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A proposed cell model for multiple-occurrence regional landslide events: Implications for landslide susceptibility mapping

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ABSTRACT

Multiple-occurrence regional landslide events (MORLEs) consist of hundreds to thousands of shallow landslides occurring more or less simultaneously within defined areas, ranging from tens to thousands of square kilometres. While MORLEs can be triggered by rainstorms and earthquakes, this paper is confined to those landslide events triggered by rainstorms. Globally, MORLEs occur in a range of geological settings in areas of moderate to steep slopes subject to intense rainstorms. Individual landslides in rainstorm-triggered events are dominantly small, shallow debris and earth flows, and debris and earth slides involving regolith or weathered bedrock.

The model used to characterise these events assumes that energy distribution within the event area is represented on the land surface by a cell structure; with maximum energy expenditure within an identifiable core and rapid dissipation concentrically away from the centre. The version of the model presented here has been developed for rainfall-triggered landslide events. It proposes that rainfall intensity can be used to determine different critical landslide response zones within the cell (referred to as core, middle, and periphery zones). These zones are most readily distinguished by two conditions: the proportion of the slope that fails and the particular type of the slope stability factor that assumes dominance in determining specific sites of landslide occurrence. The latter condition means that the power of any slope stability factor to distinguish between stable and unstable sites varies throughout the affected area in accordance with the landslide response zones within the cell; certain factors critical for determining the location of landslide sites in one part of the event area have little influence in other parts of the event area. The implication is that landslide susceptibility maps (and subsequently derived mitigation measures) based on conventional slope stability factors may have only limited validity for many events.

The overall ability to predict the impact of these events and consequently the development of effective mitigation measures is limited by the ability to predict the travel path, storm centre, and intensity range within the cell structure of extreme weather systems.

1. Introduction

Multiple occurrence regional landslide events (MORLEs) consist of hundreds to thousands of landslides occurring more or less simultaneously within defined areas, ranging from tens to thousands of square kilometres (Fig. 1). They occur in a range of geological settings in areas of moderate to steep slopes and are triggered by intense rainstorms and/or high intensity earthquakes. While they have been described from many parts of the world, they are particularly well represented in New Zealand as a result of the country's exposure to intense rainfall from tropical and mid latitude weather systems and earthquakes generated from highly active tectonic plate convergence. Because there are differences in the failure mechanisms between rainstorm and earthquake triggering agents and because rainstorm events have been more frequently analysed, this paper has chosen to define discussion solely to rainfall triggered events.

The largest rainfall triggered event in New Zealand in recent years took place in the Wanganui Manawatu region on 15–17 February 2004 (Fig. 2), resulting in approximately 80,000 landslides over an area of 16,000 km^2, with total storm rainfall in the centre of the cell in excess of 300 mm in 72 h (Hancox and Wright, 2005a, 2005b). Almost two decades earlier, Cyclone Bola had produced an event of similar magnitude with storm rainfall in parts of the region reaching 700–900 mm in 72 h (Marden and Rowan, 1994). Many other events of lesser magnitude bracket these landmark storms, the most recent being the Golden Bay event of 13–15 December 2011 that produced devastating landslides and debris flows in response to maximum 24 hour rainfalls of 454 mm and storm totals of 674 mm in 48 h (Page et al., 2012).

Individual landslides within these events are generally small (< 1000 m^3 in volume), dominantly shallow debris and earth flows,

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Fig. 1. A large, multiple-occurrence regional landslide event resulting from Cyclone Bola rainfall of 300–900 mm in 72 h, affecting an area of over 8300 km^2, March 1988, East Coast, North Island, New Zealand (photo: Noel Trustrum).

Fig. 2. Landslides resulting from the Wanganui-Manawatu event of February 2004; rainfall exceeded 300 mm in 72 h in the worst affected areas. Landslide locations are aligned to drainage lines and to ridge crests (photo: Graham Hancox).

and debris and earth slides (terminology: Cruden and Varnes, 1996) involving regolith or weathered bedrock.

Rainstorm triggered events are the most common mode of land sliding in New Zealand, occurring somewhere in the country two or three times a year on average and are the principal agent of soil erosion, reduction of primary productivity, and downstream sedimentation problems (Page et al., 2000; Crozier, 2005). The aim of the paper is to examine the range of landslide impacts prevalent within these events and to analyse which factors are exerting dominant control over the specific location of landslides within the affected area. The method use to achieve this aim involves examining data from published reports and photographic records of events. This material is analysed to extract reported relationships between rainfall gradients, the degree of land slide impact, and preferred location of landslide occurrence, with re spect to: the type of vegetation cover, topographic features that influ ence runoff distribution, and availability of susceptible material. In an attempt to represent the patterns that emerge, a model is presented based on 40 years of field observation by the author, backed up by data from a range of published reports. While trends and patterns re presented within the model are established empirically, they are sup ported and explained by a number of studies by the author and others that provide a physical basis of explanation these are referred too throughout the body of this paper.

2. Measures of landslide impact

Spatial variation in landslide impact throughout the storm cell has been an important aspect of this study and a fundamental component of the model presented in this paper. For this reason, it is important to recognise that landslide impact data has been represented in many different ways throughout the literature. The term 'impact' is used here to refer to the extent to which a given area of land surface is affected by landslides. A range of different parameters has been used to represent impact. The broadest and most subjective measure is the magnitude of 'affected area' or 'event area'. This term refers to the land area envelope within which landslides associated with the storm event have been identified. Not only is the determination of the event area subject to the resolution of imaging used to identify landslides but it is also affected by the extent to which peripheral outliers have been taken into account. In erosion and sediment budgeting studies, a fundamental measure of impact is the cumulative volume or mass represented by the landslide scars (the total amount of displaced material) expressed per unit of land surface of the study area or event area (e.g., m^3/ha or tonnes/ha). This measure can be converted to an event denudation or surface lowering (mm) or a denudation rate when combined with other events of known age, on the assumption that all displaced material leaves the study area. Because of the difficulty in determining the depth of scars from remote sensing (in some cases involving thousands of landslides) in place of scar volume, the cumulative scar area alone is used to provide an in dication of the extent of erosion, often expressed as a percentage of the study area. Pre established regressions between measured scar area and measured volumes can be used to estimate volume from scar area. Whereas today, topographic surface difference analysis of 'before' and 'after' LiDAR imagery can be used to determine scar volume, many valuable older investigations have relied on two dimensional imagery or field sampling for event assessment; thus comparison of impact studies from different periods needs to recognise and adjust for the different levels of precision underlying the data sets.

At the reconnaissance level, landslide impact may be represented simply by landslide density (the number of landslides/km^2) or by the cumulative area of the entire landslide footprint, i.e., scar and runout (transport zone and deposit) represented as a percentage of the study area. In their characterisation of the Wanganui Manawatu event, Hancox and Wright (2005b) used landslide density and landslide footprint (scar and runout), noting that the average ratio of runout length to scar length was between 2.5 and 3.1:1.

Landslide impact resulting from an event can also be measured by sediment delivery ratios (SDRs) by comparing the mass of material displaced by landslides with the mass of material leaving the catch ment. This approach was used successfully in one of New Zealand's largest MORLEs on record, the Cyclone Bola event of 1988. In the Tutira catchment affected by this event, Page et al. (1994) employed lake sediment analysis to measure the magnitude and frequency of land slides based on the delivery of landslide derived sediment to the lake. In the latter part of this record they were able to correlate magnitude of events with catchment rainfall, providing a measure of the minimum landslide triggering rainfall and an indication of the exponential in crease in landslide event magnitude with increasing rainfall (Fig. 3).

3. Susceptibility factors

Observation indicates that most slopes are stable most of the time and even when a multiple occurrence regional landslide event is in itiated, only certain parts of the terrain succumb to landsliding, while the rest remains stable. These observations suggest that while a tem poral rainfall threshold must be met to initiate a multiple occurrence event where many landslides occur, not all parts of the event area will undergo failure in other words, spatial thresholds dictated by sus ceptibility factors can also be recognised in any given area. Susceptibility factors are those that indicate where a landslide is likely

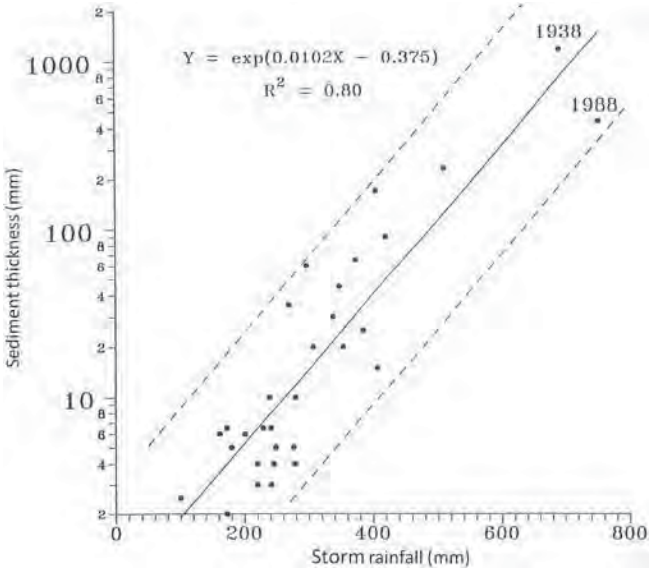

Fig. 3. A 70-year record showing the exponential relationship between the thickness of landslide event lake sediment and storm rainfall, Lake Tutira, Hawke's Bay, North Island, New Zealand (Page et al., 1994).

to occur within a given area and are often used as the basis for landslide hazard mapping. Where particular susceptibility factors can be shown to be significant, they may point to the most effective measures to employ in landslide mitigation.

From a global perspective, numerous factors are recognised as capable of rendering a site susceptible to failure (e.g., Cooke and Doornkamp, 1990, list 41 such factors), but most MORLEs used to de velop the current model have taken place in relatively similar types of terrain (in terms of variation in geology, relief, vegetation cover, and human modification of slopes) where distribution of rainfall intensity within the rainstorm cell dominates all but a few of the recognised susceptibility factors.

The initiation of rainfall triggered landslides requires a critical water content to be met within the slope; essentially at some location water entry to the slope must exceed drainage for a sufficient period to accumulate to a critical level (Crozier, 1997, 1999; Fig. 4). When cri tical water content is achieved, shear resistance is lowered below the prevailing shear stress, through development of porewater pressure or the reduction of cohesion. In geomechanical terms, this is represented by the ratio of shear strength to shear stress (Factor of Safety) lowering to a value of 1.0 or less, allowing failure to occur (Brooks et al., 2002, 2004).

Given the large areas affected by MORLEs and the unpredictability of the movement of rain bearing weather systems, it is unlikely that an actual water content threshold within the slope will be measured. Consequently, reliance is placed on less precise measures such as, storm rainfall totals, rainfall intensity, and duration in order to approximate the critical water content threshold within the slope. Crozier (1999) and Glade et al. (2000) also demonstrated that in many events the antecedent water status within the slope prior to the event will dictate the amount of storm rainfall (event water) required to reach critical water content. In other words, the amount of rainfall required to in itiate landsliding will be reduced if there has been a wet period before the event. Thus, the susceptibility factors that become important in the landscape are those that promote the concentration of slope water; these include elements of surface and subsurface topography as well as substrate conditions such as permeability of the regolith and sub regolith surface.

Another factor controlling the location of landslides in these events is the availability of susceptible material (Brooks et al., 2002), in par ticular its depth with respect to slope angle (Crozier and Preston, 1999). For example, Crozier et al. (1990) showed that even when the regolith is completely saturated, failure will not occur unless the regolith depth exceeds a critical threshold. In the Wellington event of December 1976 (Eyles et al., 1978), these conditions were met predominantly in col luvium filled bedrock depressions, while adjacent slopes remained stable.

The role of vegetation as a factor in terrain resistance and sus ceptibility to landslide initiation during rainstorm events has been studied extensively in New Zealand. The greatest differences found are between mature forest and pasture, where the densities of rainfall triggered landslides are ~10 times greater under pasture than forest (Marden and Rowan, 1994; Page and Trustrum, 1997).

4. Method

While the model presented here is essentially empirical, it is also conceptual in that a certain amount of logic has been employed to synthesise observations into a theoretically robust representation of these large scale events. The concepts employed to construct the model have been developed from over 40 years of personal observation (lar gely, but not solely within New Zealand) and from a body of my own and my students' published research (referred to in appropriate places throughout this paper), involving field, laboratory, and computer modelling. Of particular value has been the extensive work referred to throughout this paper carried out by the New Zealand Landcare Research team and New Zealand Geological and Nuclear Sciences led by Noel Trustrum, Mike Page, John Dymond, Graham Hancox, and others.

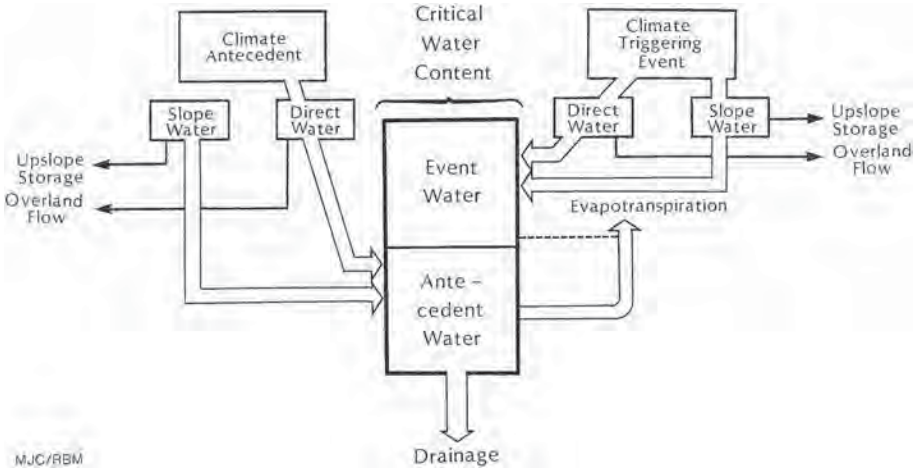

Fig. 4. Model of pathways affecting the critical water content of slopes, with respect to slope failure.

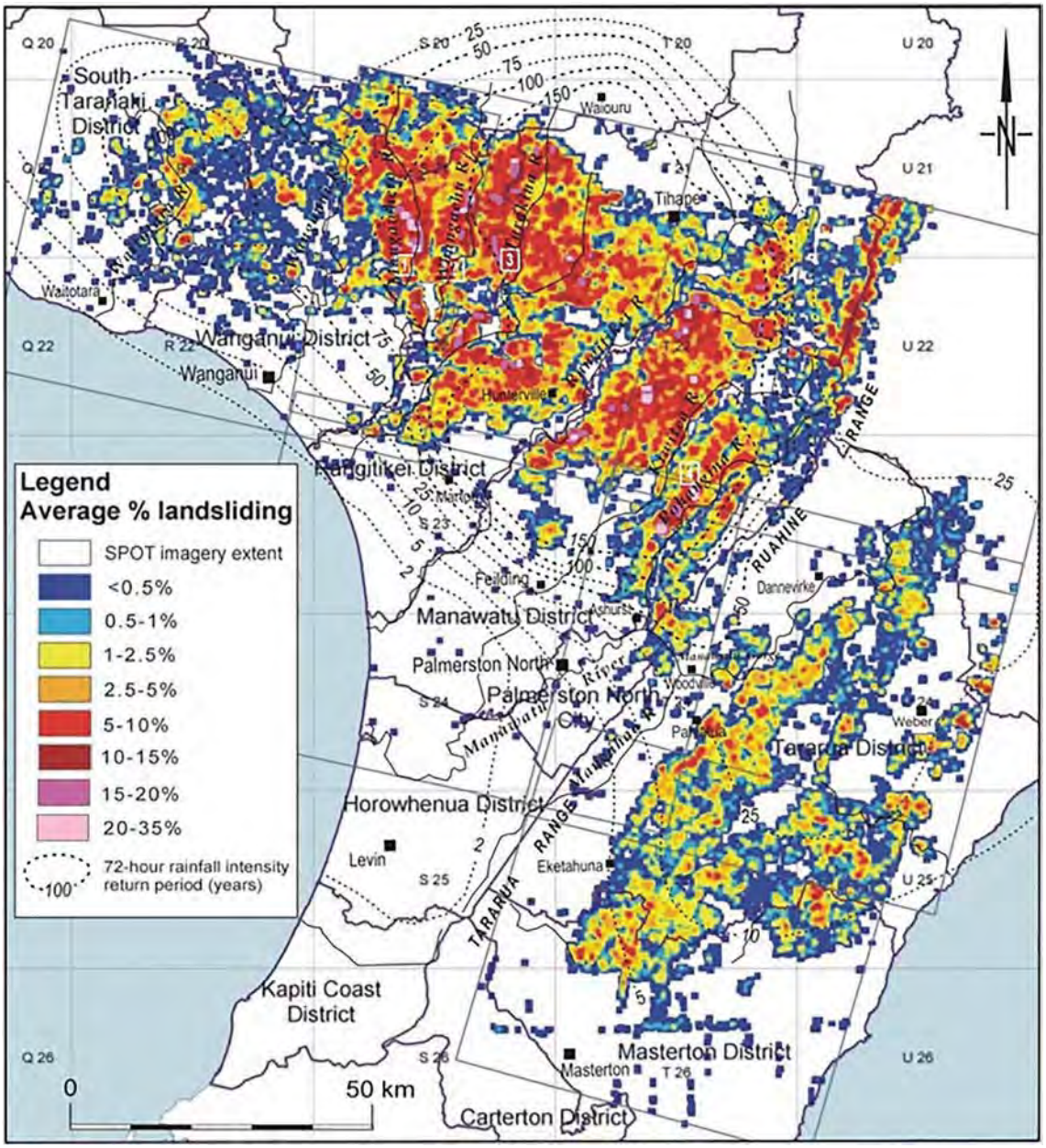

Fig. 5. Percentage of slope affected by landslides, together with 72-hour recurrence interval isohyets for the Wanganui-Manawatu event of February 2004, North Island, New Zealand, indicating the cell structure and relationship of landslide impact with rainfall (Hancox and Wright, 2005b, with acknowledgement to Dymond et al., 2006 for the landslide distribution map).

While the model is largely empirical, explanations of its structure and susceptibility implications are justified with reference to a number of studies covering the physical basis of slope stability. However, the numerical values used in the version of the model presented here are indicative only, representing modal values derived from a range of different events occurring on Tertiary sedimentary rocks (mudstone to sandstone) with a regolith cover extending to a maximum of 2 m in depth. The modal slopes are about 15 35° on rolling hill country. They are dominantly areas of pasture cover with inclusions of native forest, scrub, and pine plantation.

The assertions on the potency or otherwise of susceptibility factors have been established by examination of the specific locational attri butes of landslides with respect to their presence within the rainfall bands represented by the model. While numerical values presented with the model will vary from place to place in accordance with factors af fecting terrain resistance (geology, slope, etc.) the trends in impact and potency of susceptibility factors are considered to be valid for all events. The model presented illustrates the maximum credible event. Many landslide events will be of lesser magnitude and will not achieve the full range behaviour illustrated.

5. Model structure and justification

Apart from the model presented here, there is one other model that has been attempted to identify the susceptibility of New Zealand terrain to shallow landsliding on a regional basis. Dymond et al. (2006) de veloped a statistical model to predict susceptibility of slopes to rainfall triggered shallow landslides applicable to 60% of New Zealand that is occupied by the type of hill country typically subject to MORLEs. Their model employed four independent variables: one exogenic storm rainfall; and three endogenic soil resistance (implied from geology), slope angle, and vegetation cover. In testing the model against the 2004

Wanganui Manawatu event, they registered a 58% success rate and attributed the lack of a better prediction partly to the failure to re cognise the linear relationship between landslide impact and slope angle that exists on slopes with an angle < 30°.

The cell model proposed in this paper recognises all these factors to a greater or lesser extent. The term 'cell' is used here to describe the atmospheric storm cell phenomenon and the pattern of associated landslides, which generally occur within a roughly circular pattern radiating out from and identifiable 'nucleus' or core. Rainfall is the dominant factor of the cell model and implies that there are rainfall gradients within the cell that dictate not only the degree of landslide impact but also the criticality of susceptibility factors, which in turn determines the location landslides. Soil resistance in terms of regolith depth is also recognised, as is vegetation, as determinants in the cell model; but their effectiveness is contingent upon rainfall gradients within the cell. However, variation in terms of geology and slope may be important when comparing different event areas, and the model would need to be calibrated to take into account the resulting differ ences in rainfall related impact thresholds.

The primary principle underlying the model for rainfall triggered MORLEs rests on three observations. First, that rainstorm triggered landslide events are invariably instigated by a rainfall cell with an identifiable high intensity locus or core from which the rainfall dis sipates outward toward a periphery, beyond which rainfall is in sufficient to generate landslides (the rainfall value at the periphery boundary is referred to as the minimum landslide event triggering threshold). I infer here that the landslides occurring within the band of lowest rainfall at the periphery occupy the most susceptible parts of the terrain.

