BEFORE THE SOUTHLAND REGIONAL COUNCIL

In the matter	of sections 88 to 115 of the Resource Management Act 1991
And	
In the matter	of applications for resource consents by:
	FAWNA FARMS LTD
	Applicant

STATEMENT OF EVIDENCE OF DANIEL GERARD MINEHAN
ON BEHALF OF IFS GROWTH LIMITED
8 March 2023

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1. QUALIFICATIONS AND EXPERTISE

1.1 My name is Daniel Gerard Minehan and I am Director and Shareholder of IFS Forestry Group Ltd.

1.2 IFS Growth is a subsidiary of IFS Forestry Group and is the Forest Manager for the Feldwick property.

1.3 TreeBilly NZT Ltd is a subsidiary of IFS Forestry Group Ltd and is a shareholder in the Feldwick property.

1.4 I hold professional memberships with:

(a) Member of the Institute of Forestry

(b) Institute of Directors

(c) B.Com (Forestry)

1.5 I have been involved in the NZ forestry industry for 20+ years in a professional capacity. Previous to this I grew up (Hokonui Hills) on a forest from the age of 5, and my Father, Grandfather, and Great Grand Father were all involved in the NZ forest industry.

1.6 While we operate our Forest Management business in several areas of NZ, my primary residence is in Southland and I work out of our Invercargill office. Our Forest Management business provides all-encompassing services to our forestry customers including Establishment, Silviculture, Harvesting, and Carbon/Consulting advice.

1.7 IFS Growth approximately employs 20 direct staff, 75 people in harvest operations, 170 people in our silviculture, planting, and releasing crews.

1.8 My primary level of expertise is in the planning, establishment, and Forest Management side of the Forest industry.

2. CODE OF CONDUCT FOR EXPERT WITNESSES

2.1 I have read the Code of Conduct for Expert Witnesses within the Environment Court Practice Note 2023 and I agree to comply with that Code. This evidence is within my area of expertise, except where I state I am relying on what I have been told by another person. To the best of my knowledge, I have not omitted to consider any material facts known to me that might alter or detract from the opinions I express.

3. BACKGROUND

3.1 IFS Growth has been involved with the syndicate ownership group of this proposed Forest for the last 3 years. In this time, we have established over 4,000 has of production forest for timber and carbon sequestration. On top of this IFS has worked with other customers including several leading-edge farmers primarily in Southland in establishing production forests for both timber and carbon sequestration.

3.2 IFS Growth is part of a working group of forestry experts working on a 'wood energy' project, primarily focused on the substitution of coal from commercial boilers in Southland. This project is well through the scoping and feasibility phase. This proposed forest is well positioned to make up part of the fibre resource required in the future.

3.3 Further to my involvement in the NZ forest Industry our family has business interests in the following:

i. Regenerative Beef and dairy support Farming in Southland.

ii. Fishit – A salmon hydrolysate business that produces a 'soil conditioner' and is sold to farmers, horticulturalists, nursery men. This business repurposes the mortality Salmon from the Stewart Island Salmon farm.

iii. A native forest restoration and carbon sequestration property on the boundary of Fiordland.

3.4 During this period, I have been 'watching' competing interests of many individuals, LGAs, Governments, Lobbyists, and companies with varying and ranging agendas including:

- Water Quality
- Nutrient losses
- Carbon ambitions both emissions and sequestrations
- Biodiversity
- Urban 'drift'

All over which has led to an unrivalled amount of 'finger pointing' in the time I have been involved in business.

3.5 From what I can see and tell, the polarisation of opinions is making moving forward on some of these issues as a region incredibly difficult. In fact, some of the suggestions to move forward on these issues seem so uncommercial that Southland runs the risk of large areas of landowners being bankrupted.

3.6 While IFS Growth must focus on commercial outcomes to remain in Business, environmental and social outcomes are also very deeply rooted in our values.

3.7 This resource consent is the culmination of several years of thought on how tying diverse land uses together can create better environmental outcomes for the region while still retaining commercially viable outcomes.

3.8 IFS Growth has been waiting to work with a 'like-minded' farming entity (Fawna Farms) to 'strip back' the effects of each other's operation and find a sustainable way of combining the two activities based on scientific facts and evidence.

3.9 It is clear to me unless good environmental outcomes can be recognised and rewarded, then change is not going to naturally occur. Change is primarily driven by reward and the associated capital investment, if the capital cannot see a clear path, it will not be funnelled into an investment.

3.10 I hope this consent can be the start of a pathway for different landowners and land uses to work together for the environmental betterment of the region.

3.11 If this can happen and we project ourselves into the next few years maybe there is room for native planting (currently economically unviable) to become real options for landowners.

