



**POST
QUAKE**
FARMING

Integrated Farming and Forestry Case Study

The Gates, Waiau, North Canterbury





Farms affected by 2016's earthquakes are turning the huge challenges of devastation into an opportunity for their business. Using expert advice, analyses and information, farmers are diversifying land use to improve economic, environmental and social outcomes.

This is the first case study of a series which presents information about farms affected by the 2016 Kaikoura Earthquake. The farms have all had analyses carried out by a farm system consultant, a forestry/carbon consultant, and the farmers themselves. All farms have completed a farm environment plan with soil and land use capability mapping.

A C K N O W L E D G E M E N T S

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M E E T T H E P I N C K N E Y S

INTEGRATED FARMING AND FORESTRY CASE STUDY: THE GATES, WAIAU, NORTH CANTERBURY

OVERVIEW

The Gates is owned by Henry and Olivia Pinckney. The Gates covers a total of 1,430 ha, of which 828 ha are currently in effective grazed pasture or forage crops. The property has significant biodiversity attributes with nearly 300 ha in native bush or mixed-species scrub, and 12 ha in rushes or wetland species. The farm has just under 300 ha in exotic plantation forest.

The property was badly damaged by the 2016 Kaikoura Earthquake. The Pinckneys have turned the huge challenges created by the earthquake into an opportunity for their business. Using expert advice, analyses and information, the couple is continuing to diversify their land use to improve economic, environmental and social outcomes for their family.



PINCKNEYS' OBJECTIVES

- Operate a sheep and beef unit that is financially, environmentally and socially sustainable.
- Develop the underperforming areas of the property to maximise production within the capability of the land.
- Keep the animal production system simple and profitable and within the capability of the land, with negligible environmental impact.
- Create an efficient farm in terms of infrastructure.

CURRENT FARM SYSTEM

- 4,000 MA Ewes lambing 140%
- 1,000 Hoggets lambing 60%
- 40% lambs sold prime
- 200 Dairy Beef finishing steers/trade beef
- Intensive pasture development program
- Ongoing subdivision and stock water upgrade

LAND USE DECISIONS AND LAND USE CAPABILITY

Land is managed according to opportunity to maximise productivity and minimise risk. The Gates has been Land Use Capability Mapped at the farm-scale (1:7,000) which has been very valuable in identifying which land is best suited to specific use.

The areas which have been planted or a planned for planting are generally class VI and above (refer to Case Study 2 for more information on LUC assessments); or have other management limitations such as access or weed burden.

The better class of land is utilised for pastoral farming with highly productive legume. Pastoral systems have been identified, as have the areas that need to be in trees.

Table 1 shows the area of and, relative stocking rate, and financial performance of different land classes on The Gates.

Table 1 Summary of stocking rate in relation to financial performance for different land classes at The Gates.

Land Class	Area (ha)	% Stocking Rate	SU/ha	EBIT \$/ha
Cultivable	340	61%	12.6	\$685
Developed Hill	245	25%	7.2	\$392
Back Country/Gullies	243	14%	3.9	\$212
Trees	287	0%		
Ineffective	315	0%		
Total	1430	100%	6990	\$380,256

The farm environment plan (of which the Land Use Capability assessment is a part) suggests the Pinckneys are already carrying out many recommended best management practices for looking after their land and water resources. It also recommends retirement and afforestation of erosion-prone areas, poplar pole planting in the sandstone country (pastoral), and retirement of a wetland area.

FORESTRY

Exotic forestry (*Pinus radiata*) planting started at The Gates since 1991 with a total of 288ha now planted and registered into the ETS.

Figure 1 below shows the area of Pre-1990 forestry, the area of Post-1989 which uses the MPI Look-Up tables, and the area of Post-1989 which has the yields measured for carbon.

WHY FORESTRY?



We took over the farm in 2012 and there was nearly 100ha already in trees. It's fair to say we were not big fans of the forestry industry at that point. However, with the right advice and observing the issues that some of the harder land had with weeds, we realised that trees had a place and we decided to stick with it. It was a great way to improve our sanity to plant the heavy broom country in something productive and not have to continue battling it.