The second observation is that landslide impact is closely related to the distribution of rainfall within the cell. This relationship was strik ingly demonstrated in the devastating landslide event that struck north of Rio de Janeiro, Brazil, on 11 January 2011. During a 24 hour rainfall period in the locality Sitio Santo Paula, 310 landslides were recorded within the 160 180 mm isohyet band, 559 within the 180 200 mm band, and 689 within the 200 220 mm band (Netto et al., 2011). Hancox and Wright (2005b) observed for the Wanganui Manawatu rainstorm event that while landslides were recorded across an area of 16,000 km^2, the most severely affected area occupied only 8000 km^2. Fig. 5 illustrates the cellular nature of storm rainfall and the dissipation of landslide impact from the core to the periphery of this event. A number of studies indicate that an exponential relationship exists be tween landslide impact and event rainfall (Fig. 6). This is also evident in the historical record for events recurring in one place (Fig. 3).

The third observation on which the cell model is based is that the preferred location of individual landslides within the cell varies with the rainfall gradient, inferring that the criticality of susceptibility fac tors varies accordingly. Rainfall intensity, degree of impact, and the criticality of susceptibility factors have been used to define three zones within the cell: core, middle, and periphery (Fig. 7). Because MORLEs can occur on a range of terrain types with large differences in terrain resistance, rainfall thresholds for landslide initiation and degree of impact will vary substantially. Therefore it is probably more robust to define cell zones in terms of the critical susceptibility factors and impact gradients as these concepts are considered more readily transferrable to a range of terrain conditions.

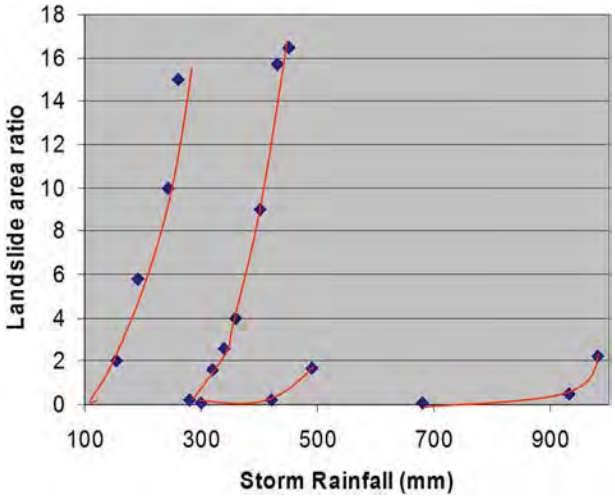

Fig. 6. Percentage of slopes affected by landslides compared to storm rainfall for different locations, showing regional differences in minimum triggering thresholds and ex ponential trends (1: Eyles and Eyles, 1982; 2, 3, and 4: Omura and Hicks, 1991).

6. Distinguishing criteria of the model zones

6.1. Peripheral zone

The peripheral zone is bounded at its outer limit by a subjectively chosen line representing the separation of event generated landslides from terrain unaffected by the rainstorm event. In a single event, the coincidence of this line with rainfall estimates provides the minimum triggering rainfall (triggering threshold) for the event. This is most commonly derived from total storm rainfall isohyets, recorded at the end of the event. Because the actual timing of landslide initiation is generally not known, it is likely that the total storm rainfall over estimates the actual amount of rainfall required to trigger landslides. For example, the modelling of rainfall and geomechanical response during Cyclone Bola (Brooks et al., 2002, 2004) indicated that slope conditions reached the point of failure after 40 h of rainfall (when be tween 100 and 400 mm of rain had fallen), while the total event rainfall amounted to over 700 mm in 3 days.

In the version of the model presented here, indicative rainfall thresholds are used to demarcate the zone boundaries. The minimum triggering threshold chosen for the model has been derived from a number of studies. For example, in the December 1976 Wellington event, Eyles et al. (1978) found that the 150 mm storm rainfall isohyet coincided with the overall landslide event boundary, while the 200 mm isohyet represented the boundary for those landslides that occurred on unmodified natural slopes as opposed to urban slopes. The historical record also provides another means of determining rainfall thresholds for various landslide impact levels. For instance, Fig. 3 indicates that the lowest storm rainfall coincident with the appearance of landslide sediment in Lake Tutira is also between 150 and 200 mm. Using se quential air photo coverage for a period of 60 years, Reid and Page (2002) analysed the landslide density for 44 multiple occurrence events in six different terrain types in the hill country of the Waipaoa catch ment, Poverty Bay, North Island. For the Te Arai terrain type, Fig. 8 indicates that the minimum triggering storm rainfall for landslide event initiation is about 150 mm. Of the remaining terrain types studied, two had threshold rainfalls of 150 mm, two had thresholds of 200 mm, and one had a threshold of 125 mm.

In the peripheral zone while vegetation cover, regolith depth, and slope angle exert some control over landslide occurrence, the principal constraint is the availability of sufficient water to induce failure. Consequently, most landslides occurring in this zone are located in places that are able to accumulate water. These include surface con vergent zones such as hollows, swales, and drainage lines with rela tively large catchment areas, and subsurface features such as colluvium filled bedrock depressions. Colluvium filled bedrock depressions are preferred locations for landslides by virtue of the fact that they con centrate vadose and groundwater and, in some cases, may be the only slope locations that exceed critical regolith depth. The typical landslide distribution pattern that develops under these conditions is illustrated by Figs. 9 and 10, which show that landslides are located in close proximity to drainage lines and are oriented at an angle of entry

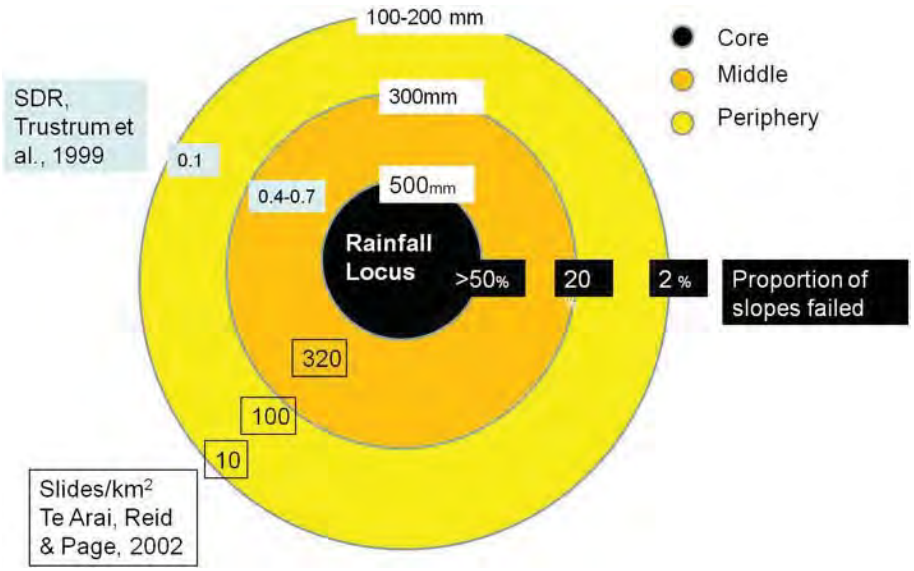

Fig. 7. The cell model for multiple-occurrence regional landslide events.

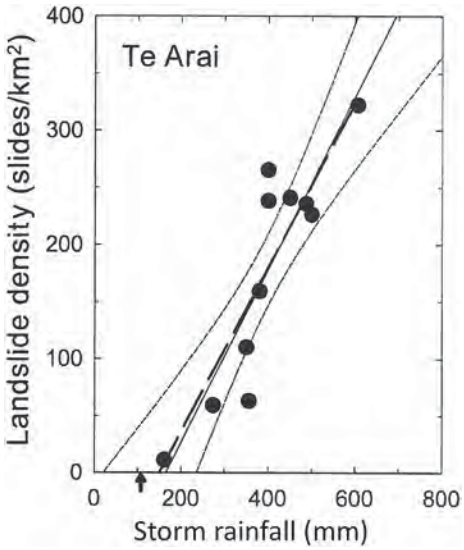

Fig. 8. A 60-year record of landslide events and associated storm rainfall, Te Arai terrain, Waipaoa catchment, Poverty Bay, North Island, New Zealand (Reid and Page, 2002).

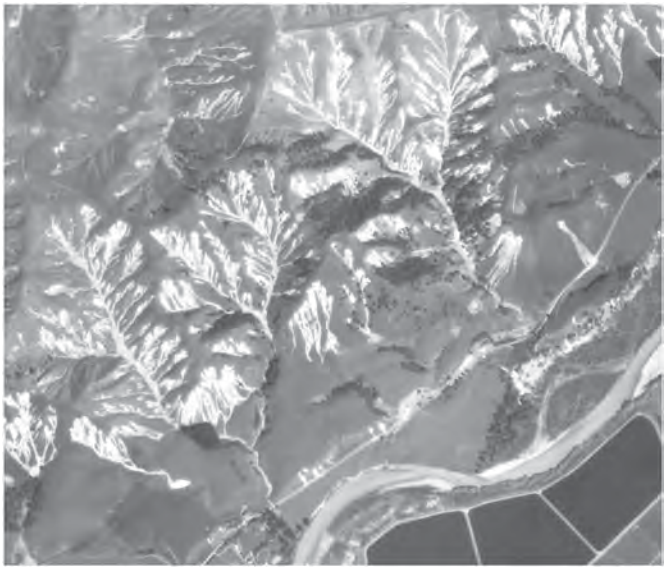

Fig. 9. Landslide pattern in the 1977 event, eastern Wairarapa Hill country, North Island, New Zealand. Note the alignment of landslides with the drainage system, characteristic of the peripheral zone of the cell model (photo: Lands and Survey, New Zealand).

consistent with the drainage system.

6.2. Middle zone

In the middle zone, with higher rainfall than in the peripheral zone, the availability of water is no longer a critical constraint. Instead, variations in terrain resistance assume greater influence over the landslide distribution pattern. The most important of these are vege tation cover and the availability of susceptible material. Areas of ma ture forest (whether native or exotic plantation) offer a high level of resistance compared to young exotic plantations, scrub, or pasture, the latter being the vegetation cover with the least resistance to landslide initiation. For example, in the Wanganui Manawatu event, Hancox and Wright (2005b) found, for areas subject to 160 180 mm of storm rainfall, that 30 50% of pasture covered land was impacted by land slides compared to 8% of land covered by mature forest and scrub (Fig. 11). The resistance imparted by vegetation in these high rainfall events can be attributed mainly to mechanical reinforcement by roots, as hydrological attributes (such as interception and evapotranspira tion), which in less intensive rainstorm events may enhance stability, are essentially negated by the intensity and duration of storm rainfall in high magnitude events.

The availability of susceptible material as a critical factor is evi denced in this zone by the paucity of landslides in areas where the critical depth for a given slope angle is not met even under saturated conditions (Crozier et al., 1990). In areas of New Zealand that have experienced a history of successive landslide events, regolith stripping by landslides has over time affected up to 50% of the land surface area, thus reducing susceptibility to future failure and inducing a condition referred to as 'event resistance' (Crozier and Preston, 1999; Brooks et al., 2002). Regolith stripping is achieved by a succession of events initially starting from the base of the slope, near drainage lines, and progressing upslope through time as a wave of erosion. Consequently, areas of remnant undisturbed regolith of sufficient thickness to fail are now located toward the ridge crests. The presence of failures on ridge crests (with essentially no catchment area) is indicative of high in tensity rainfall available within the middle and core zones of the storm cell (Figs. 12 and 13).

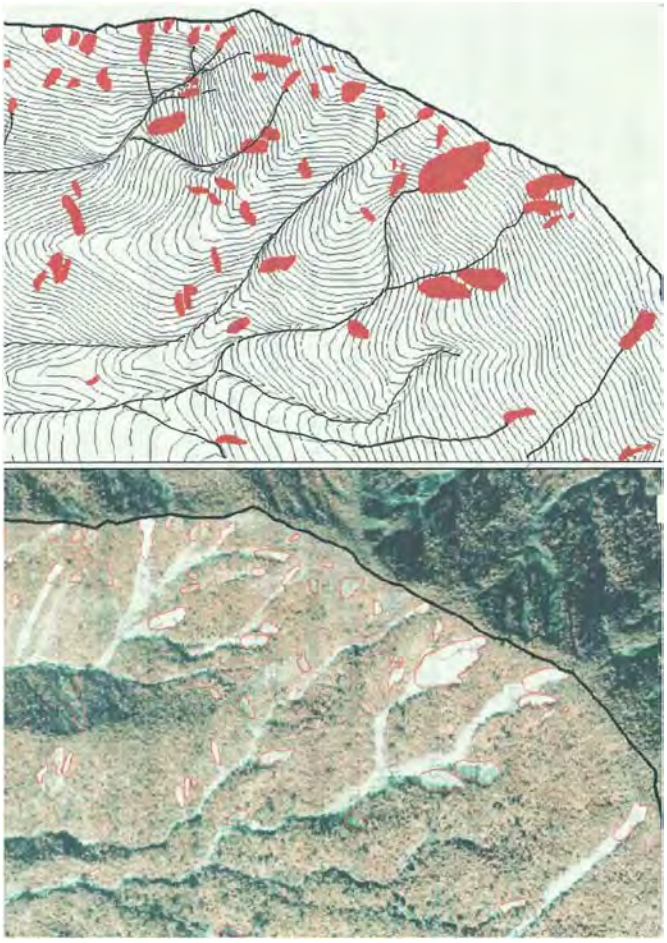

Fig. 10. Landslides aligned with drainage lines, typical of the peripheral zone of the cell model, resulting from the 22–23 January 1985 event (380 mm in 48 h) in the Copebrás Basin, Brazil (Vieira, 2007).

Fig. 11. Stabilizing influence of exotic pine plantation compared to pasture, characteristic of the middle zone of the cell model, Wanganui-Manawatu event 2004 (photo: Graham Hancox).

6.3. The core zone

The core zone of a MORLEs cell is the area of maximum rainfall and maximum impact. To achieve the level of impact indicated in the version of the cell model presented, the event would need to be of high

Fig. 12. Landslides initiated on summit and ridge crests, typical of middle and core zones of the cell model, indicating that critical water levels can occur on all parts of the slope as a result of intense rainfall, the 2002 event, Gisborne, North Island, New Zealand.

Fig. 13. Ridge line initiation of landslides, typical of middle and core zones of the cell model, resulting from high rainfall intensities and the location of regolith with sufficient depth to allow failure, the 1977 event, Wairoa, Hawke's Bay, North Island, New Zealand (photo: R. Black, Hawke's Bay Catchment Board).

Fig. 14. Massive slope failure, typical of the core zone of the cell model, June 2011, southern Hawke's Bay, North Island, New Zealand.

Fig. 15. The January 2011 event (> 300 mm in 48 h), Condominio do Lago-Friburg, Brazil, showing landslides occurring under all types of vegetation cover, typical of the core zone of the cell model (photo: Bianca Carvalho Vieira).

magnitude rainfall, at the extreme end of the range of events that have been recorded in the literature. The intensity of rain in this zone is such that it overrides most terrain resistance factors and entire slopes can fail over a range of slope angles and regolith conditions (Figs. 14 and 15). Landslides appear to occur irrespective of vegetation cover or variations in slope morphology, drainage conditions, or regolith thickness. This level of impact has been observed at the core of a number of events where total storm rainfall has exceeded 500 mm. Given that a range of these factors is often targeted by landslide mitigation and control measures, it is likely that such measures would be rendered ineffective within the core of an extreme event.

7. Conclusion

Rainfall induced, multiple occurrence regional landslide events (MORLEs) involving thousands of landslides are capable of repeatedly affecting large areas of terrain. They are a significant geomorphic agent dominating soil erosion and sediment supply to drainage systems. Extreme events represent a major hazard through reduction of primary production and damage to infrastructure and buildings.

These events can be represented by a cellular event model, mirroring the cell structure of rainfall intensity distribution within the initiating storm cell. The model is based on strong relationships between rainfall gradients and degree of landslide impact and recognises three landslide response zones: the periphery, middle zone, and core. Each of these zones can be further distinguished by a distinctive spatial pattern of landslide occurrence. In turn, these spatial patterns can be attributed to the particular susceptibility factors that become critical in influencing the specific sites of landslide occurrence in each zone.

In the peripheral zone, the dominant constraint to landslide occurrence is the availability of water sufficient to reduce soil strength and initiate failure. Consequently, landslides occur most commonly in areas of water concentration, such as convergent topography, drainage lines, and colluvium filled bedrock depressions. The pattern of landslide distribution is strongly aligned with the drainage network. In the middle zone, water availability is less of a constraint, and factors representing terrain resistance dominate. The distribution of landslides within this zone reflects the variation in vegetation cover as well as the availability and depth of regolith the latter often reflecting the erosional history of the slopes. The core zone is distinguished by the high percentage of slopes that fail completely. The extreme rainfall intensity in this zone overwhelms the influence of most recognised susceptibility factors. It is proposed that mitigation and control measures, which are based on reducing the influence of susceptibility factors, will be rendered ineffective in the core of extreme events. Consequently, hazard mitigation programmes need to recognise that even if control measures are put in place, the core of many extreme events represents an inevitable residual risk. This finding means that in high magnitude events local authorities will need to be prepared for essentially unpreventable landslide damage and downstream impacts. For lesser magnitude events, conventional landslide susceptibility mapping and associated mitigation measures such as soil conservation planting and field drainage, may be affective. However, predetermination of landslide susceptibility for a given terrain is complex because of the difficulty in identifying the likely track, destination, and intensity of storm rainfall cells.

The model presented here is for extreme events; smaller events may not display the full range of zones represented. Similarly, the specific rainfall values for event triggering and zone identification used in the model will vary from place to place in accordance with terrain conditions, such as geology and relief.

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The New Zealand Poplar and Willow Research Trust submission to the Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

Summary

- The New Zealand Poplar and Willow Research Trust (NZPWRT) considers that the key to successful utilisation of trees in the NZ environment with its highly variable topography and climatic conditions is ensuring that the right tree is used in the right place
- The Trust offers some solutions to the problem of mobilisation of slash and sediment based on using the right tree in the right place, and based on the experience of its scientists and trustees
- This applies across areas of plantation forestry, of pastoral farming and in stream and river bank protection
- In severe erosion gully systems, an advisory needs to be introduced requiring riparian buffers or “setbacks” to be established up slope and include protection species such as willow, poplar, eucalyptus, acacia, robinia, tree lucerne, etc, (species with a degree of persistence) these also being a canopy for improved native regeneration. These areas become non-P. radiata zones, and in future should remain stronger, have the ability to regenerate and filter or trap any mobilisation of forest residues.
- In better assessing the right tree for the right place we consider it would be desirable for those planning forests, irrespective of variety, to better identify key erosion areas and plant accordingly by being required to apply1:10,000 scale land map rather than relying on the national 1:63.000 Land Resource Inventory national mapping.
- The advisory recommended above may extend to flood plain buffers and filter areas, which by design can filter and slow flood flows, rows of trees as demonstrated by shelterbelts can collect and filter log and slash debris. Poplar is a very effective tree for these purposes.
- Poplar and willows play a very important role in soil conservation on pastoral land especially in classes 6&7. When space planted, they allow for grazing under the trees while providing good soil protection as well as shelter and shade for livestock.
- Training for foresters’, advisors and regulators in the choice of the right tree for the right place in relation to limiting erosion, slips, slash and silt retention needs to be undertaken. NZPWRT is contributing to this through running 3-day bioengineering workshops in various locations around NZ.
- A barrier to extending protection in this situation, as well as in establishing “setbacks” in gullies in forest areas is a shortage of nursery material. Supporting investment in expanding nurseries is necessary.
- As with many tree species, success is reliant on eliminating risks to establishment and tree growth. An effective removal policy of pest browsing animals such as deer, pigs, wild cattle, goats, hare and possum should be maintained.
- National regulations are not sufficiently robust to ensure adequate protection in such vulnerable landscapes as exist in Eastland. Regional regulations as advocated by

local experts (scientists, land management advisers) should take priority over national regulations. Right tree, right place - right regulation, right region!

Who we are

The NZPWRT funds poplar and willow research for the public good of New Zealand. This research focuses on supporting the productive potential of our pastoral hill country, and the protection of our floodplains and our vulnerable urban areas. Approximately 700,000 hectares of pastoral hill country needs space planted willows or poplars for erosion control and in turn enhancement of water quality with only some 500,000ha protected to date. In addition, most rivers require willows for bank stabilisation to manage flooding and waterways and fish need shade. Breeding and improvement programmes are needed to produce new varieties that will be resilient in the face of a changing climate (drought, storms, exotic pests and diseases.