3.12 I believe this could be the start of commercial parties bringing true environmental benefits to the region without the need for subsidies, and over complicated bureaucracy.

4. RESPONSE TO SUBMITTERS

4.1 Prior to afforestation in NZ, a commercial plantation must undertake an assessment of the land and forest type and submit to the local government authorities. NZ commercial forests rules are administered under the National Environmental Standard for Plantation Forestry (NESPF) which is designed to give standardisation across regions of NZ.

4.2 The NESPF notification takes into account:

- Wilding Tree Risk and Control
- Significant Natural Areas and Outstanding Natural Landscapes
- Visual Amenity Landscapes and Archaeological Sites
- Setbacks
- Clearance of Indigenous Vegetation
- Erosion Susceptibility of Land

4.3 Afforestation in the rural zone of Southland is permitted activity, providing the design of the forest meets the permitted criterion NES PF. A copy of our NES notification is attached in Appendix 3, and shows that the forest is a permitted activity base on the criteria.

4.4 I will address the issues raised by submitters in relation to the proposed forestry.

4.5 The following points on Radiata Pine and the effects on soil acidity and ground water impacts, are taken from an article from Michelle Harnett who is the Senior Science Communicator for Scion, which is a Crown Research Institute (Appendix 1).

Issue* - *Pines Impact on Soil Acidity

4.6 "The widespread belief that pines lower soil pH is false. In fact, all forest soils tend to be acidic including indigenous New Zealand forests, deciduous forests and conifer forests. A factor reinforcing the acid soil view in New Zealand could be that grass prefers a neutral to alkali pH. Pasture is usually top-dressed with lime and fertiliser to increase the soil pH. Pasture allowed to regenerate into native forest, or is converted into planted forest, naturally reverts to a more acidic state."*

Issue* - *Impact on Ground Water

4.7 "All trees, indigenous or exotic, affect water in the soil. Several things happen when rain falls on trees. The moisture is caught in the foliage and branches, and it is tree height rather than species which influences how much. Some of the moisture intercepted by the tree evaporates. Water that makes it into the ground is taken up by the roots and transported around the tree and some is breathed out or transpired though pores in leaves or needles. Surprisingly, rooting depth does not control the rate at which water is transpired. Rather, it is how easy it is for water vapour to escape through leaf surfaces. Trees can control the pores in their leaves in dry conditions and transpiration is less than that of pasture, for example.

4.8 Tree planting in a previously deforested area can be thought of as returning catchment water flows to what they were when a catchment was in native bush. While afforestation will usually reduce average local water yield, unless the afforested area is large, downstream effects on water resource security and river ecosystem health are generally likely to be small."*

*Source - Scion - Forestry myths busted (scionresearch.com)

***Issue* - Wilding Pine Issues on Adjacent Farmland**

4.9 During the NESPF application the site has been assessed for Wilding Risk (Appendix 2) and it can be seen once measured against the relevant criteria this site has a Wilding Risk score of 0.

***Issue* - Consider the proposal to mitigate using Pinus radiata totally inappropriate in this area and especially in light of Government and other farmers and farming communities recognising the negative effects of planting non- native species.**

4.10 I consider that based on the evidence in support of the application that planting Pinus Radiata is an excellent mitigation tool.

***Issue* - Taking land out of farming production opportunities which in turn affects the local communities by reducing the number of people employed on farms, affecting schools, community facilities and social well-being**

4.11 I believe that a community is made up of a combination or people, both individual and families, regardless of their working profession. There are two houses on this site, one has not been used for at least the last year. On settlement, the second house the property is being sold to a local family that work in the area.

4.12 There are many papers written of which I have extracted a table below from the PWC report: Economic Impact of Forestry In New Zealand, Te Uru Rakau May 2020

4.13 This table shows the FTE workforce required to establish, manage, harvest, and process the forest far exceeds that of sheep/beef farming which is primarily the land type we will be planting post subdivision.

Table 3 provides the economic impacts on a per 1,000 hectares basis.

Table 3: Annual economic impacts – forestry and sheep and beef value chain per 1,000 hectares

	Direct	Indirect	Induced	Total
Forestry value chain				
Value-add ($m)	1.7	1.8	1.1	4.6
FTEs	11	18	9	38
Sheep and beef value chain				
Value-add ($m)	0.7	0.6	0.5	1.7
FTEs	7	6	4	17

Note: There may be small discrepancies due to rounding

Overall, the forestry value chain is a smaller industry than the sheep and beef farming industry, but generates significantly more value-add on a per hectare basis. Some caution needs to be taken in generalising from these results - the figures are national averages for the whole supply chain and do not reflect the specific impacts from any particular 1,000 hectares. The land-uses are also not entirely substitutable. For instance, sheep and beef farming uses large areas of low productivity land, such as South Island High Country, which is not suitable for forestry. Land is also just one factor of production, and the value chain comparison by 1,000 hectares does not reflect, for instance, the relative capital intensity (use of building, plant and equipment) of each value chain.