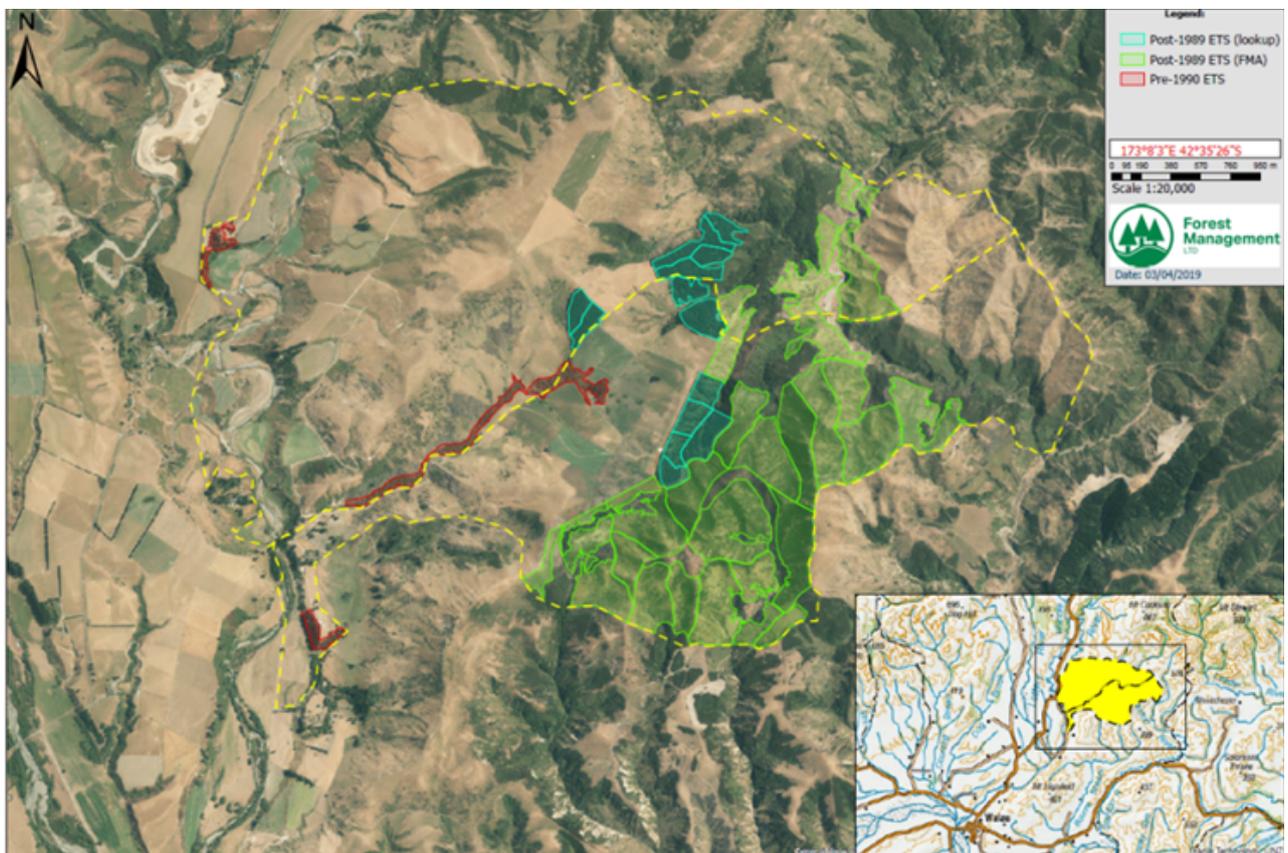


Figure 1: Forest classifications for The Gates.

CARBON

Carbon yields have been measured on the majority of the forestry at The Gates (as the main block is greater than 100ha). For the remaining areas (refer to map), the MPI Look-Up Tables[1] are used. Table 2 below shows the measured carbon yields and their value to-date.

The Gates has an exceptional growing environment for trees so measured numbers are well ahead of that expected in the lookup table.

MEASURING VS LOOK-UP TABLES

Forestry blocks that exceed 100ha must be measured for yield to work out the carbon sequestered. However, on blocks less than 100ha, Look-Up Tables based on regional average sequestration rates with forest type and age can be used. It is worth noting the benefit of measurement vs the use of Look-Up Tables as it is significant for The Gates (refer to Table 2).

Table 2: Measured carbon yields at The Gates and carbon value

	Age	Total carbon units	Value @ \$25/unit	Average per ha/year
Radiata	18 years	600	\$15,000	\$833
Douglas Fir	28 years	790	\$19,750	\$705

Table 3: Comparison of measured carbon yield income to Look-Up Table carbon yield incomes

	Age	Total carbon units measured	Total carbon units Look-Up Tables	Value @ \$25/unit measured	Value @ \$25/unit Look-Up Tables	Average per ha/year measured	Average per ha/year Look-Up Tables
Radiata	18 years	600	249	\$15,000	\$6,225	\$833	\$345
Douglas Fir	28 years	790	468	\$19,750	\$11,700	\$705	\$418





COSTS

- \$650,000 of capital invested to date in a Joint Venture.
- Annual costs of \$35 per ha for carbon administration and forest management.

INCOME

Carbon has been claimed on the forestry since 2008, and after planting post-2008. Harvest will begin within the next three to four years. Expected income from Radiata is between \$20,000 and \$40,000 per hectare net at age 30-32 years. Expected income from Douglas Fir is \$40,000 to \$50,000 per hectare net at age 45-50 years. The oldest Radiata block has expected stumpage of \$33,000 per hectare net at age 30-32 years. Variability in returns are due to growth rates, tending, ease of access and harvesting costs.