In its role of breeding new clones of poplars and willows and assessing field performance, the Trust operates in close liaison with Land and Rivers Managers in the Regional and Unitary Authorities. Trust scientists along with trustees, have an extensive knowledge about NZ hill country and land protection.

The Trust considers that poplars and willows can play a role in reducing the impact of silt and slash, such as seen in the aftermath of Cyclone Gabrielle, as a result of poor farming and forestry practices.

The Right Tree in the Right Place

Pastoral slopes need woody vegetation to stabilise the soil, and this has been known for 100 years.
The Trust acknowledges that the key to successful utilisation of trees in the NZ environment with its highly variable topography and climatic conditions is ensuring that the right tree is used in the right place. This applies across areas where plantation forestry is well suited as well as in pastoral farming and in stream and river protection. Native woody species form part of this mix in many situations but we do not consider that they are the most appropriate as a stand-alone tree in a range of circumstances including in highly erodible areas such as waterways and in particular gully areas. We also recognise the importance of the *Pinus radiata* industry to the NZ economy noting that our climate allows for some of the most efficient softwood production conditions globally. Also, as standing trees they generally provided good erosion protection, other than on steep slopes and in gullies.

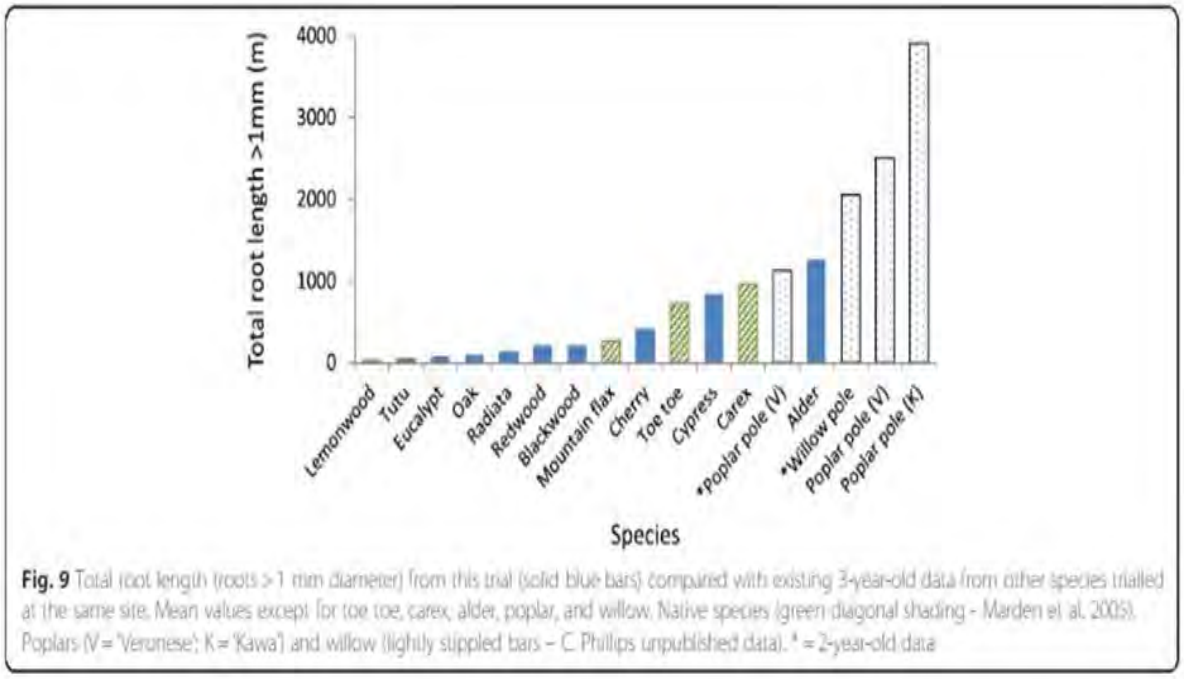


Fig. 9 Total root length (roots > 1 mm diameter) from this trial (solid blue bars) compared with existing 3-year-old data from other species trialled at the same site. Mean values except for toe toe, carex, alder, poplar, and willow. Native species (green diagonal shading - Marden et al. 2005). Poplars (V = 'Veronese'; K = 'Kawa') and willow (lightly stippled bars – C. Phillips unpublished data). * = 2-year-old data

Fig 9 Total root length (roots > 1 mm diameter) from this trial (solid blue bars) compared with existing 3 yr old data from other species trialled at the same site. Mean values except for toe toe, carex, alder, poplar and willow. Native species (green diagonal shading) - Marden et al 2005. Poplars V = Veronese, K = Kawa) and willow (lightly stippled bars). C Phillips unpublished data * = 2yr old data

Chart taken from Phillips and Lambie, Landcare Research, "Observations of "coarse" root development in young trees of nine exotic species from a New Zealand plot trial"

Willows in particular have very tight and extensive root system that binds the soil.

- This makes them the best tree by far for stabilising gullies and banks in water prone situations. Experienced practitioners would say they are at least 10 x more effective in this capability than any other tree including natives.
- They also grow quickly and start the soil binding process far quicker than other trees
- In the event of erosion damage or topple, willow will continue to grow, adding a level of persistence.
- Selected willows from the current nursery stock and breeding programme do not include crack and grey willow which are recognised nationally as a major weed species in lowland alluvial and wetland areas.

Poplars also have extensive root systems, more importantly applied to earthflow, slip and small gully erosion areas.

The capacity of poplars and willows to resist uprooting, bind soil and prevent erosion in severe storm events is its own testimony.

In better assessing the right tree for the right place we consider it would be desirable for those planning forests, irrespective of variety, to better identify key erosion areas and access paths to water courses and plant accordingly by being required to apply1:10,000 scale land map rather than relying on the national 1:63.000 Land Resource Inventory national mapping.

We also would emphasise the very important role that poplar and willows play in soil conservation on pastoral land especially in classes 6&7. When space planted, they allow for grazing under the trees while providing good soil protection as well as shelter and shade for livestock. In this regard they play an important role in supporting pastoral production with its diversified flow of exports thus reducing risk from reliance on a too narrow range of export products.

A barrier to extending protection in this situation, as well as in establishing “setbacks” in gullies in forest areas is a shortage of nursery material. Supporting investment in expanding nurseries is necessary.

As a Barrier to Slippage of Slash and Silt

Poplar and willow trees planted on erodible slopes come into their own in the event of prolonged rain or a heavy rainstorm event when the soil becomes saturated. The trees can reduce the degree of slippage and hold up slipped material – slash as well as silt to an extent, preventing it from falling all the way into water systems.

In severe erosion gully systems, the riparian buffer may need to be extended up slope and include protection species such as willow, poplar, eucalyptus, acacia, robinia, tree lucerne, etc, (species with a degree of persistence) as well as being a canopy for improved native regeneration. These areas become non-P. radiata zones, and in future should remain stronger, have the ability to regenerate and also filter or trap any mobilisation of forest residues. In effect Foresters and Carbon Farmers should be developing Radiata setbacks in consultation with the Land Management Advisory Services.

This advisory may extend to flood plain buffers and filter areas, which by design can filter and slow flood flows, rows of trees as demonstrated by shelterbelts can collect and filter major log and slash debris. Poplar is a very effective tree for these purposes.

As with many tree species, success is reliant on eliminating risks to establishment and tree growth. A strong removal policy of pest browsing animals such as deer, pigs, wild cattle, goats, hare and possum should be maintained.

Poplar as an Alternate Timber Species

There is recognition in the Forestry and Wood Processing Industry Transformation Plan that a key challenge in forestry is over-reliance on a single species.

While planting and harvesting poplar for timber is in its infancy in NZ poplar timber is used extensively in the northern hemisphere. We know from our surveys of poplar timber use in New Zealand that there is opportunity for expansion of a commercial poplar timber industry in NZ. At present there is only modest exploitation of poplar for timber domestically, mainly

from space planted trees grown for soil conservation purposes, but there is growing interest including in planting plantations and a Poplar Interest Action Group has just been formed within NZFFA. This group will promote further research into supporting a commercial poplar timber industry in NZ.

Selective harvesting of mature trees will reduce slash build-up

While there is no evidence to suggest that bulk harvesting of poplar would produce any less slash than other trees, we envisage that space planted poplars will be increasingly grown for timber with appropriate silviculture being undertaken and that in order to maintain soil protection (and carbon credit requirements), selective, selective logging and replacement will be undertaken. Wide-spaced poplars will resprout from the stump following harvesting maintaining a live root system which will continue to protect against erosion

Training

Training for foresters', advisors and regulators in the choice of the right tree for the right place in relation to limiting erosion, slips, slash and silt retention needs to be undertaken. NZPWRT is contributing to this through running 3-day bioengineering workshops in various locations around NZ.

General

We acknowledge however, that there is a need for change relating to management of slash and silt. However, we would urge that prescriptive national regulations be avoided.

National regulations are not sufficiently robust to ensure adequate protection in such vulnerable landscapes as exist in Eastland. Regional regulations as advocated by local experts (scientists, land management advisers) should take priority over national regulations. Right tree, right place - right regulation, right region.

Appendix 1

NZDFI NEW ZEALAND DRYLAND FORESTS INNOVATION

Breeding durable hardwood | Whakatipu taikākā mauroa

A wood supply catchment approach for Wairoa

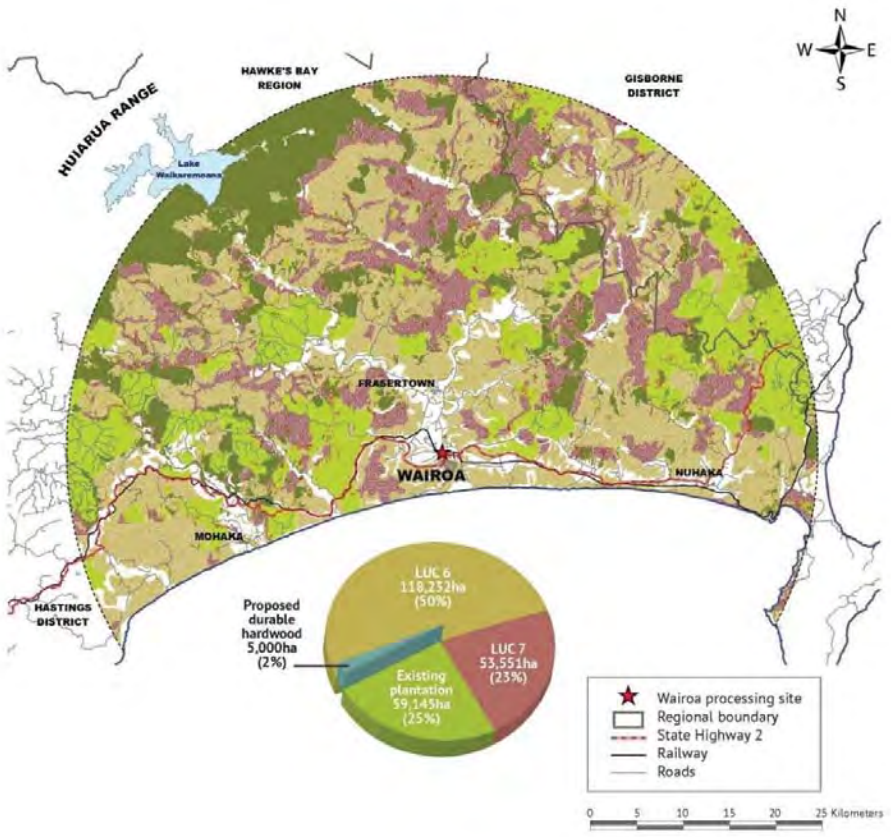
While the Hawke's Bay has many areas well-suited to growing durable eucalypts, NZDFI has a vision for a sustainable hardwood industry centred on a small-to-medium processing operation in Wairoa. The operation could be located on industrial land to the north of the river, where there is an existing sawmill.

For an economically viable, sustainable processing operation, an estimated 5,000 hectares of durable eucalypts will need to be planted over the next 30 years, to generate an average annual harvest of 50,000 tonnes of resource for the mill*. This equates to around 170 ha/year of new planting for 30 years.

There are over 175,000 hectares of farmland in Land Use Capability (LUC) classes 5-7 within a 40km radius of Wairoa, plus a further 60,000+ hectares of forestry plantations. The map below shows where the **40km indicative catchment boundary** lies.

Around 2.1% of the total land area identified as having potential needs to be converted to durable eucalypts to sustainably supply a small-to medium processing operation.

(* Data based on modelling done by Scion using the Woodscape model - Hall, Peter (2020) 'Assessment of afforestation and future wood processing opportunity with non-radiata species: Wairoa District'. Report by Scion for Hawke's Bay Reginal Council/HBRIC.)



In summary:

Suitable land in Wairoa wood-supply catchment:

LUC 6	119,898 ha
LUC 7	55,217 ha
Plantation	60,911 ha
Total suitable land:	**235,926 ha**

Proposed total area of new planting: **5,000 ha**

Proposed new durable hardwood forest: **2.1%** of suitable land

New planting for 30 yrs: **170 ha/year**

Direct Jobs created: **200 FTEs**

Contribution to GDP: approx $85 million/year

Projected Return on Capital Employed (ROCE) – **25%** (integrated sawmill and remanufacturing operation, $27 million capital cost).

For more information on NZDFI's strategy for regional wood supply catchments, see https://nzdfi.org.nz/grower-information/guidelines-for-growers/regional-strategies/

Aratu Forests Limited Submission on the Ministerial Inquiry into Land Use

Date: 4 April 2023

Introduction

1. The recent catastrophic events in Tairāwhiti and Wairoa highlight the need to swiftly address the issue of mobilised woody debris and sediment, and the significant impact it is having on the community. Aratu Forests Limited ("**Aratu**") is committed to taking action to contribute to resolving this issue. Some actions can be initiated rapidly and have almost immediate effect. Others, due to their nature, fit into the medium, and longer-term time frame for implementation and for the effects to be recognised.

Aratu

2. Aratu (formerly Hikurangi Forest Farms) is a large owner and manager of plantation forestry in Tairāwhiti and Wairoa. Aratu currently manages around 35,000 hectares of freehold land and land linked to joint ventures with local landowners including iwi. Of this total area, approximately 12% (4,200 hectares) constitutes reserves of ecological significance, and around 70% (24,700 hectares) is classified as productive forest estate and actively managed for timber production. The majority is Radiata pine, with smaller areas of various Eucalyptus species and Douglas fir also present. The remaining area includes roads, landings, unplantable areas and areas used for public utilities.

3. Aratu is governed by a Board, including two independent directors. The Gisborne office employs 28 staff, and around 250 contract workers are engaged working in the forests on any one day. In the last 12 months, Aratu has represented 24% of the log volume shipped across Eastland Port. Annually, Aratu also sells approximately 10% of its 700,000 tonnes of sawlog harvest to local sawmills, and around 15,000 tonnes of residues to Renalls' chipping plant at Matawhero. Aratu is both Forest Stewardship Council ("**FSC**") and Programme for the Endorsement of Forest Certification ("**PEFC**") certified, which means Aratu's performance on Environmental, Social and Governance facets of its business is independently audited annually.

4. A number of initiatives have been implemented by Aratu since purchasing Hikurangi Forest Farms in 2019 to reduce the risk of woody debris mobilising. These include an active program of building roads and harvest landings to a civil construction standard, and forming a joint venture with eLandNZ[1] that, since 2021, has planted 100 hectares of harvested land which Aratu has decided to retire to indigenous plant species (approximately 5% of Aratu's annual harvested area). Aratu believes that it can diversify its business by introducing new projects that are focused on societal benefits, including biodiversity enhancement and indigenous species restoration.

5. Our submission sets out recommendations that will help forestry businesses significantly reduce negative impacts on the communities they operate in. Forestry currently forms a cornerstone of Tairāwhiti's economy through direct employment, and wider economic benefits. As a part of the community, Aratu must regain the trust and confidence of the people of the regions it operates in, and we hope our submission demonstrates our commitment to doing so.

Executive Summary

6. Given the unique environment of Tairāwhiti, and its history, addressed at **Appendix 1 and Appendix 2**, it is imperative that careful, appropriate management of land identified as highly erodible is conducted. This will need to include afforestation, using a range of indigenous and

[1] eLandNZ – www.eLandNZ.com a company specialising in transitioning land use to sustainable uses primarily by monetising environmental benefits of native tree planting.

exotic species as specific situations require. For sufficient change to occur, the forestry industry and both central and local government will need to work in tandem.

7. The plantations in the region were developed using best intentions and science of the day to provide enhanced economic and environmental benefits to Tairāwhiti, including erosion reduction. As these plantations have matured, and been harvested, unforeseen negative consequences, in particular the mobilisation of woody debris and silt, have been encountered resulting in negative impacts to downstream communities.

8. With the benefit of hindsight, it is clear that some areas should not have been established in commercial exotic forestry. Consequently, some areas that were planted should not be harvested and some areas that have been harvested should not be re-established in commercial exotic forestry.

9. Solutions to prevent the mobilisation of woody debris and silt from forestry estates need to be carefully considered and implemented to minimise negative future consequences. In particular, Aratu recommends the following approaches to ensure improved management of the risk of woody debris mobilisation; noting, however, that it will be important to take regional differences into account before implementing any such measures on a nationwide basis:

    (a) **Commission an independent science-based approach to catchment limits and coupe harvesting limits:** Develop catchment or sub-catchment limits (which restrict the overall amount logged within a catchment in a defined period), and coupe harvest limits and green up rules (which limit the extent of clearfelling in adjoining sections) based on scientific, third-party research.

    (b) **Apply best practice pre-harvest planning**: Support forestry companies to further develop their pre-harvest planning approaches. In particular, the creation of a standard operating procedure, detailing a robust harvesting risk assessment process that addresses onsite and off-site effects, and preventative and recovery controls. Te Uru Rākau could assist in providing support to companies and regulators in the development of techniques, standards and compliance processes.

    (c) **Further develop regional forestry infrastructure standards**: Set standards for in-forest roading, waterway crossings, and landings,[2] in addition to the standards contained in the Forestry Owners' Association Road Engineering Manual, to help ensure that they remain stable during extreme weather events, given the Tairāwhiti region's erosion issues. Also, expand on erosion and sediment control structure methods to help lessen risks associated with landslides commonly triggered through water control outlets, such as cutouts and culverts. Te Uru Rākau could assist in providing support to companies and regulators in the development of techniques, standards and compliance processes.

    (d) **Improve in-forest management to reduce woody debris mobilisation risk:** Introduce both short-term and long-term measures to deal with woody debris mobilisation, including:

        (i) *Address large woody debris on vulnerable areas*: Support forestry companies to reduce large woody debris left on landslide vulnerable areas to the extent that it is operationally possible.

[2] The area of land where logs are accumulated, processed, and loaded for removal.

(ii) *Increase residue utilisation*: Encourage the development of sustainable economically viable industries that consume woody residues from all sources.

(iii) *Make it easier for companies to install and manage a range of debris retention mechanisms*: Develop resource consent processes that allow for engineered (e.g. debris nets) and non-engineered (e.g vegetative barriers and debris "run off"[3] areas) retention mechanisms to be implemented via a clear and cost effective approval process.

(iv) *Ensure adopted silviculture regimes, including establishment practices, do not increase debris mobilisation risk:* Review silviculture regimes to determine whether current practices increase risk of slope failure and debris mobilisation, and develop techniques to reduce this risk.

(e) **Government guidance and support:**

(i) *Support from Te Uru Rākau – New Zealand Forest Service***:** Te Uru Rākau to develop a slash management guide, and provide support to local authorities to ensure they have the resources and expertise needed to carry out effective compliance monitoring.

(ii) *Government support for indigenous afforestation:* Promote indigenous afforestation via amendments to the Emissions Trading Scheme ("**ETS**") and the development of a biodiversity incentive scheme.

(iii) *Government support for loss of land use:* If future regulations will result in a material loss of current land use, provide fair compensation to address this loss of asset value, and to assist forestry companies to cope with inability to utilise land.

(f) **Actively encourage transition of high-risk land**: Develop processes and timeframes that allow for the risk assessment of land, including the managed retirement of high-risk production forestry land and its conversion to other vegetative cover and provide mechanisms to incentivise this transition.

10. Further evidence supporting the above recommendations is set out in **Appendix 3** (an expert report produced by Brett Gilmore, Mike Marden and Rien Visser) and **Appendix 4** (a report on debris barriers, produced by Geobrugg).

The need for afforestation

Advantages of afforestation

11. Vegetation, especially forests, contributes to slope stability by reducing soil moisture (both through the canopy intercepting rainfall, and roots extracting moisture from the soil) and by reinforcing the ground through root systems.[4] As noted in **Appendix 1**, Tairāwhiti's unique and challenging terrain and environment mean that afforestation is key to addressing long-standing soil erosion issues in the area. Addressing soil erosion helps reduce landslides and debris flows, which contribute to the issue of mobilised woody debris and sediment.