The direct FTEs figure estimates both the on-land employment (such as silviculture, forestry services, management and harvesting) and the wider employment in supporting forestry operations. One limitation of Input-Output modelling is that it does not break down FTEs employed on-land and FTEs supported elsewhere.

Source: Economic Impact of Forestry In New Zealand, Te Uru Rakau May 2020

Issue **- From iwi:**

- **planting forestry is not suitable - Rūnaka don't agree that the mitigation adds value to the application instead has significant risks albeit different from dairy support.**

4.14 This has been addressed by the evidence in support of the application.

5. IFS Growth – Tree Planting Investment 2022/23:

Nitrogen Loss

5.1 Based on the Technical Report - **Nitrogen, Phosphorus and sediment losses from rural land uses in Southland –** prepared by Environment Southland there are a range of estimated nutrient losses across different land uses.

5.2 For comparative purposes we have looked at the estimated N losses* from intensive Sheep/Beef/Deer pasture versus the losses estimated from forestry land use. To summarise these were:

- Estimated N losses on intensive sheep/beef/deer – 12kg's/Ha/Yr
- Estimated N losses on forestry - 2kg's/Ha/Yr
- Net benefit to Southland's environment is estimated at 10kg's/Ha/Yr

*Source - *Environment Southland – Nitrogen, Phosphorus and sediment losses from rural land uses in Southland – Technical Report August 2013*

5.3 To add context, over two years from 2022 – 2023, IFS Growth has and will convert approx. 7,800 ha's of land largely from intensive sheep/beef/deer use to forestry. At a net benefit of 10kg's per hectare under forestry, this equates to an estimated 78,000kg's of improvement in N losses. This is the equivalent of approx. 170 tonnes of Urea Fertilizer (based on 46% elemental N content) over a two-year period.

Yr Planted	Ha's of Farm to Forest	Estimated N Loss kg's saved/ha	Total N Loss saved/annum in Kg's	Equivalent Urea tonnes (46% N)
2022	3,400	10	34,000	74
2023	4,400	10	44,000	96
	7,800		78,000	170

Carbon Sequestration

5.4 The resultant forests created by IFS Growth also play an important role in carbon sequestration.

5.5 To summarise the estimated amount of carbon sequestered over the area IFS Growth will plant during 2022 -2023:

- Our Plantations are estimated to sequester on average 470T/ha carbon over a 28-year period.
- Based on a forecast area of new planting of 7,800 ha's, this equates to 3,666,000 tonnes of carbon over this 28-year period.

To add context, the average New Zealander's carbon footprint is approximately 8.6* tonnes per year. Over a 28-year period this amounts to 240 tonnes per person. This means IFS Growth's planting over a two-year period would offset the total carbon footprint equivalent to the population of almost Gore & Winton combined (15,275 people).

Source – www.genless.govt.com

Yr Planted	Ha's of Farm to Forest	Tonnes of carbon Sequestered/ha - Forestry 28 Years	Total tonnes of carbon Sequestered	Equivalent NZ population footprint
2022	3,400	470	1,598,000	6,658
2023	4,400	470	2,068,000	8,617
	7,800		3,666,000	15,275*

Based on the average NZ person's footprint over 28 years being 240t

6. SUMMARY

6.1 Put simply, we believe the proposal results in a far better environmental outcome. This is backed by existing science and the modelling provided as part of this submission.

6.2 The environmental outcomes have been shown to be beneficial for the property and therefore the greater catchment.

6.3 The concerns around plantation Pinus Radiata are driven more by misinformation than fact.

6.4 This could provide further opportunities including native plantings being more commonly used in the region.

D.G. MINEHAN
8 March 2023

RTC-268249-4-23-V1:JAS

Appendix 1 -

Scion Article

Myth conceptions
Are planted forests really the Devil?

Michelle Harnett

...radiata pine is a foreign weed, spreads like herpes, makes rubbish timber and falls over after 50 years.

A *Stuff* article on planting pines to make money from carbon farming attracted around 100 comments like the one above. Farm and forest owners will be interested to learn that they are greedy swindlers who are ruining New Zealand. Planted forests are also barren deserts which destroy water and soil.

The comments on a *Stuff* article may not fully represent all New Zealanders' opinions, but they do give an eye-opening view of the 'facts' and beliefs held dear by some. Here are some of bad things alleged to come along with planted forests.