Table 4 outlines the overall income and EBIT/ha for the forestry area. This is based on average carbon yield being recognised in the ETS (known as averaging). This is not in policy yet but is anticipated and likely. This will significantly reduce the risk for landowners looking to invest in forestry.

	\$/Year	EBIT/ha	Description
Carbon income	\$185,000	\$644.60	Cash income
Timber growth	\$220,000	\$766.55	Timber growth
TOTAL	\$405,000	\$1,411.16	Per ha per year

Table 4: Total income from carbon and timber (based on average carbon yield recognised in ETS, which provides 22 years of income. Following that, income will be timber only for this forestry block).

CARBON SELLING STRATEGY

- Initially sold on contract. The open-market price was \$2 when the Pinckneys first started selling carbon, so having a contract that performed better than this was key.
- Now that the carbon price has recovered, the Pinckneys are reassessing their selling strategy.
- All carbon earned is sold. The liability this creates at harvest, or risk of an adverse event which creates a liability (e.g. wind throw or fire) is managed through staged planting over time, so not all trees will be harvested at once; and using a mix of Pinus radiata and Douglas Fir which mature for harvest at different times.
- Its likely that a change will occur in policy to 'averaging' which will eliminate the liability risk within two years.
- The carbon income is used to offset the costs of further planting.

“

We are constantly trying to improve our farm business to meet our short- and long-term objectives. We recognise that there are significant climatic challenges farming in this area and so have identified business diversification as very important to minimise our business risk. The trees are part of that, but not our passion. The focus for us is on maximising the value returns per hectare.”



FUTURE FOR THE FARM BUSINESS

- Continue to reduce weed costs using forestry on the highly weed-prone land, and through subdivision in the pastoral area which should lead to improved grazing management.
- Continue to develop the high production legume-based systems.
- Move to a low input system without compromising production, using multi-species crops, genetics, and improved grazing management from subdivision and water.
- Simplifying system to create efficiency in the business and allow time to further develop the property and progress new ideas.
- Looking at integrating sheep milking into the overall business as part of a diverse portfolio. Already have the genetics programme in place for this.
- Based on the completed analysis of land capability and financial viability, plant and retire an additional 230 ha of forestry.

PROPOSED FOREST SCENERIO

The proposed scenario is to plant 115 ha of *Pinus radiata* and 115ha of indigenous forestry, supported by accessing the One Billion Trees Funding grants. The indigenous forestry will be native regeneration or a mixture of natives and exotics which will eventually return to a mature canopy native forest.

Figure 2 shows the areas to be planted in native, and the areas to be planted in pines.

WHAT IS THE OUTCOME SOUGHT FROM MORE FORESTRY?

The Pinckneys have thought carefully about what they want to achieve before considering more forestry. In this case they want to get better use out of marginal land, get good economic returns, and leave an environmental legacy.

“ There are areas on the farm which are still challenged by weeds which we spend a lot of time and effort trying to manage. These areas are marginal from a farming perspective currently, and would require significant intensive development to get them to where they would need to be, which we don't think is sustainable. Forestry provides an economic return, manages the risk of soil erosion, gives the ability to fence off waterways, enhances native biodiversity in gullies where regeneration is happening in the forestry blocks, and helps to diversify our income, thereby reducing risk. It also enables a focus our efforts into farming the land that is best suited to pastoral farming and really making it perform while meeting objectives.”