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[3] Strategically located land areas specifically set aside and enhanced to aggregate woody debris, that inevitably will enter waterways, before it creates a hazard to downstream property and where it can be efficiently managed.

[4] Landslide Hazard and Risk at 517-519.

12. Further, a wealth of evidence exists to demonstrate that shrub/tree cover of some type on the Tairāwhiti landscape reduces sediment runoff and land slips that result in both soil and material on the land entering waterways.

Afforestation is only part of the answer

13. However, it needs to be acknowledged that the underlying geology in parts of the Tairāwhiti landscape is inherently weak and, irrespective of the forest regime (e.g. production or permanent exotic for carbon), the vegetation cover alone will not always prevent slope failure.

14. Consequently, it will be imperative that consideration is given to adopting a range of options for stabilising these weak landscapes, including:

    (a) Designation of some land for retirement, with reversion to a permanent indigenous forest cover. Aratu has a joint venture with eLandNZ that has been establishing indigenous forest, primarily around riparian zones and areas considered unsuitable for plantation forestry. Whilst in its infancy (100 hectares has been planted since 2021) this programme will continue and could be "put on steroids" with appropriate support mechanisms. For example, support to develop scale nurseries to reduce seedling cost, streamlining of consent processes, and enhancement via the ETS of ability to earn revenue from such plantings. We discuss below at [70] how indigenous afforestation could be accelerated through government support, including biodiversity credits.

    (b) the selection of other species (exotic or indigenous) able to be selectively harvested; and

    (c) passive management techniques that allow some of the worst affected areas to revegetate naturally.

Successful afforestation

Methods

15. A number of significant afforestation attempts have been made in the Tairāwhiti region, some more successful than others (addressed in **Appendix 2**). To achieve a lasting solution, it will be important to consider, and implement, a variety of methodical approaches, including both long-term and short-term measures.

16. The importance of such a specific and methodical approach is demonstrated by the history of Tairāwhiti land use, set out in **Appendix 2**. As evidenced there, the historical approach of planting forests on all available areas including near waterways and on the steepest slopes, and planting forests at the same time, may create problems in addition to solving some.

17. Learning from these previous projects, it would appear that the key factor for success is taking a tailored approach to afforestation, including by ensuring that all future afforestation:

    (a) takes into account relevant features of the land, such as water bodies, steepness of slope, and soil type;

    (b) is implemented in a planned manner, that is supported by independent and scientific research, to maintain slope stability through the presence of sufficient mature vegetation and forest at all times; and

(c) is supported by regulatory and commercial incentives that support the long-term nature of such a transition and the desired outcome of the project(s).

Tree type

18. Extreme weather events can affect both indigenous and exotic trees. The key factor as to the level of protection trees provide is the age of the tree, rather than the type.[5]

19. Therefore, it is important to consider the most appropriate kind of forest type and its purpose. In essence, consideration must be given as to which species will provide the best protection in certain areas. For example, longer rotation species, such as the Douglas fir and coppicing species, including coastal redwood, are particularly well suited to some high-risk sites.[6] This flexibility supports the tailored approach referred to above.

Steps towards afforestation

20. The overarching point is that, due to the instability of the land in Tairāwhiti, trees, through soil moisture reduction and soil reinforcement, continue to be the most cost effective and rapid stabilisation approach. This task will require significant investment, which is why Government and forestry companies will need to work together to ensure that as much of the riskier land can be covered as quickly as possible.

21. As observed in **Appendix 2**, the land use issue in Tairāwhiti is extensive; the resources within the Tairāwhiti region are insufficient to achieve a permanent solution with the urgency that is required; and resolving the issue will require government support either directly or via the development of market mechanisms to allow for projects to be funded.

22. Private companies, landowners, and investors need an economic reason to plant forests. The Government is incentivising forestry through the ETS and has used a broad brush to promote trees. However, if, for example, commercial forestry is banned on red zone country, and permanent exotics are banned from the ETS, then indigenous protection forestry remains as the only land use. Presently, revenue streams do not exist to support investment of this type because carbon accumulation does not cover the cost of establishment. Therefore, if afforestation of indigenous species on a broad scale is to be a solution, Government funding will be necessary due to the significant up-front investment that such an endeavour will require. Such funding will need to be available irrespective of whether the current use of the high-risk land is commercial forestry or agriculture. This is discussed further below at [70].

23. It is, however, significantly cheaper to prevent erosion than it is to fix damage caused by erosion. A 2001 study calculated that, at the time, the cost of preventing erosion would be $26 million annually, whereas the cost of addressing damage caused by erosion would cost $126 million annually.[7]

Wider benefits of afforestation

24. Afforestation in the Tairāwhiti region also has the following benefits:

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5 Landslide Hazard and Risk at 523.

6 Michael Marden, Donna Rowan, and Alex Watson "Effect of changes in forest water balance and inferred root reinforcement on landslide occurrence and sediment generation following Pinus radiata harvest on Tertiary terrain, eastern North Island, New Zealand" (2023) New Zealand Journal of Forestry Science 53:4 https://doi.org/10.33494/nzjfs532023x216x at 14.

7 Landslide Hazard and Risk at 533-534.

(a) Planting trees enables New Zealand to meet its requirements under the ETS, and, therefore, its international climate change commitments.

(b) Afforestation and forestry will continue to provide jobs and make a significant contribution to Tairāwhiti's economy. Given Tairāwhiti has limited productive land, for the reasons noted in **Appendix 1**, it is important for the region that land is utilised where it can be. Likely reflecting the difficulties with land use, Tairāwhiti had the second highest unemployment rate of all New Zealand regions at the end of 2022,[8] and severely reducing forestry activity will exacerbate this in the near term.

(c) Further, afforestation in Tairāwhiti can contribute to Māori employment success. Government should do all it can to support Māori economic resilience in the district. Tairāwhiti has one of the largest Māori populations in New Zealand – 52.9% of people in Tairāwhiti identified as Māori in 2018[9] – and 80% of the local forestry workforce identifies as Māori.[10]

Disadvantages of forestry sector afforestation

25. Although afforestation by the forestry sector contributes to land stability, ETS requirements and employment, it can also become a source of woody debris that can mobilise and impact downstream communities.

26. Plantation forestry companies need to rapidly adopt techniques to reduce the mobilisation of woody debris, so the benefits of the industry noted above can be achieved without causing harm to the community. Below we set out forestry management practices and debris management practices that will help reduce the impact of woody debris from forests impacting the community.

27. These practices combine prevention and mitigation measures. If a range of measures can be put in place across the management cycle, woody debris mobilisation and its impacts will be reduced.

Forestry Management Practices

Catchment limits and coupe harvesting

28. As noted above, forestry cover assists with slope stabilisation. Therefore, an issue that arises during the harvesting period is that if this cover is removed at a time when a severe storm occurs, the land is destabilised, leading to an increase in landslide occurrence[11] and the mobilisation of woody debris.

29. For forest stands that have already been planted, an effective way of responding to this problem is to develop:

(a) catchment or sub-catchment limits (which restrict the overall amount logged within a catchment in a defined period); and

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8 Figure NZ *Unemployment rate in New Zealand by region* https://figure.nz/chart/r9PsV2REYkH4yuj5-pJRjtp01mao0dErz.

9 Massey University *Regional differences in ethnic groups* https://www.ehinz.ac.nz/indicators/population-vulnerability/ethnic-profile/#:~:text=The%20M%C4%81ori%20population%20is%20concentrated,52.9%25)%20(Figure%201.

10 Tairāwhiti Regional Skills Leadership Group *Tairāwhiti Update,* February 2022 https://www.mbie.govt.nz/dmsdocument/18735-tairawhiti-update-february-2022.

11 Michael Marden, Donna Rowan, and Alex Watson "Effect of changes in forest water balance and inferred root reinforcement on landslide occurrence and sediment generation following Pinus radiata harvest on Tertiary terrain, eastern North Island, New Zealand" (2023) New Zealand Journal of Forestry Science 53:4 https://doi.org/10.33494/nzjfs532023x216x at 14.

(b) coupe harvesting limits and green up rules (which limit the extent of clearfelling in adjoining sections).

to ensure that there is sufficient vegetation and forest remaining to maintain slope stability.

30. Such an approach could, however, have financial implications on the viability of production forestry in certain areas of Tairāwhiti. Therefore, the key is to develop limits that ensure sufficient forest cover remains, while still enabling companies to harvest a sufficient volume of wood that will produce enough revenue to cover operating costs for access. Any other outcome would risk the operations of forestry companies, which would have significant flow-on impacts given their contribution to the Tairāwhiti region in terms of jobs as well as the wider economy.

31. Aratu considers that the best way to develop such limits would be by commissioning scientific, third-party research.

Recommendation 1: Commission an independent science-based approach to catchment limits and coupe harvesting limits.

Develop catchment or sub-catchment limits (which restrict the overall amount logged within a catchment in a defined period), and coupe harvest limits and green up rules (which limit the extent of clearfelling in adjoining sections) based on scientific, third-party research.

Best practice pre-harvest planning

32. Pre-harvest planning is key to ensuring that harvesting occurs in a way that protects both people and the environment. This is recognised, to some extent, by the Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 ("**NES-PF**") which requires the development of both a "forestry earthworks management plan" and a "harvest plan".[12] In areas controlled by the Gisborne District Council ("**GDC**"), harvesting and associated activities are generally subject to a further set of requirements as set out in Resource Consents. However, these plans are quite high level and are developed for the purpose of demonstrating regulatory compliance.[13] Although they are required to identify and provide a proposed response to environmental risks, including slash,[14] they lack practical detail, including the "when" and "how" that are necessary for those on the ground.[15]

33. Therefore, the first step to mitigating and reducing slash is requiring forestry companies to develop a standard operating procedure for slash ("**SOP**"), which will provide step-by-step instructions to help forestry workers carry out operations so as to mitigate and reduce slash at every stage of the harvesting process. Adopting an SOP will ensure staff and contractors understand, and meet, the company's expectations around slash management.

34. The SOP should also include a robust harvesting risk assessment process to enable forestry workers to identify the risks that are specific to the land they are working on (above and beyond those that need to be addressed by the NES PF Harvest Plan and Resource Consents); address the potential on-site and off-site effects; and set out preventative and recovery controls. Examples of measures that could usefully be set out and explained in the SOP are noted below at [64]. The development of a best practice slash management guide by Te Uru

[12] Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017, sch 3.

[13] Brett Gilmore Consulting *Queen Charlotte Forest's Oyster Bay Catchment Harvest Plan*, July 2022 at 11.

[14] Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017, sch 3, cls 3, 5 and 6.

[15] Brett Gilmore Consulting *Queen Charlotte Forest's Oyster Bay Catchment Harvest Plan*, July 2022 at 11.

Rākau – New Zealand Forest Service, discussed below at [65], will also assist forestry companies with developing an effective SOP.

Recommendation 2: Apply best practice pre-harvest planning.

Support forestry companies to further develop their pre-harvest planning approaches. In particular, the creation of a standard operating procedure, detailing a robust harvesting risk assessment process that addresses onsite and off-site effects, and preventative and recovery controls. Te Uru Rākau could assist in providing support to companies and regulators in the development of techniques, standards and compliance processes.

Further develop regional forestry infrastructure standards

Types of infrastructure standards

35. Research notes that most countries which suffer from erosion problems utilise both "soft" and "hard" measures to deal with them – soft measures being afforestation, and hard measures being "hard engineering' mitigation measures" – but that New Zealand generally only focuses on afforestation.[16] Aratu has, since 2019, significantly increased the rigour with which infrastructure is designed, constructed and maintained. These measures are expensive but a significant step up from practices adopted pre-2018 within the estate. With the resilience of this infrastructure being demonstrated in recent years when intense storm activity has occurred, Aratu is increasingly confident that these adopted standards do reduce the risk of infrastructure failure, and subsequent debris mobilisation from such construction, to very low levels. Aratu suggests that the adoption of similar standards across the Tairāwhiti region, in addition to those contained in the Forestry Owners' Association Road Engineering Manual, would aid in the reduction of debris mobilisation. In particular:

(a) Standards should be set:

(i) for on-site roading and landings to ensure that they remain stable during extreme weather events;

(ii) as to the requirements for onsite slash and sediment measures, including water tables, cutouts, berms, culverts, flumes, sediment traps, soak holes, silt fences, sediment retention ponds, and crossings. Whilst the Forestry Owners' Association Forest Practice Guide contains high-level advice on these matters, the content is generic and forestry companies would be aided by more detailed information and adoption of greater levels of technical design appropriate to each specific situation; and

(iii) for earthworks, in particular, forestry companies should look to reduce the on-site landing earthworks footprint to help minimise landing failure.

(b) Forestry companies should be required to have an infrastructure maintenance programme and to regularly re-evaluate it to ensure that vulnerable structures are maintained consistently and in a timely manner.

[16] Landslide Hazard and Risk at 541-542.

Resilience of well-developed infrastructure

36. The value of well-developed infrastructure cannot be overestimated. Following the 2018 storms, Aratu reviewed and upgraded its existing infrastructure inherited from the previous owner and that company's practices. Following assessment of 760 landings and connected roading networks Aratu:

(a) Rehabilitated 308 landings so that they complied with the requirements of abatement notices that had been issued.

(b) Pulled additional slash back on 154 landings, and end hauled some of the slash to more stable and contained sites.

(c) Improved road drainage structures and road stabilisation, in accordance with civil and forest engineering best practice by:

(i) benching all works where fill needed to be contained and compacted;

(ii) compacting fill to consolidate it to a more stable and stronger state;

(iii) reducing fill slope angles (previously beyond the natural angle of repose);

(iv) reducing side cast construction (which uses the fill for construction without a bench) and increasing cut and fill construction;

(v) increasing end hauling to remove additional fill to more stable and contained sites;

(vi) utilising vegetation stabilisation of fills to reduce sheet wash erosion, like rilling;

(vii) increasing water controls, such as crossroad drains and flexiflumes, to reduce water volume and speed and help protect sensitive fill slopes; and

(viii) developing erosion and sedimentation structures to reduce erosion and trap larger sediment.

37. Improved construction practices result in a significant increase of costs up-front. For example, Aratu's road construction costs have tripled since 2018. However, better constructed infrastructure is much more resilient to the effects of storms. The evidence post the 2023 storms demonstrates that Aratu's upgraded roading and landing systems, and slash and sediment infrastructure measures, have held up very well and have prevented significant damage from occurring. Whereas in 2018 collapsed landings with debris discharges were a considerable problem, in 2023 landslides triggered by landing and road fill failures, and water control failures, such as successive blocked culvert inlets, have been relatively infrequent occurrences.

Recommendation 3: Further develop regional forestry infrastructure standards.

Set standards for in-forest roading, waterway crossings, and landings, in addition to the standards contained in the Forestry Owners' Association Road Engineering Manual, to help ensure that they remain stable during extreme weather events, given the Tairāwhiti region's erosion issues. Also, expand on erosion and sediment control structure methods to help lessen risks associated with landslides commonly triggered through water control outlets, such as cutouts and culverts. Te Uru Rākau could assist in providing support to companies and regulators in the development of techniques, standards and compliance processes.

Improve in-forest management to reduce woody debris mobilisation risk

38. Although the above measures can reduce slash creation, it is inevitable that the harvesting process will result in some slash. Therefore, it is necessary to introduce measures, both short-term and long-term, to deal with slash post-harvest.

39. Both on-site and off-site slash management practices will need to be adopted, as it is very difficult to remove all of the slash off a hill (as you can in flat environments) due to the terrain type. Further, some slash cover provides for rainfall interception, thereby reducing erosion, and contributes to reduced sediment runoff.[17]

Address large woody debris on vulnerable areas

40. The first step to preventing harm from slash is addressing the amount of slash and woody debris left in vulnerable areas. This can be achieved by:

(a) reducing the amount of large woody debris left on landslide vulnerable areas;

(b) reducing the amount of large woody debris on or near all waterways;

(c) reducing the piece size limit, above which the material needs to be recovered to the landing; and

(d) ensuring that the woody debris that is removed is either stored in a safe storage place, such as a solid landing, or taken off-site.

41. By removing larger pieces of woody debris, and focusing particularly on vulnerable areas, there will be a reduction in both the amount of debris that will be mobilised by storms and extreme weather events, and the damage that it can cause.

42. It is important to acknowledge, however, that all debris that is removed will have to be physically removed either by people or machinery. As noted above, the steep terrain in Tairāwhiti makes it very difficult to extract all of it and to attempt to do so would give rise to health and safety concerns for forestry workers, and other potential adverse environmental effects.

43. An option that is currently being trialled by some forestry companies is a slash grapple, including specialised grapple attachments which improve the ability to remove slash from cutovers and creeks. This machinery enables large amounts of slash to be moved from harvest sites, near waterways and from landings, and creates less risk for forestry workers.

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[17] Forest Owners Association *Forest Practice Guide 5.4 Vegetation to Manage Erosion* https://docs.nzfoa.org.nz/site/assets/files/1507/5-4_vegetation-to-manage-erosion_slash-2-0.pdf at 1.

44. However, there are also some limits on what slash grapples can achieve. First, slash grapples can only retrieve logs of up to a certain diameter, as if the diameter is too small the grapple will simply snap the stem. Second, the steep terrain in Tairāwhiti means that it may either be impossible to get such a machine to the woody material safely, or in a manner that would not cause damage to the surrounding environment.

45. Given slash grapples are a relatively new technology for New Zealand, time will be needed for them to be tested and, if successful, embedded. Aratu is currently meeting with manufacturers of slash grapples and if trials are successful will encourage its contractors to invest in slash grapples.

Recommendation 4: Address large woody debris on vulnerable areas.

Support forestry companies to reduce large woody debris left on landslide vulnerable areas to the extent that it is operationally possible.

Increase residue utilisation

46. Developing sustainable secondary industries that consume woody debris would aid with its removal. For example, options for it to be used for fuel or other bio materials would assist with the costs of processing and transporting. Potential avenues include: pellet fuels, biofuels hog fuel, and pyrolysis to create biochar. Aratu considers that both the industry and Government can collaborate to further investigate options for residue consumption.

47. It is especially important to explore residue consumption ideas within Tairāwhiti, for example, the utilisation of pellet fuel and biofuels at local facilities such as schools, hospitals and vegetable processing facilities. Local options are likely to be more economically feasible than exporting processed woody material outside of the region due to Tairāwhiti's relative isolation from main end users. Further, it also provides the opportunity for local economic benefits. Developing these options will inevitably take time and resources, but it is such long-term solutions that will best enable the efficient utilisation of some of the woody debris that causes downstream issues.

Recommendation 5: Increase residue utilisation.

Encourage the development of sustainable economically viable industries that consume woody residues from all sources.

Make it easier for companies to install and manage a range of debris retention mechanisms:

Why are debris nets (aka slash nets) necessary?

48. Although the above operational measures will significantly reduce the production and mobilisation of woody debris, it is impossible to control or remove it all, for the reasons noted at [42] and [44]. Therefore, it is important to also introduce secondary measures to deal with any residual debris, including that which eventuates from other sources e.g land slips unassociated with harvest operations, that has the potential to cause damage to the environment or housing and infrastructure.

49. As noted by Geobrugg, an international engineering company which specialises in geohazard and impact solutions: "Slash barriers are not designed to mitigate poor forestry practice but

are [a] useful tool in managing any waste material which was not able to be controlled at the source".[18]

How do debris nets work?

50. Debris nets are high-strength steel wire ring nets that can be placed around vulnerable sites, such as areas prone to land sliding and water bodies, to catch woody debris.[19]

51. The effectiveness of debris nets depends on:[20]

(a) **Retention volume**: Retention volumes can be maximised by utilising the topography of the land (ideally placing the debris nets on a straight section of river with sufficient bank height and/or at the entrance to a gorge or narrow section) and installing multiple barriers where the topography is difficult.

(b) **Protection and back-up mechanisms:** Ensuring that the debris nets that are installed have mechanisms to deal with multiple impacts, overtopping and erosion. For example, Geobrugg's debris nets have mechanisms to increase absorption capacity, and to concentrate overtopping debris flow material to the middle of the net, therefore avoiding overflow and erosion of the torrent banks.

(c) **Regular clearing:** Debris nets should be cleared out regularly to decrease the chances of them overtopping, which is why the location of the nets needs to be carefully considered.

52. The advantages of debris nets include that they:[21]

(a) are low in weight and have a short installation time so they can be installed on steep, difficult terrain without doing any damage to the environment;

(b) have low visual impact and produce significantly less carbon pollution when compared to a concrete check dam; and

(c) can easily be removed once they are no longer needed, or can be better positioned elsewhere.