Planted forest soil health and quality

Pine ruin land. They take a lot of moisture and nutrients out of the soil...

Pine planted on a large scale destroys the quality of land it is growing in.

...pine forest is dead clay very shallow.

Soils in planted forests are in better shape than soils supporting other primary production. Over 50 per cent of land in planted forests assessed between 2009 and 2013 met the soil health measures for fertility, organic reserves, pH and physical status. In contrast, only 13 per cent of dairy sites and 18 per cent of dry stock sites met all criteria. In both cases, soil compaction was a major problem.

After the harvest and before canopy closure, planted forests can look rough and raw, and New Zealand planted forests are usually established on less fertile, steeper land which is unsuitable for intense agriculture and horticulture. The soils which support planted forests are generally young and naturally acidic with low levels of nitrogen, phosphorus, and sulphur.

Radiata pine forests can actually improve soil quality. Examples include –

- Radiata pine with added superphosphate improving

Radiata pine trees minding their own business

the soil chemical properties of an eroded clay soil in north Auckland
- Stimulated tree root activity lowered the water table and improved the physical condition of the soil at the same site
- Radiata pine on coastal sand dunes north of Auckland accelerated the development of a topsoil resulting in a soil classification change from 'raw' to 'recent'.

Acid soils

All forestry sites tested between 2009 and 2013 were in the healthy range for soil acidity. The widespread belief that pines lower soil pH is false. In fact, all forest soils tend to be acidic including indigenous New Zealand forests, deciduous forests and conifer forests.

A factor reinforcing the acid soil view in New Zealand could be that grass prefers a neutral to alkali pH. Pasture is usually top-dressed with lime and fertiliser to increase the soil pH. Pasture allowed to regenerate into native forest, or is converted into planted forest, naturally reverts to a more acidic state.

Examples of soil pH values for different soils, all from the Waikato region, and land uses include indigenous forest pH 5.60, pasture pH 5.92, maize crop pH 6.30. Pumice soil in the Kaingaroa Forest falls to within an approximate range of pH5.1 to 5.6.

Effect of repeated rotations on soil fertility

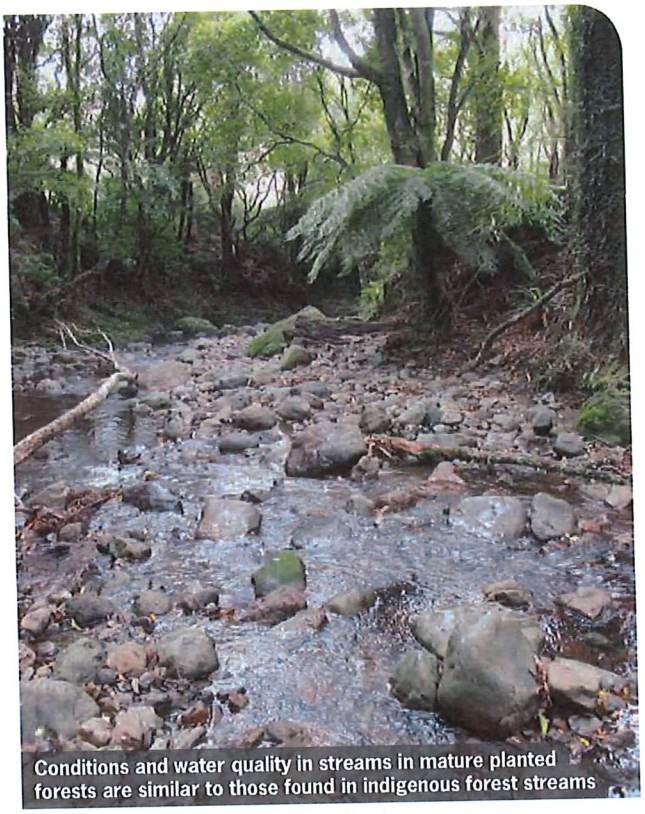
Maintaining fertility from one rotation to the next is a concern as many of New Zealand's planted forest soils are now supporting their third rotation. Initial soil nutrient levels, vulnerability to soil disturbance, and the number of harvests which have taken place influence the effect of harvesting activities. Sites at greatest risk of nutrient deficiencies are those which have soils already low in nutrients.

Scion research has found repeated rotations have not caused a decline in nutrients. This takes place as long as the forest floor is left intact and some slash is left on site to supply nutrients for the next rotation.

Water

Pines suck moisture out of the ground and that's also bad if they are near a stream.

