to' aspects of restoration ecology. Design is also important, and in some respects we are utilising the principles applied by the famous and pioneering English landscape gardener – Capability Brown. During the late 18th Century he and his disciples 'constructed' the idealised English countryside by using trees, shrubs, lawns, rural elements (invisibly controlled livestock) and serpentine lakes to create the impression of natural patterns and controlled wilderness – an idyllic pastoral scene framed within natural aesthetic.

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Planting of Canterbury House in September 2005, and the same area in May 2006. Divaricating shrubs, kanuka, golden akeake, cabbage trees, kohuhu and kowhai are prominent.

Wider landscape implications

No vineyard is an island. It has a wider context within the district, the catchment, the region and the country. Processes such as biological control of pest insects operate at more than just a few metres; there are larger-scale dynamics at work. Insects may travel from one vineyard to another; birds may travel many kilometres and tree seeds may be transported with those birds or on the wind. Some of these birds and plants may be desirable while others will need to be controlled. Once the individual property, road verge and riverside plantings have been established, there will be more to learn about these wider landscape processes. How long will it take for the majority of transported seed to become mature native plants? Where will we see these establishing? Can we facilitate this dispersal and establishment? How long will it take for native insects, birds and lizards to discover the new landscape full of their favourite food? These questions will be answered as part of an ongoing research programme and through the careful observations made by the property owners and workers. It will form the basis for new stories to be told about our natural history which will enrich our understanding of natural processes and the experience of tasting the bounty - one of the products of all this effort at the end of a hard day's planting – the vinous liquid! As Sheridan said, 'A man may surely be allowed to take a glass of wine by his own fireside!' What Sheridan didn't say is that 'man also wants to know whether the wine has been sustainably produced!'