International and domestic examples of debris nets

53. Debris nets are used internationally. For example, in the last ten years Geobrugg, an international engineering company which specialises in geohazard and impact solutions, has installed over 250 debris nets in more than 25 countries.[22] The following examples and pictures show how effective debris nets can be in protecting communities and the environment:

(a) **Peru**: In the Chosica region El Niño rains cause multiple mudslides and landslides. In February 2016, Geobrugg installed 22 debris nets across 9 valleys in the region. The following year, a 1 in 30-year storm hit the region. The barriers performed well

[18] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [1].
[19] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [1].
[20] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [1.1] and [1.2].
[21] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [1.1].
[22] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [1] and [3].

with two of them being filled to 95% capacity (10,000m^3), protecting the residential area below. (See pictures 1 and 2 below).[23]

(b) **Switzerland**: The Hüpach (or Huepach) barrier is the largest debris system in the world, being 40 metres wide and 10 metres high. It was installed to protect a settlement below which was highly endangered by debris flow and flooding.

54. Debris nets are also increasingly being installed in New Zealand. In 2021, the first dedicated debris net was established in Napier for an 800-hectare catchment; being 13.5 metres wide at the top, 8 metres wide at the bottom and 3.5 metres high.[24] In March 2022 it was filled for the first time and successfully contained a combination of slash and landslide material (see picture 3 below). The system was then cleared out and filled again in January 2023 (see picture 4 below) and in February 2023 (clearing did not occur in-between). Although the barrier was over topped, it remains intact (though as at time of writing it has only been inspected from the air due to road closures).[25]

Picture 1

Picture 2

[23] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [3].

[24] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [2].

[25] Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [2].

Picture 3

Picture 4

Current impediments to installing debris nets

55. Aratu considers that debris nets are a very effective supplementary measure for dealing with debris and that installing debris nets strategically within its forest estate will contribute significantly to the protection of the environment and the community. Debris nets are one of the few physical barriers that can be established straightaway and be immediately effective at arresting debris flows, when compared with vegetative barriers that require years to grow to a sufficient size and strength to be effective.

56. Debris nets are provided for in the NES-PF (referred to therein as slash traps). They can be either a "permitted activity" or a "restricted discretionary activity", which requires consent from the regional council.[26] Currently, most debris nets need to be consented as the NES-PF requires consent for any debris net located within the bankfull channel width of the river where "the catchment area upstream of the slash trap is greater than 20 ha".

[26] The Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017, regs 83-92.

57. In 2019, Aratu approached Geobrugg to provide a debris flow/driftwood barrier design for its Waimanu and Te Marunga sites. A system was designed that was "dimensioned to withstand a debris and slashing load including a dynamic puncturing load of a 15-tonne tree stem traveling at 10 m/s. The systems had edge protection to protect the top rope in the event they were over topped".[27]

58. Aratu applied for a Resource Consent from the GDC to obtain consent for these debris nets as designed. However, it took 4 years for the application to be considered, and cost Aratu in the vicinity of $100,000 on expert advice. Late 2022, the GDC notified Aratu that the project would need to go to public consultation, a process that would be funded by Aratu. Given the lack of progress and likelihood of further cost with no positive result, Aratu withdrew its application in December 2022.

59. In contrast, the Napier debris net, discussed above at [54], was applied for on 30 September 2021 and was granted on 15 November 2021 by the Hawkes Bay Regional Council ("**HBRC**").[28] No public consultation was required.[29] Instead, the consent imposed conditions that would protect the environment (largely reflective of the criteria laid out in the NES-PF for permitted debris nets), including that the debris net be:[30]

    (a) inspected every three months and within five days of significant rainfall events;

    (b) cleared of accumulated debris; and

    (c) installed in accordance with strict parameters to limit the environmental impact, including provision for the ongoing passage of fish.

60. The consent holder was also required to provide an annual report to the HBRC detailing the frequency of maintenance and clearance of the debris net, including photos, and any observations of blockages to fish passage; disturbance of the stream bed or banks; or damage to downstream property or infrastructure.[31]

61. Given the significant protection debris nets have been proven to provide to downstream communities elsewhere, Aratu considers that it is imperative that resource consent processes that enable debris nets to be implemented be developed with some urgency. The approach adopted by the HBRC provides a good example as to how the environmental impact can be considered, whilst still promoting the community's safety as a primary concern.

Debris Flow Barriers and Run off Areas

62. In addition to debris nets, Aratu recommends investigating the practicality of establishing a network of a variety of mechanical debris catchers in catchments of a full range of sizes. These structures may include:

    (a) rudimentary railway iron and wire rope structures on small or low risk catchments;

    (b) establishment of fast-growing tree species i.e. willows (Salix spp) strategically positioned to act as effective barriers, even if they topple; and

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27 Geobrugg New Zealand *Summary – Geobrugg slash/debris flow barriers*, 16 March 2023 at [2.1].

28 Hawke's Bay Regional Council *Resource Consent*, AUTH-127638-01, 15 November 2021 at 1 and 2.

29 Hawke's Bay Regional Council Assessment of Resource Consent Application, AUTH-127638-01, 15 November 2021 at [8] and [11].

30 Hawke's Bay Regional Council *Resource Consent*, AUTH-127638-01, 15 November 2021 at 2–4.

31 Hawke's Bay Regional Council *Resource Consent*, AUTH-127638-01, 15 November 2021 at 4.

(c) engineered structures that can encourage the flow of debris being carried in rivers onto areas of land that are already effective natural repositories of some debris at times of flood. Aratu considers that there are areas of some farms adjacent to rivers that are relatively low value as farmland, which already attract woody debris deposits when floods occur, and that this feature could be enhanced at relatively low cost. From this position of concentration, efficient removal and processing of the debris could occur.

63. To facilitate this approach the ability to achieve consents for deliberate deposition, storage and disposal would need to be obtained. This may not be possible in the current regulatory environment.

Recommendation 6: Make it easier for companies to install and manage a range of debris retention mechanisms.

Develop resource consent processes that allow for engineered (e.g. debris nets) and non-engineered (e.g vegetative barriers and debris "run off" areas) retention mechanisms to be implemented via a clear and cost effective approval process.

Silviculture regimes and establishment practices

64. Silviculture regimes, including establishment practices, can increase the risk of debris mobilisation. Therefore, it is important to review silviculture regimes to determine whether the current practices increase risk of slope failure and debris mobilisation, and to develop techniques to reduce this risk. Silviculture techniques that can assist with reducing such a risk include:

(a) **Utilising up to date planning tools.** Until 2021, planning tools were unable to generate precise contours. The development of light detection and ranging mapping ("**LiDAR**") has revolutionised harvest planning as it can generate contours at 1 metre resolution, significantly increasing the ease and accuracy of forestry planning.[32] Aratu has used such techniques for several years and found LiDAR particularly useful for enabling:[33]

(i) the planning and construction of resilient harvesting infrastructure i.e. roads and landings, as it allows earthworks to be effectively implemented and minimised, leading to less runoff risk. In particular, limiting fill slopes to 30° prevents steep ground from being overloaded, which was what previously led to failures in old roads. (as noted above at [36]–[37] the Aratu forestry estate suffered less damage from the 2023 storms than the 2018 storms due to the improved landing and roading infrastructure);

(ii) the identification of areas:

(aa) of indigenous vegetation to ensure they remain untouched;

(bb) where mechanical felling can be carried out safely and effectively, preventing trees from being planted in sensitive areas; and

[32] Brett Gilmore Consulting *Queen Charlotte Forest's Oyster Bay Catchment Harvest Plan*, July 2022 at 15.

[33] Richard Rennie "Design shows Aratu Forests' impact reduction focus" *Farmers Weekly*, 3 February 2023 https://www.farmersweekly.co.nz/special-report/farms-forests-and-the-future/design-underpins-aratu-forests-impact-reduction-focus/.

(cc) that should be retired or left unharvested.

Further, combining LiDAR with a good geographical information system ("**GIS**") and design software provides topographical data on a scale which ensures much better land management than was previously possible. Particularly where planting stocking rates and thinning practices can be managed reflecting the variation in terrain and inherent risk.

(b) **Effective planting practices and strategies:** The following planting practices help slope stabilisation and protect vulnerable areas from slash and sediment:

(i) **Riparian planting using indigenous and introduced tree species:** Permanent vegetation needs to be strategically planted around water bodies (to minimise sediment and debris filling waterways.

As noted above, Aratu, via a joint venture with eLandNZ, is undertaking a long-term project to transition sensitive areas within the Aratu estate from pine to indigenous trees. The project aims to have sensitive areas within the estate planted with indigenous trees that, in time, will act as land stabilisers, silt filters and debris catchers.[34] Planting began in 2021, with 50 hectares established, and a further 50 hectares was established in 2022. This represents approximately 5% of the area harvested by Aratu each year.

It should be noted that riparian planting must occur in a thought-through, methodical way. Although planting trees around waterways reduces the amount of sediment entering the waterway, there is the potential for the trees to contribute woody debris to the waterways in the future if they are planted too close or not managed properly.

(ii) **Setbacks:** Production forests need to be set sufficiently far away from the riparian area and bodies of water to minimise them being filled with sediment and debris at harvest time. The NES-PF does set standards for setbacks (5 metres for rivers less than 3 metres wide and wetlands larger than 0.25 hectares; 10 metres for rivers greater than 3 metres wide, lakes larger than 0.25 hectares, outstanding freshwater bodies, water bodies subject to a water conservation order, or a significant natural area; and 30 metres for coastal marine areas).[35]

However, Aratu has found it more effective when replanting in the Tairāwhiti region to introduce setbacks of 10 metres for all water bodies, and 40 to 50 metres for large, incised gully systems. These large setbacks form some of the area that is established with indigenous trees via the eLandNZ project.

(iii) **Staggered harvesting:** As noted above, vegetation and forestry contribute to slope stability by removing soil moisture and providing reinforcement via roots. This makes it desirable to ensure that there are always sections of vegetation in place to improve slope stability. One way to achieve this is by harvesting in sections (discussed above), but a long-

[34] eLandNZ *The First Ground is Broken* https://www.elandnz.com/projects/the-first-ground-is-broken.

[35] Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017, reg 14.

term solution is for forests in the same area to be planted at different times. By increasing the age class spread within a catchment, the need to harvest within a narrow time window will be relieved, as a wide age class spread will inevitably result in different harvesting times.

As noted at **Appendix 2**, one of the key issues with the post-Cyclone Bola response was the fact that the trees were planted within such a narrow time window that they all became due for harvesting within a similarly short window. This practice increased the risk of large areas of a catchment being harvested within a relatively narrow time frame, increasing the areas subject to the widely recognised high-risk post-harvest period.

(c) **Identification of highly erodible areas**: Identifying the extent and location of the most highly erodible areas at greatest risk of shallow landslide initiation, with the intention of transitioning these areas from a production forest to forest cover (exotic and/or indigenous forest) will mitigate landslide occurrence and the mobilisation of debris (discussed in detail below from [76]).

Recommendation 7: Ensure adopted silviculture regimes, including establishment practices do not increase debris mobilisation risk.

Review silviculture regimes to determine whether current practices increase risk of slope failure and debris mobilisation and develop techniques to reduce this risk.

Government guidance and support

Provision of a debris/slash management guide

65. Woody debris management is a complex issue. It requires a large degree of planning and foresight; the implementation of several different measures at a variety of stages; and effective evaluation and monitoring of those measures to make sure they are working as intended. Therefore, it is imperative that good guidance is provided to forestry companies so they can conduct their operations in the best way possible. Such guidance would also achieve consistency of practice and supplement each forestry company's SOP.

66. Aratu considers that Te Uru Rākau – New Zealand Forest Service is well placed to provide a debris/slash management guide that sets out what good practice looks like.

Support local authorities to have the resources and expertise to carry out effective monitoring

67. For standards and regulations to be effective, it is vital that they are monitored. Monitoring is the only way to ensure that compliance is occurring, and to determine whether enforcement action is necessary. In essence, you must inspect what you expect.

68. Therefore, local authorities must have both the resources and expertise needed to carry out effective monitoring. Currently, the GDC attends Aratu's forestry estate to monitor compliance with resource consent conditions. During 2021 and 2022 these visits averaged three per year. Aratu always finds these visits extremely helpful in ensuring that it is meeting the standards required. Since Aratu took over the forestry estate in 2019, the GDC has not issued any abatement notices or enforcement orders against Aratu.

69. Ideally, Aratu considers that the GDC should attend forestry estates no less frequently than quarterly to check for compliance. However, Aratu is aware that there are currently only two

personnel within the GDC who are responsible for monitoring compliance. This is not enough personnel to cover the Tairāwhiti region. Aratu considers that local authorities, such as the GDC, would be assisted by Te Uru Rākau – New Zealand Forest Service providing:

(a) additional resourcing, so more compliance officers can be employed; and

(b) education and training for compliance officers to ensure they have all the skills needed to provide effective monitoring.

Recommendation 8: Support from Te Uru Rākau – New Zealand Forest Service.

Te Uru Rākau to develop a slash management guide, and provide support to local authorities to ensure they have the resources and expertise needed to carry out effective compliance monitoring.

Support for indigenous afforestation

70. *Indigenous afforestation requires a significant up-front investment due to indigenous trees'* longer growth period and increased management needs. Reflecting this reality, the current ETS settings similarly incentivise the planting of exotic forests over indigenous forests. Consequently, to achieve successful indigenous afforestation further government support will likely be required.

71. Aratu considers that there are three potential avenues that could be explored further:

(a) amending the ETS to better account for the carbon that is contained within indigenous forests;

(b) providing capital to support native tree nurseries in local communities, and initiatives establishing indigenous riparian zones (such as eLandNZ); and

(c) developing a biodiversity incentive scheme, including biodiversity credits. Biodiversity legislation has already been introduced in the United Kingdom[36] and Australia is working on something similar.[37] In particular, the biodiversity scheme should strongly incentivise planting indigenous species on pre-1990 land, as currently the ETS settings prevent forests on pre-1990 land from qualifying for New Zealand Units.

72. In tandem with this approach, the ETS should be amended to relax carbon liabilities on pre-1990 forest land, where replanting indigenous tree species will meet the ETS thresholds for growth after a site is harvested.

Recommendation 9: Government support for indigenous afforestation.

Promote indigenous afforestation via amendments to the ETS and the development of a biodiversity incentive scheme.

[36] Environment Act 2021 (UK) and https://www.pm.gov.au/media/biodiversity-certificates-increase-native-habitat-and-support-australian-landholders.

[37] Prime Minister, Minister for the Environment and Water *Biodiversity Certificates to Increase Native Habitat and Support Australian Landholders*, 26 August 2022.

Compensation in the event that regulations impose significant constraints

73. In the event that regulations are made imposing significant constraints on future land use, such as forced land retirement or restrictive catchment constraints, fair compensation reflecting the loss of current land use, including asset value, would be appropriate and fair.

74. In particular, where the regulations lead to a significant amount of a forestry estate being unable to be utilised over a period of time, the impact on forest owners could be significant and lead to viability issues. A lack of support could leave forestry companies, particularly smaller ones, struggling to continue operating, and is likely to swiftly have a negative impact on employment in the region.

75. Where the rules change and materially affect asset values without compensation this has the potential to reflect negatively on New Zealand as a destination for foreign investment. The precedent will likely impact a broader range of sectors that seek foreign investment than just forestry.

Recommendation 10: Government support for loss of land use.

If future regulations will result in a material loss of current land use, provide fair compensation to address this loss of asset value, and to assist forestry companies to cope with inability to utilise land.

Rehabilitation of land and managed retirement

76. Forestry management practices and slash management practices can largely address the issue of slope stabilisation and debris mobilisation. However, there are some types of geologies where the inherent land weakness makes it very difficult, and in some cases impossible, for vegetation and forestry to prevent slopes from falling, for example, steep incised gullies.

77. Therefore, it will be necessary to develop processes and timeframes that allow for the risk assessment of land, and the rehabilitation or retirement of high-risk land. In particular, for areas designated high-risk it will be necessary to develop a strategic retreat plan, which may include the planting of longer lived or indigenous production species, or, in severe cases, land being taken out of production and retired.

78. Developing a strategic retreat plan takes time, as a number of steps need to be worked through, including:

(a) Mapping the terrain of the forestry estate via a terrain attribute extraction process. Such a process considers slope, elevation, aspect, geology, a range of terrain metrics, and some climate data.

(b) Using the above data to create:

(i) a model of the landslide susceptibility risk across the forestry estate using appropriate modelling techniques, such as the Melton ratio; and

(ii) land use capability maps, which will then be used by a geoscientist to develop operational-scale erosion susceptibility ("**ESC**") maps. ESC maps provide a highly detailed and accurate depiction of the high and very high erosion susceptibility parts of the forestry estate. Although Te Uru Rākau – New Zealand Forest Service currently has ESC maps, they are not

sufficiently specific to enable the detailed assessment required to manage landslide risks in these difficult areas.

(c) Using the above modelling and maps to develop a land use optimisation matrix or tool to inform future land management decisions and techniques to reduce risk.

79. Aratu started this process in August 2021, and it is still ongoing, partially due to the disruption caused by the 2023 storms. Therefore, any recommendations relating to rehabilitation and retirement of land would need to take into account the need to conduct such processes, and the fact that they require a significant amount of time.

80. Additionally, any retirement of high-risk areas should ideally only occur once these areas had been harvested a last time. This reflects the fact that "leaving larger areas of plantation on high or extremely risky sites is unlikely the best long-term risk management alternative to harvesting from an economic, environmental and social perspective".[38] However, there may be site specific areas that are best left unharvested, such as streamside management areas with steeply incised gullies, where the stand provides stability, and the ability to both trap mobilised sediment and woody debris. Further, harvesting should not occur on high-risk areas where this would create a health and safety risk to workers.

Recommendation 11: Actively encourage transition of high-risk land.

Develop processes and timeframes that allow for the risk assessment of land, including the managed retirement of high-risk production forestry land and its conversion to other vegetative cover and provide mechanisms to incentivise this transition.

[38] Brett Gilmore Consulting *Queen Charlotte Forest's Oyster Bay Catchment Harvest Plan*, July 2022 at 27.

APPENDIX 1

Tairāwhiti's geology, topography, climate, and indigenous forest clearance

Geology

1. Land use in Tairāwhiti is a complex issue, due to the land in the East Coast region being "severely erodible".[39] Whereas only 8% of land in New Zealand is "susceptible to severe erosion", 26% of the land in the Tairāwhiti district meets this criteria.[40] Of all New Zealand regions, Tairāwhiti has "the highest proportion of its area classified as highly erodible land at risk of erosion" – 1,377km² (137,700 hectares) – comprising 16% of its area.[41] As a consequence, Tairāwhiti also has "the greatest area in New Zealand with severe earthflow risk (235km²) and gully risk (162km²)".[42] Due to forestry's use as an erosion control mechanism, the proportion of forest estates in these susceptible classes is significantly higher than the region's average.

2. The Parliamentary Commissioner for the Environment has noted that the East Coast's geology has a "predispos[ition] towards rapid or accelerated erosion" given the two main rock types – mudstones and argillites – are "inherently unstable".[43] This instability is further concentrated in the southern and eastern areas, which are dominated by younger rocks of Tertiary age (soft mudstones, sandy mudstones, sandstones and limestones).[44] In contrast to the northern and western areas, which are dominated by older rocks of the Cretaceous age (fractured argillites, greywackes and basalt).[45] This difference will be important when considering measures that can be introduced to improve land use outcomes.

Topography

3. In addition to soils that are prone to erosion, the land in Tairāwhiti is also characterised by "moderately steep to very steep, dissected terrain".[46] Steeper slopes are more prone to landslides. For example, a study conducted after the 2018 storms in Te Marunga Forest, which has a majority of slopes between 25º to 35º (for context, slope groups are 0-6º, 6-16º, 16-20º, 20-25º, 25-35º and 35+º), found that 75.5% of the landslides occurred on slopes greater than 35º, with a further 16% of landslides occurring on slopes between 25-35º.[47] In comparison, only 2% of landslides occurred on slopes between 0-6º.[48]

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39 Chris Phillips and Michael Marden "Reforestation Schemes to Manage Regional Landslide Risk" in Thomas Glade (ed) *Landslide Hazard and Risk* (John Wiley & Sons Ltd, West Sussex, 2005) 517 at 524 ["**Landslide Hazard and Risk**"].

40 MPI Erosion Control Funding Programme (ECFP) for the Gisborne district, 19 September 2021 https://www.mpi.govt.nz/forestry/funding-tree-planting-research/closed-funding-programmes/erosion-control-funding-programme/.

41 Stats NZ Tatauranga Aotearoa *Highly erodible land*, 18 April 2019 https://www.stats.govt.nz/indicators/highly-erodible-land.

42 Stats NZ Tatauranga Aotearoa *Highly erodible land*, 18 April 2019 https://www.stats.govt.nz/indicators/highly-erodible-land.

43 Parliamentary Commissioner for the Environment *Sustainable Land Management and the East Coast Forestry Project* (Office of the Parliamentary Commissioner for the Environment, Wellington,1994) at 6.