All trees, indigenous or exotic, affect water in the soil. Several things happen when rain falls on trees. The moisture is caught in the foliage and branches and it is tree height rather than species which influences how much. Some of the moisture intercepted by the tree evaporates. Water that makes it into the ground is taken up by the roots and transported around the tree and some is breathed out or transpired though pores in leaves or needles. Surprisingly, rooting depth does not control the rate at which water is transpired. Rather, it is how easy it is for water vapour to escape through leaf surfaces. Trees can control the pores in their leaves in dry conditions and transpiration is less than that of pasture, for example.



Conditions and water quality in streams in mature planted forests are similar to those found in indigenous forest streams

Tree planting in a previously deforested area can be thought of as returning catchment water flows to what they were when a catchment was in native bush. While afforestation will usually reduce average local water yield, unless the afforested area is large, downstream effects on water resource security and river ecosystem health are generally likely to be small.

In drought-prone areas with highly modified landscapes, changes in catchment flow may be a problem. Interestingly, low flows during a drought can be affected by the underlying rock type. Some rocks hold more water, especially those with voids and cracks, and release water over a long period. Forests may be better at recharging bedrock than pasture. In landscapes with adequate storage in bedrock fractures, forest regrowth can help recharge aquifers, and maintain water flow in dry seasons, compared with cropping.

Trees and their deep roots soaking up water provide other benefits, including binding the soil and slowing slip movement, decreasing water run-off and erosion, and draining and improving heavy, clay soils. Trees may also reduce shallow slips and local 'flash' floods but are not likely to reduce major large-scale flooding or deep landslides.

Streams in planted forests

The quality of water in mature planted forests is high and similar to that of streams winding through indigenous forests. Both forest types reduce sediment and nutrient loss, especially compared to scrubland or grassland. Afforestation of pasture land has been found to significantly improve a wide range of water quality attributes such as stream temperature, nutrient and sediment concentrations and microbial contamination within four to six years of planting.

The shade provided to forest streams by mid-rotation and mature planted forests keeps the water cool, providing habitats for native fish species such as the banded kokopu and other galaxiids, longfin eels and freshwater crayfish. The aquatic invertebrate communities are also healthy – a further indication of good water quality.

Water quality can suffer at harvest, especially with clear-cut harvesting up to the stream edge. Retaining intact riparian buffers, and to a lesser extent, moderate quantities of logging slash across small stream channels, helps reduce harvest effects. The speed with which streams recover after harvest is influenced by terrain and harvesting activities.

Biodiversity

I don't think pine forests are good for bird life and eco systems.

Does anyone in NZ … actually want NZ as a pine-forested wasteland inhabited only by people, cicadas and possums?

Planted forests are home to plants, birds, bats, lizards, frogs, insects and other invertebrates despite the pervasive monoculture, wasteland myth. Biodiversity levels in planted forests are higher than those found on pastural, agricultural and horticultural land, but lower than the levels in indigenous forests.

At least 120 threatened indigenous species are found in planted forests including kiwi and forestry's poster bird, the karearea or bush falcon. Kiwi are found in all parts of planted forest, from slash piles to mature stands. The ground-nesting falcons like clear felled blocks and the high prey density nearby. Insect eating birds are common, but fruit and nectar eaters less so. Both the country's rare bat species are also found feeding, commuting and roosting in radiata forests. Bats choose home ranges near native forest remnants and in areas with older trees that provide roosting sites. Carnivorous snails, rare orchids, Archey's frog – the list goes on.

The surprising level of indigenous species living among radiata pine is due in part to planted forests functioning as a haven for some species in highly modified landscapes where they are often the only forest habitat. In fragmented landscapes, planted forests can also become parts of corridors which help species movement between

Karearea find favourable nesting sites in planted forests

otherwise isolated native forest patches and other habitats.

New Zealand and its forest owners are looking after indigenous flora and fauna. Areas of significance are protected by law. Forest certification systems like the Forest Stewardship Council and Programme for the Endorsement of Forest Certification certify forests to meet verified standards of forest management, including maintaining, conserving and enhancing biodiversity throughout the entire forest estate. By identifying, mapping and managing areas of significant indigenous biodiversity, forest owners and managers can schedule forest activities around kiwi and karearea breeding seasons, fish spawning, and maintain riparian buffers during logging, for example. Predator control is another activity that directly improves biodiversity.

The Emissions Trading Scheme is a rort

I am keen to hear someone explain the rort that is ETS to me.

The only benefit in planting pine is the profit to the planter and the carbon tax profiteer.

... If the scheme doesn't require payment for the carbon released then it is a fraud. Anyone know how it currently works?

Are we not just temporarily storing carbon as wood, which then most likely gets made into timber or paper, which eventually ends up getting burnt or rotting in a landfill? Net gain =zero?

Here the commenters may have a point. The Emissions Trading Scheme is complicated and Ministry for Primary Industries is changing it to make it simpler to understand and run.