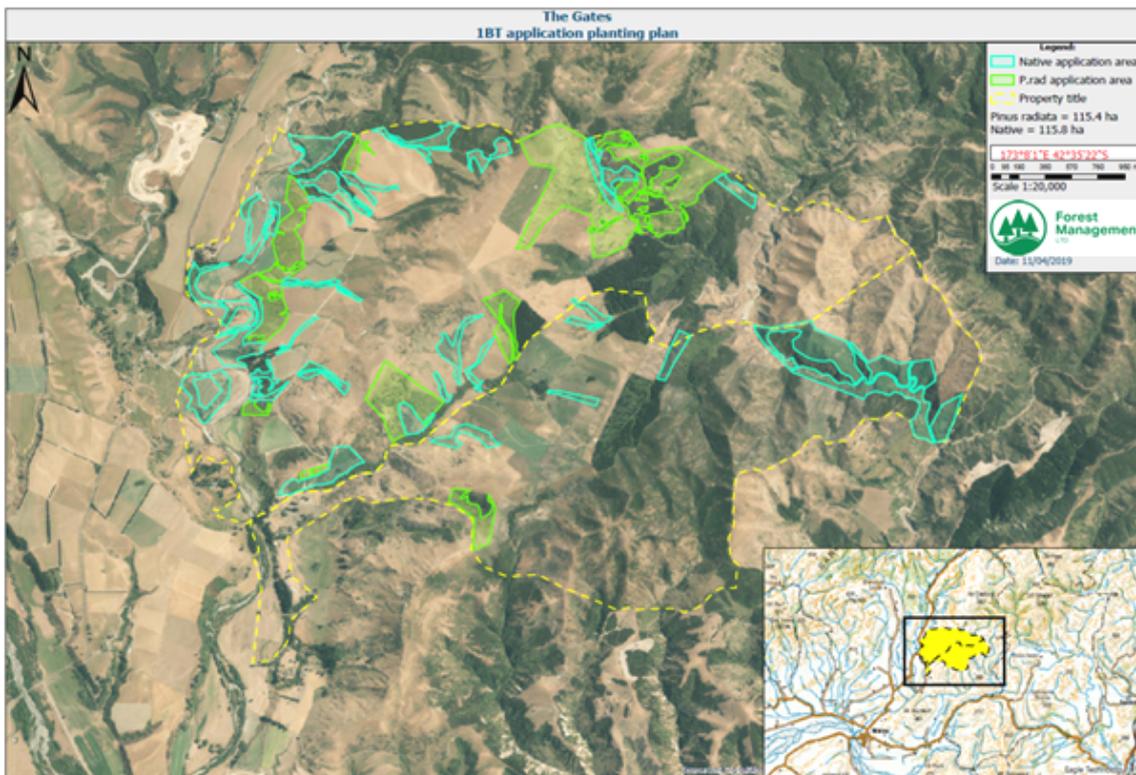


Figure 2 Proposed forestry planting of natives and *Pinus radiata* to be used to support One Billion Trees grant application.

WHY THIS SCENARIO?

The scenario provides a balance of maximising carbon income, while also achieving environmental outcomes. Most of the areas proposed to be planted have been recommended for afforestation or retirement to natives in the environment plan.

The recommendations are made on the basis of managing soil erosion risk, stock carrying capacity, and returns from forestry.

The permanent, indigenous forestry aligns with the values of the Pinckneys, particularly around enhanced biodiversity outcomes. It also provides a method to offset liability associated with harvest of the exotic forestry (although, this liability will not exist if 'averaging' is brought into policy).

ONE BILLION TREE FUNDING

Using the One Billion Trees grants provides a strong incentive to plant additional areas of The Gates in forestry, part of the long-term plan.

The base rate grant available for these plantings is \$1,500/ha for the pines, and \$4,000/ha for the natives. There is an additional \$500/ha for erosion-prone and (~33ha of the 230ha), and \$500/ha for fencing for the pines (115ha).

This is a total value of \$709,500 worth of grants that the Pinckneys can apply for to support the implementation of their plan.

PINCKNEYS' ADVICE FOR OTHER FARMERS CONSIDERING FORESTRY ON THEIR FARMS

- Seek advice, but if your values don't align, then find someone else.
- If you don't like pine trees, there are other species options including native regeneration or mixed-planting regimes which can generate sustainable returns and meet your objectives.
- Assess land use options on merits objectively rather than how you or others feel towards it. You can do this by getting your farm mapped for Land Use Capability at farm-scale. This will provide you with an understanding of the land and water resources and opportunities or risks within it.



KEY POINTS

- Forestry is a long-term or permanent decision. It is critical to think about what you want to achieve by using trees on your property, then getting good advice before proceeding.
- Forestry has provided diversification of income and stability of cashflow which has helped the Pinckneys achieve their goals faster than they planned.
- With the appropriate design, forestry can enhance native biodiversity and become a win-win. Gullies in The Gates' forestry areas are now regenerating into natives. There are plans to retire an additional 115 ha into natives in the next phase of development and generate carbon income from this.
- Forestry has enabled the ability to match the land to its best use in a sustainable way.
- Partnering with the right people means good advice and the ability to consider a whole range of options in the farm system as well as in the potential forestry areas. A Land Use Capability map and detailed farm plan is valuable for this.
- There is currently significant opportunity for funding support through the One Billion Trees Programme.
- Forestry returns are variable depending on a range of factors, but can provide very positive returns, and, managed well, carbon income can be very beneficial to cashflow.



C O N T A C T U S

Michael Bennett
PQF Project Manager
Terrier Rural Consulting
027 505 7535
postquakefarming@beeflambnz.com

Jansen Travis
Tambo New Zealand Ltd
021 220 1263
jansen.travis@tambo.co.nz

Dave Janett
Forest Management Group
027 434 1104
dave@forestmanagement.co.nz

Lachie Grant
Land Vision
021 526478
lachie.grant@gmail.com

Andrew Dartnall
Riverside Horticulture
0800 400 454
sales@riversidehort.co.nz