44 Landslide Hazard and Risk at 524.

45 Landslide Hazard and Risk at 524.

46 Parliamentary Commissioner for the Environment *Sustainable Land Management and the East Coast Forestry Project* (Office of the Parliamentary Commissioner for the Environment, Wellington,1994) at 6.

47 Dr Mike Marden *Preliminary findings on factors contributing to sediment/slash generation and transport during storm events on 3-4 and 11-12 June 2018, part Te Marunga Forest, Mangatokerau Catchment,* July 2018 at 11 ["**2018 Marden Report**"].

48 2018 Marden Report at 11.

Climate

4. As well as having a difficult landscape, the Tairāwhiti area is "susceptible to severe storm events and occasionally to cyclones, which contribute to the incidence of erosion".[49] There has been a "high frequency in events" in the region with storms in "1975, 1980, 1982, 1988 [Cyclone Bola], 2002, 2005, 2011, 2015, three storms in 2017, two in 2018.[50] This year has seen two further cyclones, Hale (January 10th) and Gabrielle (February 14th). It has been predicted that the climate for the East Coast will include "more frequent extratropical cyclones with associated higher intensity rainfall".[51]

5. Given Tairāwhiti's unstable geography and topography, "heavy or prolonged rainfall" acts as a "triggering event" to mass movement or landslides.[52] Essentially, exceptional rainfall permeates through the erosion-prone coverbed materials, adding to the water beneath the land surface (known as subsurface water), and causing an increase in pressure within the coverbed materials (known as pore water pressure).[53] Eventually, the pressure will increase to a point where the materials liquefy and fail; compounded by the fact that soils on slopes over 26º become unstable as they approach saturation.[54]

6. It is hard to identify a set threshold of rainfall that will trigger a landslide, but it has been noted that, generally, an excess of 200mm over a few days leads to "significant regional landsliding events in New Zealand soft-rock hill country".[55] Once triggered, landslides and debris flows begin as small streams of water heavily laden with soil and woody debris, with a transporting power disproportionate to their size.[56] These debris flows occur on both pastural and forested land to varying extents. Debris flows from commercial pine plantations entrain many sources of woody residues, including younger trees in their entirety (as occurs with younger tracts of indigenous forest), harvesting residue (slash), and older trees that have blown over for reasons not associated with harvesting.

Indigenous forest clearance

7. The above environmental factors which predispose a region to erosion and landslides can be mitigated by the presence of vegetation, especially forest.[57] However, the Tairāwhiti region has a lack of vegetation, reflecting the fact that between the 1880s and 1920s European settlers cleared all the existing forest for pastoral production. During that period, there was no land clearance policy in place stating what could be cleared and where. Consequently, the settlers cleared as much of the forest as they could, often with government support, without realising that severe consequences would follow. Despite warnings by geologists at the time, clearance continued well into the 1920s by which point there was very little forest left standing.

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49 Landslide Hazard and Risk at 526.

50 2018 Marden Report at 4.

51 2018 Marden Report at 4.

52 Landslide Hazard and Risk at 522.

53 2018 Marden Report at 16.

54 2018 Marden Report at 16.

55 Landslide Hazard and Risk at 522.

56 2018 Marden Report at 22; and Michael Marden, Donna Rowan, and Alex Watson "Effect of changes in forest water balance and inferred root reinforcement on landslide occurrence and sediment generation following Pinus radiata harvest on Tertiary terrain, eastern North Island, New Zealand" (2023) New Zealand Journal of Forestry Science 53:4 https://doi.org/10.33494/nzjfs532023x216x at 13.

57 Landslide Hazard and Risk at 517 – 519.

Relevance for Inquiry

8. The environmental factors set out above demonstrate that land users in Tairāwhiti face a unique set of challenges. Any recommendations made by the Inquiry will need to take into account these specific regional challenges to ensure successful outcomes across all land uses.

APPENDIX 2

Historical response to land use issues

1940s-1988

1. In the early 1940s, the impact of soil erosion and sediment deposition on East Coast pastoral lands and rivers became evident.[58] Consequently, the Government began introducing a variety of measures in an attempt to address these issues:

   (a) In 1941, the Soil Conservation and Rivers Control Act was passed, and catchment boards were instituted to "manage and prevent soil erosion".[59]

   (b) In 1944, the Poverty Bay Catchment Board was formed and by 1948 it had established a large-scale reforestation trial. The trial proved successful in slowing eroding gullies, but unsuccessful in stabilising riverbeds and gullies by check-dams as they became filled with sediment. The partial success of these early trials led to the Soil Conservation and Rivers Control Council (set up in 1955) "urg[ing] the New Zealand Government to purchase eroding farmland to establish dual-purpose exotic forests, for protection against erosion and for production of timber".[60]

   (c) In 1959, Cabinet approved an "erosion control scheme". The New Zealand Forest Service ("**NZFS**") was "to acquire and reforest 7000 ha of the most severely eroding country in the upper Waipaoa River catchment", with an estimated cost of NZ£1,240,000. Planting began in 1960 and resulted in the Mangatu Forest.[61]

   (d) In 1963, the Government established a Committee of Inquiry to "inquire into the conservation problems of Poverty Bay-East Cape (an area covering some 600,000 hectares) and to make recommendations on a comprehensive control programme".[62] The resulting report (known as the Taylor Report) acknowledged that "the immense erosion problems were beyond the resources of the farming community and required substantial taxpayer help",[63] with the Committee stating:[64]

> Where such erosion has developed on a grand scale the cost of erosion control would far exceed the value of pastoral production from the land concerned. There is, therefore, no known way of economically controlling erosion of this kind other than by the complete afforestation of the catchment concerned.

   (e) In 1968, in response to the Taylor Report, the Government introduced the 'Blue Line' approach, which instituted two measures:[65]

      (i) The "East Coast Project", for land at severe risk of erosion. The programme required the NZFS to "progressively plant the unforested parts

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58 Landslide Hazard and Risk at 528.

59 Landslide Hazard and Risk at 528.

60 Landslide Hazard and Risk at 528.

61 Landslide Hazard and Risk at 529.

62 Technical Committee of Inquiry into the Problems of the Poverty Bay-East Cape District of New Zealand *Wise Land Use and Community Development* (1970, Wellington, Ministry of Works and Development) at 1 ["**The Taylor Report**"].

63 Landslide Hazard and Risk at 529.

64 The Taylor Report at 5.

65 Landslide Hazard and Risk at 529.

of the [land at severe risk of erosion] with dual-purpose protection/production forests". This planting continued until 1987 when the NZFS was corporatised.

(ii) A government subsidy for on-farm soil conservation works, for land at less severe risk of erosion.

(f) In 1978, following dissatisfaction with the generality of the 'Blue Line' approach, the Poverty Bay Catchment Board (at this point the East Cape Catchment Board) proposed four new categories in the 'Red Report'. However, the NZFS continued to plant in conformity with the Blue Line approach.[66]

(g) In 1987, the corporatising of the NZFS (to become the Forestry Corporation) led to the East Coast Project ending. Despite the fact that the Minister of Works and Development noted the need for the Corporation to be subsidized to continue carrying out this work, interim funding was only provided until 1987. From 1968 to 1987, 36,100 hectares had been acquired and planted by the NZFS, with an additional 1809 hectares established through forest encouragement grants. The total costs were estimated at $229 million.[67] The East Coast Project Review acknowledged that the afforestation targets had not been met, but concluded that, contrary to the Taylor Report, erosion was no longer a critical problem. This optimistic assertion was proven to be false following Cyclone Bola.

1988 (Cyclone Bola) to 2018

2. In spite of the Government's extensive afforestation efforts, Cyclone Bola (6-9 March 1988) – during which 900mm of rain fell in 72 hours – caused "widespread severe landsliding, erosion, flooding and siltation".[68] Pastoral land suffered badly, with some slopes losing 70% or more of their grass cover.[69] However, landslides were less frequent on "hillslopes protected by mature indigenous forest and older pine forest".[70]

3. Studies arising out of Cyclone Bola concluded there was "little difference in the protective value between different forest types, for example indigenous forest or exotic plantation forests", however, "forest age ha[d] a significant effect on the number of landslides".[71] For example:

(a) "forest stands older than 8 years sustained ten times less damage than did stands younger than six years old"; and[72]

(b) "fully stocked stands of mānuka and kānuka provided a greater level of protection against the initiation of landslides than did 6–8-year-old stands of exotic forest but were less effective than exotic forest >8 years old".[73]

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66 Landslide Hazard and Risk at 530.

67 Landslide Hazard and Risk at 530.

68 Landslide Hazard and Risk at 531.

69 Landslide Hazard and Risk at 531.

70 Landslide Hazard and Risk at 531.

71 Landslide Hazard and Risk at 523.

72 Landslide Hazard and Risk at 532.

73 Michael Marden, Donna Rowan, and Alex Watson "Effect of changes in forest water balance and inferred root reinforcement on landslide occurrence and sediment generation following Pinus radiata harvest on Tertiary terrain, eastern North Island, New Zealand" (2023) New Zealand Journal of Forestry Science 53:4 https://doi.org/10.33494/nzjfs532023x216x at 14.

4. Following Cyclone Bola, the East Coast Conservation Forestry Scheme was set up with the Government contributing $8 million, and the East Cape Catchment Board providing the remaining one-third.[74] The fund was aimed at establishing 3000 hectares of protection forest per year for five years, with covenants precluding logging for at least 25 years after planting and then only with the permission of the local catchment authority.[75] The Government's investment in such a scheme reflected:[76]

   (a) The extent and severity of the erosion being much greater than in any other New Zealand region and its "substantial negative impact on the region's social and economic development".

   (b) The need for swift erosion control to reduce future costs of erosion and flood damage both to the region and to the Government.

   (c) The fact that there was insufficient money and resources within the region to institute a comprehensive erosion control scheme.

5. In 1992, the East Coast Forestry Project ("**ECPF**") was announced. The ECFP, administered under the Forestry (East Cost) Grant Regulations, aimed to improve erosion across the whole region (rather than just targeting specific catchments); with planting beginning in 1993.[77] In 2000, new regulations were introduced, which stated the aim of planting "200,000 ha over 28 years (1992-2020)" with "a planting rate of 70,000 ha per year and a maximum annual budget of $6.5 million".[78] In 2014, the ECPF was renamed the Erosion Control Funding Programme ("**ECPF 2**"),[79] and the funding continued until 2018 when the ECPF 2 land treatment grants were discontinued, though funding for community projects addressing erosion continue.[80]

2018 storms

6. In June 2018, severe storms once again hit Tairāwhiti, resulting in landslides and debris flows. The Council's rainfall data suggests that the rainfall in the area of Aratu's Te Marunga Forest during 3–4 June 2018, was a more than a 1-in-100-year event with downpours as heavy as 55mm per hour for three to four hours resulting in 155mm to 210mm of rainfall just during that period. During the period 3–9 June 2018, the maximum rainfall recorded was 362.5mm at Pakarae Station, south of Te Marunga Forest. The average rainfall across 44 rain stations was 143.3mm. For the week of 11 June 2018, rainfalls averaging 114mm fell over three days. A maximum rainfall of 257mm was recorded in one location.

7. These storms hit just shortly after a number of forest stands had been harvested (reflecting the fact that they had predominantly been planted after Cyclone Bola and were at an age where they were due to be harvested).[81] The resulting lack of vegetation, therefore, contributed to the level of landsliding and debris.[82]

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74 Landslide Hazard and Risk at 532.

75 Landslide Hazard and Risk at 532.

76 Landslide Hazard and Risk at 532.

77 Landslide Hazard and Risk at 532.

78 Landslide Hazard and Risk at 532.

79 Beehive *Changes to East Coast erosion grant scheme*, 31 July 2014 https://www.beehive.govt.nz/release/changes-east-coast-erosion-grant-scheme.

80 MPI *Erosion Control Funding Programme (ECFP) for the Gisborne district*, 19 September 2021 https://www.mpi.govt.nz/forestry/funding-tree-planting-research/closed-funding-programmes/erosion-control-funding-programme/.

81 2018 Marden Report at 2 and 6.

82 2018 Marden Report at 24.

Expert Report on land use issues in Tairāwhiti and forestry management practices in response

Brett Gilmore[1], Mike Marden,[2] and Rien Visser[3]

Effectiveness of afforestation in reducing erosion

1. The understanding of how vegetation contributes to slope stability and erosion control is well advanced. A closed canopy forest cover contributes to an increase in slope stability and a significant reduction in erosion by reducing the ability of rainfall to cause slope failure through the processes of interception and evapotranspiration, while the roots provide mechanical reinforcement and are how trees extract moisture from the soil to reduce pore water pressures. These processes become most effective after branches of individual trees touch (canopy closure) and lateral roots of adjacent trees overlap (full-root occupancy). The rate at which canopy closure and root occupancy occur is largely determined by plant spacing, growth rate and silviculture (tree tending) regimes.

Shallow landslides

2. Trees help reduce the frequency of shallow landslides. Soils under a closed canopy forest are less prone to rainfall-induced landslides than similar soils under pasture, or if the canopy is more open, such as in young stands of pines and scattered, regenerating scrub.

   (a) During Cyclone Bola, areas under closed canopy indigenous forest and exotic plantations older than 8-years were:[4]

      (i) 16 times less susceptible to landsliding than pasture and exotic pines less than 6-years old; and

      (ii) four times less susceptible than closed canopy regenerating scrub (age unknown) and exotic pines 6-8-years old.

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[1] Brett Gilmore is a Director of Brett Gilmore Consulting, a consultancy business working with government, sector, research, and forest companies. His expertise is in forest infrastructure, resource management, environmental compliance, environmental improvement, and risk assessments. Brett is an FSC and ISO9000 Lead Auditor. Brett's previous work with Aratu was auditing against the PEFC environmental standard in 2021 and 2022.

[2] Dr Mike Marden is a retired scientist with extensive knowledge of the extent and scale that geological influences and geomorphological processes, over geological time scales, have had on landscape development within the East Coast Region (Tairāwhiti) of New Zealand. He has researched the landscape's response to storm events, reforestation/deforestation cycles, and evaluated the effectiveness of erosion mitigation strategies required to underpin land use change and sustainability. Mike has international experience as a consultant to the Food and Agricultural Organisation (FAO) and has worked extensively with NZ government agencies, Councils and forest companies.

[3] Rien Visser is a Professor at the University of Canterbury, and is responsible for Forest Engineering at the School of Forestry. In addition to teaching, he has completed many harvesting and infrastructure related research projects over time. He also teaches outreach courses on aspects such as Forest Roads and Stream Crossing, Cable Logging Planning, and Harvest Residues. After the Queen's Birthday storm event, the Gisborne District Council used Rien's services to support their evaluation of forest practices in the region, and subsequently used him as an expert witness to support legal proceedings under the RMA.

[4] Marden, M, & Rowan, D. (1993): Protective value of vegetation on Tertiary terrain before and during Cyclone Bola, East Coast, North Island, New Zealand. New Zealand Journal of Forestry Science, 23(3), 255-263.

(b) In an East Coast study of landslide damage to fully stocked stands of reverting kānuka and manūka scrub of known age, damage to 10-year-old stands was estimated to be 65% less than that sustained by pasture and 90% less in 20-year-old stands.[5]

(c) Following the Manawatu storm,[6] landsliding under forest was 90% less than that under pasture and 80% less than that under scrub.[7]

An example of the effectiveness of a closed canopy of exotic forest in protecting slopes against storm-initiated landslides. An estimated 80% of the pastured slope was impacted by landslides.

3. Comparisons of storm-initiated landslide densities for different vegetation types shows that there is little difference in the protective value between closed-canopy evergreen forest species, but that forest age has a significant effect on the intensity of landslides initiated.

4. However, there are differences between trees species and their ability to bind the soil, due to root-system dimensions and the degree of root-soil reinforcement. For example, research has shown differences in the root systems of kānuka and *P. radiata.* The roots of individual kānuka are smaller than those of *P. radiata* at all stages of growth, however, the difference in total root mass is compensated for by the higher natural stand densities of the kānuka. Furthermore, the annual rate of root production in stands of regenerating kānuka exceed that of *P. radiata* for the first nine years of growth.[8] Research shows that a dense

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5 Bergin, D. O; Kimberley, M.O.; Marden, M. (1995). How soon does regenerating scrub control erosion? New Zealand Forestry, August 1993.

6 Marden, M. (2004). Future-proofing erosion-prone hill country against soil degradation and loss during large storm events: have past lessons been heeded? New Zealand Journal of Forestry, 49, 11-16.

7 Dymond JR, Ausseil AG, Shepherd JD, Buettner L (2006). Validation of a region-wide model of landslide susceptibility in the Manawatu-Wanganui region of New Zealand. Geomorphology 74, 70–9.

8 Watson, A., Marden, M., & Rowan, D. (1994). Tree species performance and slope stability. In D.H. Barker (Ed.), Proceedings of Institute of Civil Engineers Conference, "Vegetation and Slopes – Stabilisation, Protection and Ecology". 29-30 September 1994, University Museum, Oxford, United Kingdom (pp. 161-171). https://doi.org/10.1680/vasspae.20313.0018

stand of regenerating kānuka was less likely to fail than similar slopes in *P. radiata*, at least for the first nine years after establishment. Thereafter, older aged stands of both species afforded a high and comparable level of slope resistance against landslide initiation.[9]

Earthflows

5. Similarly, trees can reduce the rate of earthflow displacement primarily through reduced soil water content. In general terms, the denser the planting, the greater the probability of successfully stabilising earthflows. Depending on planting density and growth rate, canopy closure within pine plantations occurs within eight years. By then, the soil water content of forested earthflows is drier for longer periods than for unforested earthflows and, consequently, the rate of displacement slows appreciably.[10]

Active earth flow complex before (left) and after (right) reforestation. Rates of downslope earth flow movement declined by an order of magnitude within the period of a rotation of pines around 27 years.[11]

Gully erosion

6. The reforestation of gullies is the most practical and effective means of stabilising all but the largest of gullies. At both regional and catchment scale, the magnitude in the reduction in gully-derived sediment yield following the afforestation of gullies, relative to the yield had no afforestation been undertaken, has been substantial.[12]

7. Gully erosion is prevalent in many Tairāwhiti catchments with most gullies formed after the clearfelling of the original indigenous forest. Although gully erosion (a fluvially-driven process), as of 2017, affects just around 0.6% of the region's hill country area, gullies collectively generate the highest proportion of the sediment load,[13] and of the annual

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[9] Ekanayake, J.C., Marden, M., Watson, A.J., & Rowan, D. (1997). Tree roots and slope stability: a comparison between P. radiata and kānuka. New Zealand Journal of Forestry Science, 27(2), 216-233. https://www.scionresearch.com/__data/assets/pdf_file/0009/59508/NZJFS2721997

[10] Pearce, A.J., O'Loughlin, C.L., Jackson, R.J., & Zhang, X.B. (1987). Reforestation: on-site effects on hydrology and erosion, eastern Raukumara Range, New Zealand. Forest Hydrology and Watershed Management (pp. 489-497). [Publication 167]. International Association Hydrological Sciences, Proceedings of the Vancouver Symposium.

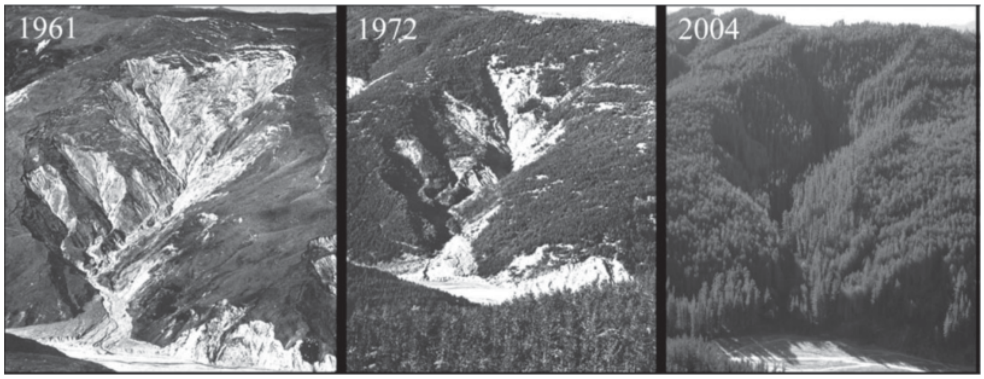
[11] Photo from Marden, M. (2004). Future-proofing erosion-prone hill country against soil degradation and loss during large storm events: have past lessons been heeded? New Zealand Journal of Forestry, 49, 11-16.