The purpose of the Emissions Trading Scheme is to encourage activity which lowers the rate at which greenhouse gases are released to the atmosphere, or prevents emissions altogether, or even better, removes greenhouse gases from the atmosphere, while discouraging activities that emit them. The use of a trading scheme is intended to allow this to happen as efficiently as possible at least cost using market forces.

Organisations which emit greenhouse gases must surrender carbon credit units – New Zealand Units – to the government. These organisations can buy carbon credits from forest growers, who can earn credits from the government as the trees grow and absorb carbon dioxide. The units earned eventually have to be paid back if the carbon stock decreases, such as when the trees are harvested.

This seems like a zero-sum game for harvested forests. But it neatly solves the main problem presented by traditional investment in forestry – incurring establishment costs and management costs from the start and having to wait for decades before any income is received. The ability to trade in carbon credits transforms the timing of cash flows, making an investment in forestry more attractive.

The commenters were also unclear about how carbon cycles naturally. The carbon dioxide emitted when plants die and decay naturally is reabsorbed by growing plants. This is known as the biogenic carbon cycle. Carbon dioxide emitted from slash after harvest, or paper or timber that is burned or goes to landfill is part of this closed cycle. The problem of increasing carbon dioxide levels comes when coal, oil or gas, which have been locked in the ground for millions of years, are burned. This ancient carbon is not part of the biogenic cycle and burning it increases the total amount of carbon dioxide in the atmosphere.

Up in smoke

Pinus radiata is like tinder for fires.

Coverage of the Pigeon Valley forest fire near Nelson in February 2019 brought out the commentators as well. Yes, radiata pine will burn in the right circumstances. It originates from fire-prone California and is adapted to a fire ecology. Fire is effective at opening cones and releasing seeds. Fire also creates a fertile seedbed. Reproduction rates are greatest after surface fires that the parent trees, with their canopies high above the ground, survive.

Forest owners and managers do not want their assets to go up in smoke. Fire protection is an important consideration for New Zealand forest managers. A survey of forest owners in 2005 found the forestry sector spent more per hectare on fire prevention and preparedness than entities such as the Department of Conservation or local and regional councils.

Dry and elevated fuel loads contribute to easy fire ignition and spread. Hot dry weather dries forest fuels such as slash and pruning material, understorey scrub vegetation, pine needle litter and organic material in the soil, contributing to the amount of fuel available to burn.

Owners of small to medium forests can take precautions by removing prunings, weeds and flammable scrub like gorse, creating firebreaks and ensuring water sources are available for firefighting. Another option is planting species such as lucerne, which has a very low flammability, in firebreaks and around forest edges.

People start fires. The Pigeon Valley fire was probably ignited accidentally by a spark from agricultural


The aftermath of the February 2019 Pigeon Valley fire

machinery. In extreme fire weather it is a good idea to work in the cool early morning with fire equipment on hand or postpone the work until later. Visitors to forests need to be fire safe, too, and unwanted visitors should be kept out.

And finally:

...how much virgin native bush or even regenerating native bush do you see catching fire? Almost never. It locks the moisture in.

The 1946 Taupo fires burnt about 13,000 hectares of planted forest and 17,000 hectares of native forest.

Debunking the myths

So how can the forestry industry start to change people's perceptions? Psychologists say calling someone an idiot and bombarding them with facts is not the way to go if you want to change someone's mind. If you push too hard, you may cause resentment, or even cause someone to hold on to their erroneous beliefs even more strongly.

One way to debunk a myth is to state the alternative positive position or central claim, back that up with evidence, address the false information as a myth then explain why the myth is wrong.

This commenter has the right idea:

Tui, bellbird and kiwi can thrive in pines to similar extent as native bush. Some other specialised species less so, but the idea that pines are sterile is a cliché that isn't correct. Some pine areas support significantly better wildlife than nearby natives.

Another approach which owners of small to medium forests can take is to tell your personal stories and back them up with evidence. People like and understand stories, and a first-hand, personal view, vivid description, and identification with the storyteller are all associated with positive change. Effective stories can be spoken or written.

This comment suggests personal experience:

February 2004 floods around Whanganui/Manawatu saw huge damage to farmland and little or no damage to pine plantations. In Okoia one catchment had a pine forest at top end and there was little damage to farms below as much of heavy rain was absorbed and held back by forest, a similar catchment with no forest had massive water damage.

A recent mainstream media example of a sympathetic story was a portrait of the Kaituna Sawmill near Blenheim. The story attracted comments such as:

A good story and really interesting

Great to see value adding in our timber industry, instead of exporting raw logs. This is what NZ needs.