[12] Herzig, A., Dymond, J.R., & Marden, M. (2011). A gully-complex model for assessing gully stabilisation strategies. Geomorphology, 133, 23-33. https://doi.org/10.1016/j.geomorph.2011.06.012

[13] Marden, M., Betts, H., Arnold, G., & Hambling, R. (2008). Gully erosion and sediment load: Waipaoa, Waiapu and Uawa rivers, eastern North Island, New Zealand. In J. Schmidt, T. Cochrane, C. Phillips, S. Elliott, T. Davies, L. Basher (Eds.), Sediment dynamics in changing environments (pp. 339-350). [Publication 325.] Wallingford, Oxfordshire, UK: International Association of Hydrological Sciences; and Herzig, A., Dymond, J.R., & Marden, M. (2011). A gully-complex model for assessing gully stabilisation strategies. Geomorphology, 133, 23-33. https://doi.org/10.1016/j.geomorph.2011.06.012.

sediment yield discharged to the marine environment from each of the major catchments in this region.[14]

8. Research on the effectiveness of exotic forest in stabilising gullies shows that the time required to 'shut down' a gully is strongly associated with the gully's size at the time of planting. Both Tertiary and Cretaceous terrain gullies of equivalent size take a similar time to stabilise.[15] Also, linear gullies are likely to stabilise earlier than their larger amphitheatre-shaped counterparts.



Severely degraded gully stabilised by planting exotic pines.[16]

9. Unfortunately, although attempts at gully remediation since the early 1960s have resulted in a 45% reduction in gully numbers, by 2017 the current area of hill country affected by gullying was only 5% less than 60 years ago. During this period, gully initiation and development have outstripped mandated erosion control targets set by the East Coast Forestry Project (**ECFP**), for land designated as LO3A, and for the 'Restoration of the Waiapu Catchment' by 2020-2022.[17]

10. While acknowledging the role of exotic forests in effectively stabilising gullies 1-10 hectares in size, for gullies identified in the National Environmental Standard for Plantation Forestry (**NES-PF**) as high erosion risk (orange zone) or where the erosion risk is very high (red zone), experts have recommended:[18]

    (a) a revision of remediation strategies for the larger and more actively eroding of gullies destined for future afforestation; and

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[14] Hicks, D.M., Shankar, U. (2003). Sediment from New Zealand rivers. NIWA Chart, Miscellaneous Series no. 79. National Institute of Water and atmospheric Research, Wellington, New Zealand.

[15] Marden, M., Arnold, G., Gomez, B., & Rowan, D. (2005). Pre- and post-reforestation gully development in Mangatu Forest, East Coast, North Island, New Zealand. River Research and Applications, 21, 1-15. https://doi.org/10.1002/rra.882; and Marden, M., Arnold, G., Seymour, A., & Hambling, R. (2012). History and distribution of steepland gullies in response to land use change, East Coast Region, North Island, New Zealand. Geomorphology, 153-154, 81-90. https://doi.org/10.1016/j.geomorph.2012.02.011.

[16] Marden, M., Arnold, G., Gomez, B., & Rowan, D. (2005). Pre- and post-reforestation gully development in Mangatu Forest, East Coast, North Island, New Zealand. River Research and Applications, 21, 1-15. https://doi.org/10.1002/rra.882.

[17] Marden, M., & Seymour, A. (2022). Effectiveness of vegetation mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60-years, East coast region, North Island, New Zealand. New Zealand Journal of Forestry Science 52:19. https://doi.org/10.33494/nzjfs522022x226x.

[18] Marden, M., & Seymour, A. (2022). Effectiveness of vegetation mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60-years, East coast region, North Island, New Zealand. New Zealand Journal of Forestry Science 52:19. https://doi.org/10.33494/nzjfs522022x226x.

(b) for gullies within exotic production forests, the replanting of species (exotic or indigenous) better suited to providing long-term stabilisation, post-harvest.

11. In the long term, if all 1800 gullies that currently remain untreated – but are treatable – were to be afforested in a timely manner, the expected reduction in sediment generation would result in a decline in the rate of bed load aggradation of the major river systems,[19] with potential off-site benefits including:

(a) a reduction in the cost of bridge replacement and road repairs;

(b) almost eliminating expensive channel excavation, realignment and/or stopbank construction; and

(c) a likely reduction in the incidence of flooding of low-lying, high-value farmland.

Actively eroding gully located within a P. radiata production forest. Forest removal before significant groundcover vegetation has established within the most active part of the gully will probably result in the remobilisation of sediment and woody debris by storms following future harvests.[20]

Relevance to Tairāwhiti

12. The Tairāwhiti region has a severe problem with highly erodible soil. The continued loss of soil from significant areas of the Tairāwhiti region resulted in the most affected intensive pastoral farming areas changing land use to plantation forestry. Plantation forests were initially established to control erosion in areas where conservation efforts on pastoral land since the 1940s had proved ineffective. During the past 60 years, a significant number of

[19] Peacock, D.H., Marden, M. (2019). Mean bed level trends in the upper Waipaoa river channel and Te Weraroa stream in response to land use change: 1948 to 2019. Prepared for Gisborne District Council.

[20] Marden, M., & Seymour, A. (2022). Effectiveness of vegetation mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60-years, East coast region, North Island, New Zealand. New Zealand Journal of Forestry Science 52:19. https://doi.org/10.33494/nzjfs522022x226x.

extreme storm events have resulted in continued mass erosion and significant soil loss from areas of pastoral hill country.

13. Afforestation was often seen as the most-efficient, environmentally sustainable, cost-effective, and preferred treatment option for areas where, if they remained untreated, there was a high risk of erosion worsening. In attempting to combat the erosion problem some 155,000 hectares of exotic forest has been planted.

14. With climate change predictions for the East Coast region of the North Island suggesting that extreme storm events will become more common, it is inevitable that there will be a need for additional areas of landslide-scarred pastoral hill country within the Tertiary terrain to be afforested. However, afforestation, including plantation forestry, can create other issues, and management of these is discussed further below.

Benefits of afforestation

15. Often understated are the net environmental benefits of exotic plantation forests during their growing cycle and their role in ameliorating erosion during large storm events. For example, once pine trees reach canopy closure, at around eight years old, they become effective at:

(a) retaining soil on the hills where it can continue to be used for productive purposes;[21]

(b) reducing the occurrence/density of shallow landsliding;[22]

(c) reducing rates of earthflow displacement;[23] and

(d) reducing the volume of sediment generated from gullies if less than 10 hectares in size.[24]

16. The reduction of sediment supply to stream channels results in:

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[21] Marden, M; Phillips, C; Rowan, D (1991). Declining soil loss with increasing age of plantation forest in the Uawa catchment, East Coast Region, North Island, New Zealand. Proceedings of the International conference on sustainable land management, Napier, New Zealand, 358-361; and Marden, M. (2004). Future-proofing erosion-prone hill country against soil degradation during large storm events: have past lessons been heeded?' (Professional paper). New Zealand Journal of Forestry, 49 (3), 11-16.

[22] Phillips, C; Marden, M; Pearce, A. (1990). Effectiveness of reforestation in prevention and control of landsliding during large cyclonic storms. Proceedings of 19th International union of forestry research organisations (IUFRO), Montreal, 341-350; and Marden, M, & Rowan, D. (1993): Protective value of vegetation on Tertiary terrain before and during Cyclone Bola, East Coast, North Island, New Zealand. New Zealand Journal of Forestry Science, 23(3), 255-263.

[23] Zhang, X; Phillips, CJ; Marden, M. (1993). A comparison of earthflow movement rates on forested and grassed slopes, Raukumara Peninsula, North Island, New Zealand. Geomorphology, 6, 175-187; and Marden, M., Phillips, CJ., Rowan, D (2008) Recurrent displacement of a forested earthflow and implications for forest management, East Coast Region, New Zealand. Sediment Dynamics in Changing Environments (Proceedings of a symposium held in Christchurch, New Zealand, December 2008). IAHS Publ. 325, 2008. 491.

[24] Marden, M.; Arnold, G.; Gomez, B.; Rowan, D. (2005). Pre-and post-reforestation gully development in Mangatu Forest, East Coast, North Island, New Zealand. River Research and Application Special Issue 21, 757-771; Marden M. (2012). Effectiveness of reforestation in erosion mitigation and implications for future sediment yields, East Coast catchments, New Zealand: A review. New Zealand Geographer, 68(1): 24 35. <Go to ISI>://WOS:000302226000003; Herzig A, Dymond J, Marden M. (2011). A gully-complex model for assessing gully stabilisation strategies. Geomorphology. http://doi:10.1016/j.geomorph.2011.06.012; and Marden, M., & Seymour, A. (2022). Effectiveness of vegetation mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60-years, East coast region, North Island, New Zealand. New Zealand Journal of Forestry Science 52:19. https://doi.org/10.33494/nzjfs522022x226x.

(a) improvements in water quality and in-stream habitat equivalent to that of streams draining indigenous forest;[25]

(b) previously aggrading stream channels starting to incise,[26] thereby alleviating the risk of future flooding and sediment deposition on floodplains;

(c) reduced rate of sediment yield delivered to larger rivers and then to the coastal ecosystem;[27] and

(d) reduced need for expensive channel excavation, realignment and/or the construction of stop banks.

Sustainability of production forestry in fragile "high risk", erosion-prone landscapes

17. Tertiary sediments on steep slopes are very prone to landslides and debris flows. When saturated, the thin mantle of ash slips off the underlying impermeable bedrock. This is especially after ongoing heavy rain and post-harvesting. Research has shown a 'window of vulnerability' post-harvest that extends until the new crop develops a closed canopy and sufficient root mass to prevent landsliding.

18. These geomorphological processes are the same as those that have shaped the landscapes within Tairāwhiti since before human occupation.[28] However, rainfall intensities/totals during ex-tropical Cyclones Debbie and Cook (April 2017), ex-Cyclone Hale (January 2023) and Cyclone Gabrielle (February 2023) have exacerbated on-site landslide damage to both pasture, exotic, and indigenous forest, including delivering large quantities of woody debris and sediment to river channels and to downstream-receiving environments, such as beaches or river floodplains.

19. Therefore, within the Tertiary terrain, paramount to the sustainability of production forestry, and any alternative land use options, are the:

(a) prevention of the further loss of the coverbed materials (soil, volcanic ash, colluvium) overlying impenetrable bedrock; and

(b) preservation of these materials where they remain intact.

20. Production forestry on steep slopes with thin soil raises the following challenges:

(a) Shorter rotation species, like radiata pine, open the land to renewed slipping during the window of vulnerability approximately every 28 years after they are harvested. The area affected by landslides increases over multiple rotations

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[25] Parkyn, S., Davies-Colley, R., Scarsbrook, M., Halliday, J., Nagels, J, Marden, M., Rowan, D. (2006). Pine afforestation and stream health: a comparison of land-use in two soft rock catchments, East Cape, New Zealand. New Zealand Natural Sciences 31, 113-135.

[26] Peacock, D.H., Marden, M. (2019). Mean bed level trends in the upper Waipaoa river channel and Te Weraroa stream in response to land use change: 1948 to 2019. Prepared for Gisborne District Council.

[27] Herzig A, Dymond J, Marden M. (2011). A gully-complex model for assessing gully stabilisation strategies. Geomorphology. http://doi:10.1016/j.geomorph.2011.06.012; and Marden M. (2012). Effectiveness of reforestation in erosion mitigation and implications for future sediment yields, East Coast catchments, New Zealand: A review. New Zealand Geographer, 68(1): 24 35. <Go to ISI>://WOS:000302226000003.

[28] Marden, M., Basher, L., Phillips, C., Black, R., (2015). Should detailed terrain stability or erosion susceptibility mapping be mandatory in erodible steep lands? New Zealand Journal of Forestry, 59(4), 32–42.

because the rate of soil development is slower than the rate at which new landslides occur during the period of vulnerability between successive tree crops. compared to the additional slips between successive tree crops. This leads to a reduction in the productive capacity of the land. The soil is slow to develop because the mudstone, sandstone or siltstone rock needs time to weather into soil.

(b) Areas in slips become gaps in the re-established plantation. Gaps are natural funnels for the wind. Trees on thin soils have shallow root mats making them more susceptible to wind toppling. Windthrown trees open the soil for direct rainwater entry, which can also compound slipping.

(c) The process of harvesting, especially ridge-to-ridge logging can create soil disturbance, depending on the harvest method and the site's terrain. Dragging logs down opposing logging faces sweeps both slash and soil downhill. Exposed soil is more prone to sheet-wash erosion, which may compound soil loss.

21. The challenge ahead for plantation forestry is better understanding the cause and effect relationships following forest removal on slopes considered to be susceptible to the initiation of shallow landslides. Equally important is the influence of planting density regimes and silvicultural practices in altering the hydrology and mechanical reinforcement properties during the post-harvest replanting period.[29]

Land assessment

22. The best way to address long-term sustainability of plantation forestry on Tertiary terrain is by assessing the individual site's features. This includes assessing the site's susceptibility to landslides and its potential uses.

23. Both the Erosion Susceptibility Classification (**ESC**) and Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 (**NES-PF**) provide a coarse screening tool with which to assess landslide 'risk' and further improve risk analysis at a forest operational scale. However, there are no current site-specific erosion models. This is problematic, as there are a wide variety of erosion processes operating within Tairāwhiti where the activity of different types of erosion and their potential to deliver sediment and slash to streams is strongly influenced by factors evident only at a more localised scale including:

(a) geology (structure (dip and strike of strata), composition (ratio of sandstone to mudstone, frequency of bedding), and intactness (degree of disruption to strata) of sedimentary lithologies);

(b) geomorphology (intensity of stream dissection and depth of incision, slope steepness, length and shape (concave vs convex));

[29] Marden, M., & Seymour, A. (2022). Effectiveness of vegetation mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60-years, East coast region, North Island, New Zealand. New Zealand Journal of Forestry Science 52:19. https://doi.org/10.33494/nzjfs522022x226x

(c) composition (soil, volcanic ash, colluvium), and thickness of coverbed materials; and

(d) subsurface drainage pathways (bedding planes, tunnel gullies, old root channels, fault crush zones).

24. A better understanding of the role that these site-specific factors play in contributing to erosion and slope failure, both during the growth phase of production exotic forests, and more so during the post-harvest period, would require a fit-for-purpose landslide susceptibility methodology and an improved understanding of the magnitude and frequency of triggering events.

25. Additionally, the adoption of risk-assessment tools and morphometric connectivity models (which predict sediment and slash pathways and potential connectivity to channels) will become critical for underpinning management strategies and policies aimed at mitigating storm-related mass movement and sediment production, particularly following harvesting.[30]

26. A risk assessment should include an evaluation of likely downstream impacts. The information provided would greatly help decisions regarding the future of forestry on these sites, and/or in deciding potential post-harvest land use options that may be more suited to providing long term sustainability and as a pathway to establishing a permanent forest cover.

27. The adoption of such models is critical for identifying:

(a) potential sites for future afforestation, and preferred species choice;

(b) the factors that predispose forested areas to repeat episodes of predominantly storm-initiated erosion;

(c) the likely connectivity between landslide erosion and waterways for areas identified as 'moderate' to 'very high' landslide susceptibility with the potential to result in adverse consequences;

(d) land classes with potential ongoing economic value from the production of timber and where future harvesting is unlikely to jeopardise the initial erosion-control function of the forest or contribute to adverse offsite impacts;

(e) high-risk areas with potential economic value over a longer time frame, and where timber extraction would be possible, while maintaining a near-continuous

[30] Spiekermann, R.I., & Marden, M (2018). Best options for land use following radiata harvest in the Gisborne District under climate change: Spatial analysis of erosion susceptibility in plantation forests, East Coast Region. MPI Technical Paper No: 2018/47; Spiekermann, R.I., Smith, H.G., McColl, S., Burkitt, L., Fuller, I.C. (2022). Development of a morphometric connectivity model to mitigate sediment derived from storm-driven shallow landslides. Ecological Engineering, 180, 106676. https://doi.org/10.1016/j.ecoleng.2022.106676; Basher, L., Harrison, D., Phillips, C., Marden, M., (2015). What do we need for a risk management approach to steepland plantation forests in erodible terrain. N. Z. J. For. 60 (2), 7–10; Marden, M., Basher, L., Phillips, C., Black, R., (2015). Should detailed terrain stability or erosion susceptibility mapping be mandatory in erodible steep lands? New Zealand Journal of Forestry, 59(4), 32–42; Phillips, C., Marden, M., Basher, L., 2012. Plantation forest harvesting and landscape response - what we know and what we need to know. N. Z. J. For. 56 (4), 4–12; and Payn, T., Phillips, C., Basher, L., Baillie, B., Garrett, L., Harrison, D., Heaphy, M., Marden, M., 2015. Improving management of post-harvest risks in steepland lantations. N. Z. J. For. 60 (2), 3–6.

canopy cover, and unlikely to jeopardise the initial erosion-control function of the forest or contribute to adverse off-site impacts; and

(f) very high-risk areas justifiably designated for retirement and reversion to a permanent forest cover to provide longer-term mitigation against the initiation of shallow landslides, and further reduce sediment delivery to streams.[31]

28. Similarly to current erosion modelling, the current Land Use Capability (**LUC**), geology, and soil mapping are at a broad scale (often at 1:250 000 or 1:50 000), so although helpful, they are not at the scale to make complex economic land use decisions. A suitable forestry scale is 1:5 000 or 1:10 000. An alternative is to use geomorphology specialists, or those trained in LUC mapping, to create these maps using LiDAR coverage for slope, and aerial imagery and field inspections for field validation.

Alternative management options

29. Once site assessment has occurred, the adoption of alternative management options for areas identified as high risk to landslide initiation will be paramount in alleviating the risk of slope failure and resultant soil loss. For example:

(a) planting high-value timber species with a longer rotation length; and/or

(b) planting coppicing species.

30. Areas considered very high risk and unsuited to any form of harvesting will need to transition to a permanent indigenous forest cover. The risk of leaving existing exotic forests standing as a permanent carbon forest in very-high-risk areas is likely to produce an even greater volume of slash over a considerably longer time as forest stands deteriorate with age due to windthrow and stem snap.

31. Change will, however, have implications for the financial viability of many of the exotic forests located in the Tairāwhiti region.[32] Addressing issues of sustainability will, in the longer term, lead to significant areas of high-risk production forestry land transitioning to appropriate forestry method that account for scale, intensity and risk, including to a permanent forest cover.

32. Consequently, there is a need for:

(a) improved models and tools for identifying areas of high risk to the initiation of landslides and their connectivity to stream channels during all stages of a rotation, but particularly after harvest.

(b) more site-specific scientific, third-party research to improve understanding of the afforestation choices for specific sites in Tairāwhiti.

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[31] Marden, M., & Seymour, A. (2022). Effectiveness of vegetation mitigation strategies in the restoration of fluvial and fluvio-mass movement gully complexes over 60-years, East coast region, North Island, New Zealand. New Zealand Journal of Forestry Science 52:19. https://doi.org/10.33494/nzjfs522022x226x.

[32] Lambie, SM., Awatere, S., Daigneault, A., Kirschbaum, MUF., Marden, M., Soliman, T., Spiekermann, RI., Walsh, PJ. (2021). Trade-offs between environmental and economic factors in conversion from exotic pine production to natural regeneration on erosion prone land. New Zealand Journal of Forestry Science. 51:14. https://doi.org/10.33494/nzjfs512021x163x

Streamside management zones (SMZs) and intercepting sediment and slash

33. A 'streamside management zone' (**SMZ**), or riparian strip/area, is a forest margin next to a waterway. A SMZ can trap non-concentrated overland flow originating from recently harvested areas that has been mobilised by storm water as it passes through. It does so by providing 'roughness' that effectively reduces the velocity of water so the sediment settles out (e.g by roots, needles, or leaves) or is trapped by the soil in the humus layer. The SMZ will filter out much of the mobilised sediment prior to it reaching the waterway. However, any concentrated flows, where water has accumulated and increased in velocity, are very likely to pass through the SMZ. Concentrated flows should be avoided as part of good harvest practice, e.g. using cut-outs on skid trails, frequent water discharge onto the cutover from infrastructure. SMZs both minimise the delivery of sediment into the waterway during harvesting, thereby maintaining water quality, and preserve the aquatic ecosystem.[33]

34. SMZs can vary in width. As an example, a typical width in North America is 50 feet (15m), and some States will increase the length of their SMZs according to slope. SMZs are most commonly not exclusion zones, and, as such, will differ by region in terms of width; required vegetation; canopy cover; and restriction with regard to harvesting practice, such as tree removal or equipment entry. Such an approach was promoted in New Zealand by Visser and Fenton.[34]

35. While SMZs are specifically mentioned in New Zealand best practice guide documents, such as the New Zealand Forest Owners' Association Environmental Code of Practice (**ECoP**), there is no mandatory use of SMZs associated with harvesting in New Zealand, and even limited guidance on when they should be used as sediment buffers. The recently published (December 2022) Eastland Wood Council "Good Practice Guide for Catchment Management" also specifically calls for the use of streamside protection zones to minimise the mobilisation of slash, and recognises the effectiveness of leaving mature trees as live slash traps.