Do not be reluctant to talk to people. Simply talking and listening to others, face to face, can be very effective. Social media can be another option for those who feel comfortable using it, as could volunteering to be a spokesperson at local events, in local newspapers or even on radio or television. Give it a go – if people are willing to be open-minded and are interested in the truth you might just have a chance.

Michelle Harnett is the science communicator for Scion.

APPENDIX 2 -
Wilding Calculator

Appendix One – Field form of the DSS1

DSS 1. CALCULATING WILDING SPREAD RISK FROM NEW PLANTINGS [a,b]

(Select score applicable for each of the five categories)

Version_07011; Issue date: June 2012

1. SPECIES – GROWTH *(score for one species only)*

Spreading vigour varies with species

➢ Redwoods, Leyland cypresses, cedars and spruces (very low risk – no need to proceed further)	0
➢ Radiata (*P. radiata*) and ponderosa (*P. ponderosa*) pine, Lawsons cypress (*C. lawsoniana*)	1
➢ Muricata (P. *muricata*) and maritime (*P. pinaster*) pine and larches (*Larix* spp)	2
➢ Corsican (*P. nigra*) and mountain/dwarf mountain (*P. uncinata/mugo*) pine	3
➢ Douglas-fir [g] (*Ps. menziesii*), Scots pine (*P. sylvestris*)	4 [g]
➢ Lodgepole/contorta pine (*P. contorta*)	5

Enter score (0, 1, 2, 3, 4 or 5) here [1] Radiata

2. SPECIES – PALATABILITY

Palatability varies with species

➢ Radiata, maritime and ponderosa pine	1
➢ Lodgepole and muricata pine and European larch	2
➢ Scots and mountain/dwarf mountain pine and Douglas-fir	3
➢ Corsican pine	4

Enter score (0, 1, 2, 3 or 4) here [1] Radiata

3. SITING OF NEW PLANTING [c, d]

Trees are located on ....

➢ Sites well sheltered from prevalent and strong winds	0
➢ Flat sites (<10^0), partially exposed to strong/prevalent winds	1
➢ Lea slopes where strong eddy gusts are likely	2
➢ Flat sites (<10^0), fully exposed to strong/prevalent winds	3
➢ *Either* elevated 'take-off' sites, (ridge-tops, or base of exposed slopes >10^0) *or* sloping land, fully exposed to strong/prevalent winds	4

Enter score (0, 1, 2, 3 or 4) here [4]

4. DOWNWIND LANDUSE – GRAZING

Wilding establishment influenced by grazing (particularly with sheep)

➢ Intensive grazing on developed pasture	0[d]
➢ Regular mob stocking with sheep [e]	1[d]
➢ Semi-improved grazing (sheep/cattle)/ occasional mob stocking with sheep	2[d]
➢ Extensive grazing only [e]	3[d]
➢ No grazing	4[d]

Enter score (0, 1, 2, 3 or 4) here [0] [d]

5. DOWNWIND VEGETATION COVER *(if Douglas-fir involved see [g] in Notes)*

Wilding establishment influenced by competition from existing vegetation

➢ Plantation forest, developed pasture (intensive grazing)	0[d]
➢ Native forest[h], shrubland/tussock/grassland with a continuous and dense vegetation cover	1[d]
➢ Forest/shrubland/tussock/grassland with few gaps	2[d]
➢ Open forest and/or scattered patches of dense shrubland/tussock/grassland with many gaps	3[d]
➢ Open slips/rockland and/or light, low-stature shrubland/tussock/grassland	4[d]

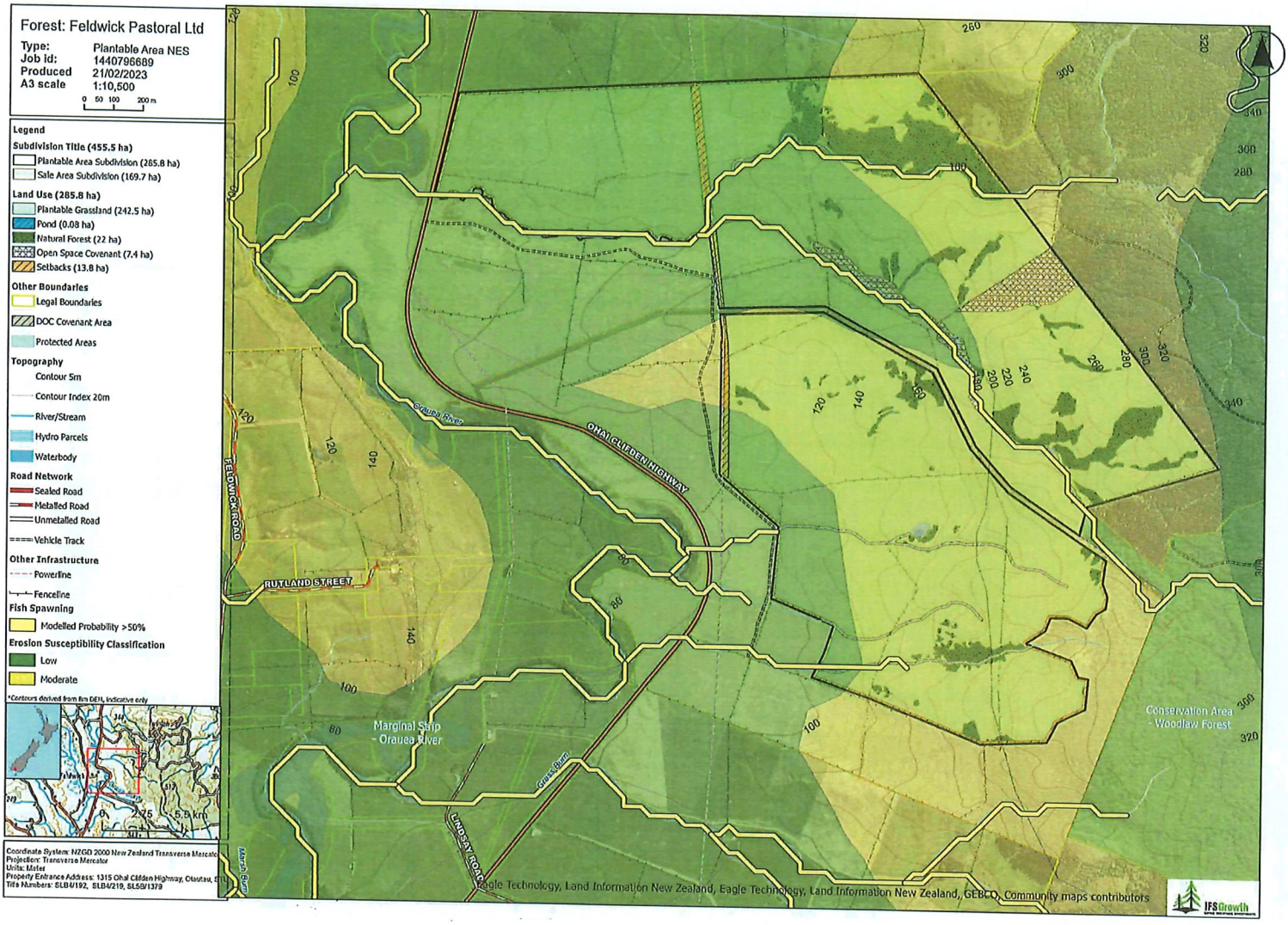
Enter score (0, 1, 2, 3 or 4) here [0] [d]

TOTAL SCORE [0]

(See Assessment below for interpretation)

Completed by: Cass Yee
Experience: 5 Years
Qualification: Bachelor Forestry Science

APPENDIX 3 -
Erosion Susceptibility Map


Forest: Feldwick Pastoral Ltd
Type: Plantable Area NES
Job Id: 1440796689
Produced 21/02/2023
A3 scale 1:10,500
0 50 100 200 m
Legend
Subdivision Title (455.5 ha)
Plantable Area Subdivision (265.8 ha)
Sale Area Subdivision (169.7 ha)
Land Use (285.8 ha)
Plantable Grassland (242.5 ha)
Pond (0.08 ha)
Natural Forest (22 ha)
Open Space Covenant (7.4 ha)
Setbacks (13.8 ha)
Other Boundaries
Legal Boundaries
DOC Covenant Area
Protected Areas
Topography
Contour 5m
Contour Index 20m
River/Stream
Hydro Parcels
Waterbody
Road Network
Sealed Road
Metalled Road
Unmetalled Road
Vehicle Track
Other Infrastructure
Powerline
Fenceline
Fish Spawning
Modelled Probability >50%
Erosion Susceptibility Classification
Low
Moderate
*Contours derived from 8m DEM, indicative only
0 2.25 5.5 km
Coordinate System: NZGD 2000 New Zealand Transverse Mercator
Projection: Transverse Mercator
Units: Meter
Property Entrance Address: 1315 Ohai Clifden Highway, Otautau, 9689
Title Numbers: SLB4/192, SLB4/219, SL5B/1379
Graupa River
OHAI CLIFDEN HIGHWAY
FELDWICK ROAD
RUTLAND STREET
Marginal Strip - Orauea River
Grass Burn
LINDSAY ROAD
March Burn
Conservation Area - Woodlaw Forest
Eagle Technology, Land Information New Zealand, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors
IFS Growth