The challenges of converting pine forests to indigenous forests

36. Although not directly within the three experts' field of expertise, Brett Gilmore and Mike Marden have worked with forestry managers over the last three decades which has informed them about the challenges of converting pine forests to indigenous forests. There are two paths to indigenous forest reversion, passive and active land change.

Passive reversion

37. In New Zealand, passive reversion follows two main forest compositional pathways, either mānuka/kānuka shrubland or broadleaved species.[35] Successful recolonisation of forest

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[33] Quinn J 2005. Effects of rural land use (especially forestry) and riparian management on stream habitat. New Zealand Journal of Forestry February 2005: 16–19.

[34] Visser, R. and Fenton, T. 1994. Developing Streamside Management Guidelines for New Zealand Production Forestry. Liro Report. Vol. 19. No. 7. Liro Forestry Solutions. Rotorua, NZ: 16.

[35] Williams, P.A. (1983). Secondary vegetation succession on the Port Hills, Banks Peninsula, Canterbury, New Zealand. New Zealand Journal of Ecology, 21, 237-247. https://doi.org/10.1080/0028825X.1983.10428556; Wilson HD (1994). Regeneration of native forest on Hinewai Reserve, Banks Peninsula. New Zealand Journal of Ecology 32(3): 373-383; and Smale MC, Kimberley MO (1994).

cutover is largely determined by the presence of a residual seed source in the soil, the availability of a seed source from a nearby and mature indigenous stand,[36] wind and a resident bird population.[37]

38. The challenge with passive conversion of pine forest to indigenous forest is about seed source, pest control, and the site's physical features. The latter includes aspect, slope, climate, rainfall and consistency of rain, soil moisture retention, and maximum temperatures and effects of equinox gales.

39. Weed competition and wilding pines are major factors inhibiting indigenous forest regeneration.[38] Costs for herbicide range between $300 and $500 per hectare.[39] A range of approaches have been used with various levels of success. Most strategies have involved different combinations, strengths, methods, and timing of herbicide applications to control weeds.[40] Whereas spraying to desiccate wilding exotics limits the diversity and density of indigenous species that germinate (thereby delaying the reversion process by several years), not spraying will result in a major, long term, wilding management problem, though it will produce a denser vegetation cover more quickly.

40. For example, Forest Lifeforce's 4,000-hectare Maungataniwha Pine Forest conversion is the largest in New Zealand. Since around 2012, the Trust has been working hard to make the conversion to indigenous species. The site is excellent to convert because of its abundant seed source due to it being beside a large indigenous tract. Additionally, the site is on easy to moderately steep terrain, with good soil and moisture retention. However, conversion still requires significant investment of time and resources. The major challenge, and cost, is eliminating regenerating pine seedlings, which crowd out the slower-growing indigenous forest species. At Maugataniwha, it will take ten years to progress to indigenous vegetation and remove the last of the regenerating pines.

41. Sustained browsing by feral and domestic animals also has a significant effect on both the composition and density of the groundcover species, particularly the more palatable broadleaf species, delaying the effectiveness of root reinforcement and canopy closure in

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Regeneration patterns in montane conifer/broadleaved forest on Mt Pureora, New Zealand. New Zealand Journal of Forestry Science 23(3): 123-141.

[36] Moles AT, Drake DR (1999). Potential contributions of the seed rain and seed bank to regeneration of native forest under plantation pine in New Zealand. New Zealand Journal of Botany 37: 83-93; and Overdyck, E., Clarkson, B.D. (2012). Seed rain and soil seed banks limit native regeneration within urban forest restoration plantings in Hamilton City, New Zealand. New Zealand Journal of Ecology, 36, 177-190.

[37] Enright NJ, Cameron EK (1988). The soil seed bank of a kauri (Agathis australis) forest remnant near Auckland, New Zealand. New Zealand Journal of Botany 26(2): 223-236; and Kelly D, Sullivan JJ. (2010). Life histories, dispersal, invasions, and global change: progress and prospects in New Zealand ecology, 1989–2029. New Zealand Journal of Ecology 24(1): 207-217.

[38] Marden, M., Lambie, S., & Phillips, C. (2020). Potential effectiveness of low-density plantings of mānuka (Leptospermum scoparium) as an erosion mitigation strategy in steeplands, northern Hawke's Bay, New Zealand. New Zealand Journal of Forestry Science, 50:10. https://doi.org/10.33494/nzjfs502020x82x; and Marlborough District Council, Department of Conservation, Marlborough Sounds Restoration Trust. (2016). Guidelines for converting pine plantations to native vegetation in the Marlborough Sounds: 11.

[39] Shaw P (2019). Annual Report 2018-2019 prepared for Lifeforce Forest Restoration Trust: 76; Marlborough District Council, Department of Conservation, Marlborough Sounds Restoration Trust. (2016). Guidelines for converting pine plantations to native vegetation in the Marlborough Sounds: 11; and Forest Lifeforce Restoration Trust (2019). Battle of the pines. Retrieved 16 January 2019, from, updated 22 August 2019: https://www.forestlifeforce.org.nz/post/battle-of-the-pines.

[40] Marden, M., Lambie, S., & Phillips, C. (2020). Potential effectiveness of low-density plantings of mānuka (Leptospermum scoparium) as an erosion mitigation strategy in steeplands, northern Hawke's Bay, New Zealand. New Zealand Journal of Forestry Science, 50:10; and Marlborough District Council, Department of Conservation, Marlborough Sounds Restoration Trust. (2016). Guidelines for converting pine plantations to native vegetation in the Marlborough Sounds: 11.

re-establishing slope stability.[41] Goats are a significant problem in Tairāwhiti. Goats are widespread, prolific (in their hundreds or thousands) and rapidly become human shy after culling. They can strip the undergrowth to nothing. Also, the terrain is both remote and challenging to access.

42. Depending on the site, the challenges of conversion to indigenous forest could be significantly harder for the Tairāwhiti region than in other areas. The natural regeneration is not as diverse or as rapid, due to the lack of remnant seed sources, and introduced weed pests, including regenerating pine.

43. Another challenge Tairāwhiti faces is that some of the existing tree crop may not be harvestable. That could be seen as a mixed blessing as the existing trees, if progressively thinned or poisoned, act as a cover crop for indigenous growth below. However, the existing pines add to management complexity, including animal pest control. The reality is that managing the succession of pine to indigenous species is expensive, time-consuming, and likely labour-intensive.

Active reversion

44. Active reversion is planting indigenous species. This is expensive and has many challenges including site mortality, and plant and animal competition that can easily lead to low survival rates. Based on plot growth trials of some of the more common early colonising indigenous plant species known to recolonise pine cutover, the planting of equal numbers of the best performing of the trialled species at 1100 ha-1 would mitigate surface erosion processes (rain splash, slope wash and minor rilling) within 2 years of establishment. Within 5 years, planting would likely provide only minimal protection against the initiation of shallow landslides. Assuming that the initial planting density is maintained (i.e. survival of ≥ 90% of establishment plantings), the expectation is that a moderate level of protection would occur by year 8 but the prevention of the initiation of shallow landslides during extreme storm events is unlikely. Stands at this density are unlikely to provide a high level of protection until year 16.[42] At higher densities (e.g., 2000 stems ha−1), as long as survival rates are ≥ 90% of establishment plantings, the likelihood of a successful erosion control outcome increases with increasing age and maturity of the plantings.

45. While the New Zealand Government has implemented a wilding pine control programme, and included provision for wilding pine control in the NES-PF, these strategies do not necessarily apply when converting pines to indigenous forests.

46. Additionally, the success or failure of either passive or active management may depend on the recurrence interval and magnitude of future storm events.

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[41] Wallis, F.P. (1966). Report on a survey of the condition of the forests, scrubland, and grasslands of the upper Ngaruroro Catchment. Protection Forestry Report, 24. Protection Forestry Branch, Forest Research Institute, Forest and Range Experimental Station, Napier: 103; and James, I.L. (1969). Report on a reconnaissance survey of the protection forest land in the Poverty Bay-East Cape District. Protection Forestry Report, 50. Protection Forestry Branch, Forest Research Institute, Forest and Range Experiment Station, Napier: 23.

[42] Marden, M., Lambie, S., & Phillips, C. (2020). Potential effectiveness of low-density plantings of mānuka (Leptospermum scoparium) as an erosion mitigation strategy in steeplands, northern Hawke's Bay, New Zealand. New Zealand Journal of Forestry Science, 50:10. https://doi.org/10.33494/nzjfs502020x82x.

47. Consequently, more site-specific scientific, third party research is required to improve our understanding of converting pines to indigenous forests on the challenging geology/soils of Tairāwhiti.

Harvesting before retiring to indigenous forest

48. There are differing views on the best way to return land to indigenous forest from pines. This is not any of our areas of expertise, but we note the following views.

49. For most sites intended to be retired from production forestry, it makes sense to first harvest the existing crop. This will help avoid mobilisation of the mature forest should mass movement occur on what has been identified as an at-risk area. In particular, leaving tall, wind-exposed pine, with shallow root balls, to naturally regenerate is highly risky in steep tertiary terrain.

The numerous windthrown trees, as evidenced by their attached root balls, show the challenges of leaving pines as a nurse crop for indigenous species on skeletal soils.

A challenging situation where a slip down into the waterway has taken down mature trees. Most likely this area will be retired from subsequent rotations. Retrieving these trees will be challenging and potentially dangerous at time of harvest.

50. However, there will be site specific areas that may be best left unharvested. This likely includes streamside management areas with steeply incised gullies, where the stand provides stability, and the ability to both trap mobilised sediment and woody debris.

Effectiveness of well-constructed infrastructure

51. Improved construction starts with a good layout and design. Operational construction standards and regular supervision help ensure foundation work and associated fills are stable through engineering principles like clearing, stripping, and appropriate compaction. Better constructed infrastructure is more resilient to the effects of storms.

52. Aratu has significantly improved the company's infrastructure construction practices between 2018 and 2023. Infrastructure covers roads, landings, waterway crossings, and associated erosion and sedimentation control structures. This level of improvement has been funded by Aratu. For example, road construction costs have about tripled. The increased investment has resulted in improved construction standards.

53. Practices continue to improve in learning from previous impacts. After the cyclones culminating in the Labour Weekend 2018 storms, Aratu assessed about 760 previously constructed landings and their roading network to develop a rehabilitation plan. Approximately 20% of the landings required machinery to go back onsite to improve the quality of the existing post-harvest rehabilitation. This included pulling additional slash back onto the skid, end hauling slash to a more stable and contained site and improved water controls.

54. Aratu has also introduced the following improved construction methods:

(a) Benching all works where fill needs containing and compaction.

(b) Compaction to consolidate fill to a more stable and stronger state.

(c) Reducing fill slope angle (previously beyond the natural angle of repose).

(d) Less side cast and more cut and fill construction. Side cast uses the fill for construction without a bench.

(e) Increased end hauling to remove additional fill to a more stable and contained site.

(f) Vegetation stabilisation of fills to reduce sheet wash erosion like rilling.

(g) Increased water controls like crossroad drains and flexiflumes to reduce water volume and speed and help protect sensitive fill slopes.

(h) Improved erosion and sedimentation structures to reduce erosion and trap larger sediment.

55. Based on discussions with staff and from aerial observations, the recently constructed infrastructure held up better in the 2023 storms than earlier construction. This was evident in reduced landslides triggered by landing and road fill failures, and water control failures,

such as successive blocked culvert inlets. When road fill slopes are constructed steeper than what the soil can contain when saturated, these fills can initiate landslides immediately below roads and tracks. However, in areas where the soil is obviously very weak and the slopes steep, there were still a larger number of slumps and slides that originated either from or onto the infrastructure. It does indicate that once the soil is very saturated in these areas it can fail easily. Apart from maintaining the highest possible construction standards, the only other realistic step is to minimise the footprint of the disturbance to the greatest extent that still allows for safe passage for truck traffic.

Pre-Labour weekend road and landing construction with many infrastructure triggered landslides evident, including from road and landing fill slopes

Post-Labour Weekend infrastructure construction. It was evident this held up well.

56. Newly constructed infrastructure is likely more susceptible to erosion and mass earth movement from storm events. Well-constructed roads will bed down over time, effectively continuing to compact, and, more importantly, the cut-banks will stabilise and revegetate, reducing runoff related movement. In the future, you would expect even less storm damage from a similar intensity storm event. Some level of slumping and slips after storm events will always be an unavoidable characteristic of this region.

Infrastructure in the foreground has held up with minimal damage. However in the background there are many slumps / slips either onto the road or from the road (black arrows).

An example of a new-build landing that was in use by a cable yarding crew. Despite high construction standards and a relatively small footprint for such a large operation, there is still a slump right below the landing, a slip from the bench track on the left, and a slip most probably from the drainage as the road approaches the landing on the right.

Common misconceptions about 'slash'

57. Public perception is that all woody debris is from plantation forestry. This is seldom the case and, depending on the catchment and the other contributing wood sources, the contribution of plantation species to woody debris can be low. For example, in 2015, the Hawkes Bay Forestry Group, a regional forest sector lobby group, commissioned an independent report on the composition of woody debris washed up on Opoutama and Taylor's Bay, Mahia, after a heavy storm. The two different results reflect the different debris sources and coastal currents. The results are seen below:

RESULTS FOR TAYLOR'S BAY

COMBINED DATA (3 X 200 m² Plots) for TAYLOR'S BAY

	150-300 mm	301-450 mm	>450 mm	Total	
Pines	26	42	5	73	33%
Poplar/Willow	10	36	19	65	29%
Others	6	44	36	86	38%
	42	122	60	224	

RESULTS FOR OPOUTAMA BEACH

COMBINED DATA (2 X 800 m² plots) for OPOUTAMA

	150-300 mm	301-450 mm	>450 mm	Total	
Pines	10	16	4	30	67%
Poplar/Willow	2	4	0	6	13%
Others	2	5	2	9	20%
	14	25	6	45	

58. The composition of woody debris likely reflects the composition of the species in the catchment that can mobilise through waterway bank collapse, landslides, debris flows or by direct entry to the water. For example, poplars and willows are extensively planted or subsidised by regional councils to assist in stream bank stabilisation, so it is not surprising in these catchments during storm flows that a large component of the slash would be these species. Likewise, in catchments with recently harvested pine plantations, pine would comprise the major slash species.

59. There are different ways to measure the composition of large woody debris. There are two guidelines currently used to assess Cyclones Hale and Gabrielle' woody debris in Tairāwhiti. The forestry sector uses Interpine Innovation's 3rd March 2023 'Woody Debris Assessment'. The other guide is Gisborne District Council's (**GDC**) 2023 V2.1 'Large Woody Debris Assessment Guide' used by the GDC.

60. However, to the extent that slash contributes to woody debris, the matters addressed below will assist in reducing slash.

Why a standard operating procedure or slash best practice guide would be effective

61. The most significant environmental risk in the plantation forestry cycle is at harvest. Mobilised slash creates the largest impact, mainly when it migrates from the forest and affects neighbours and the community's safety, access, property, environment, and recreational opportunities.

62. The NES-PF does identify the need to manage slash, and there are four New Zealand Forest Owners' Association Best Practice Guides (**NZFOA BPG**) that address slash (6.1 managing slash on landings; 6.2 managing slash on high-risk cutovers; 6.3 managing slash around waterways; and 6.4 use of slash traps).[43] Also, the SafeTree website provides a standard slash management template for companies to use.[44] However, while these documents provide basic guidance, considerable effort can be made to provide more detailed and specific guidance as to best practice, which will encourage improved and more consistent practices.

63. A standard operating procedure (**SOP**) for slash, in conjunction with other company guidance, like a company policy, should help businesses improve managing their slash risks. An SOP incorporates company policies and procedures into operational management so that those doing the work 'walk the talk'.

64. A national slash management best practice guide (**national slash BPG**) with minimum standards should help improve those who consider slash management a 'mop up' exercise and enhance knowledge and awareness around best slash practices. Risk identification and management may range from simple checklists to complex onsite and off-site effects modelling, leading to targeted site-specific slash approaches. A SOP or national slash BPG would address:

    (a) identifying slash and its causes;

    (b) clarifying the regulations around slash management (NES-PF and resource consents);

    (c) tools to help decide the level of slash risk, both on and off-site;

    (d) how managing slash at the landing helps prevent and reduce the problem, which requires pre-operational, during operations, and post-operational slash management;

    (e) managing slash on high-risk cutovers, including preventative actions, slash management plans, and operational methods that can assist in reducing slash volumes; and

    (f) managing slash near or in water, including determining acceptable slash loadings and potential slash movement risks.

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[43] Forestry Owners' Association Forest Practice Guide, 2020 https://docs.nzfoa.org.nz/forest-practice-guides/.

[44] Safetree Slash management plan https://safetree.nz/resources/slash-management-plan/.

Commissioning an independent science-based approach to catchment management

65. At the larger 'catchment management' scale the overall health of the catchment could be managed, e.g. water yield and quality, and pollution risks such as nitrate and sediment loading. There are only a few examples of this being implemented in New Zealand.

66. The challenge with individual NES-PF approvals and resource consents is that they are viewed as discrete packets. If different companies within a single catchment all file applications at a similar time because of concurrent planting, major issues could potentially arise. The difficulty of not taking a catchment-wide approach is that the overall effect of multiple parties logging at a parallel timeframe is not considered. This can significantly impact critical catchment-level environmental factors like water yield and the impact of erosion and sedimentation.

67. New Zealand research is slim on the appropriate percentage of a catchment that should be harvested over an acceptable time frame. There are New Zealand precedents and overseas research to assist in helping researchers decide if a catchment approach is suitable and what the level of environmental gains could be if such management were introduced. Some companies have used 25% or 50%, but by the nature of these numbers, they are more self-imposed rules rather than science-based outcomes.

68. Whatever the science decides on the best catchment clearance guidance, there are undoubtedly benefits of managing land use at a catchment level across all primary industries for many reasons. These include water yield and quality, nitrate and e.coli and other non-visual factors, sediment levels, and riparian and woody debris management.

69. At the smaller in-forest catchment scale, the forest manager can proactively manage aspects like setting well-informed planting boundaries and managing the extent and intensity of harvesting. This is consistent with implementing best practice guidelines.

Effectiveness of coupe harvesting limits, with green up requirements

70. Clear-cutting, also known as clearfelling, is a forestry/logging practice in which most, or all, trees in an area are uniformly cut down. It is a commonly accepted harvesting practice, with most certification schemes accepting it.

71. The issue with clearcutting is the scale at which it is implemented. Clearcutting larger catchment areas changes the hydrological response to rainfall events.[45] Many studies in forested catchments have shown that clearfelling a larger portion of the catchment will increase the hydrological response from a rainfall event.[46]

72. Coupe harvesting is clearfell harvesting with a limit on the extent of the felling. To make coupe harvests not simply a series of continuous smaller harvests, green-up rules are

[45] Bosch, J., Hewlett, J. 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. Journal of Hydrology 55:3-23; and Davie, T., Fahey, B. 2005. Forestry and water yield - current knowledge and further work. NZ Journal of Forestry 49(4):3-8.

[46] Hornbeck, J.W., Martin, C.W. and Egar, C. 1997. Summary of water yield experiments at Hubbard Brook experimental forest'. Can. J. Forest Res., New Hampshire 27, 2043–2052; and Swank, W. T., Vose, J. M. and Elliott, K. J. 2001. 'Long-term hydrologic and water quality responses following commercial clearcutting of mixed hardwoods on a southern Appalachian catchment', For. Ecol. Manage. 143, 163–168.

applied to limit when adjoining coupes are harvested. Research cited in Sidle and Ochiai suggests that limiting coupe sizes and or partial harvesting are highly effective ways to reduce erosion susceptibility of forest lands.[47] A rule-of-thumb is that harvesting more than 25% of a catchment will show a significant change in erosion from a peak flood. This combined with the increased availability of harvest residues, and the movement of soil, combines to increase the risk of a debris flow.

73. The major benefit of coupe harvesting and green-up rules is that scale, intensity, and risk (**SIR**) are incorporated into harvest planning. SIR helps recognise that the level of harvesting risk is based on the size of the harvested area, how rapidly the harvesting occurs, and the risk that comes with the work. The concept of coupe harvesting limits is identified as one of the key strategies for minimising the risk of debris mobilisation in the Eastland Wood Council “Good Practice Guide for Catchment Management".

74. Developing generic coupe harvesting and green-up rules through regulations would likely be too coarse of an approach. Not all forests, or areas within a forest, have similar risks, even in similar landscape. It may be possible to separately assess the wider harvest area, including catchment limits, and the risk at a more refined scale like the harvest unit or area. For example, a smaller, higher-risk site may need a smaller coupe size than a larger, lower-risk location. Still, high-level rules and guidance could assist in helping to address many of the current issues associated with SIR.

75. There is limited to no New Zealand research on the environmental, social, and economic cost/benefits of different coupe sizes and green-up restrictions. There needs to be more scientific, third-party research to improve our understanding of broader catchment level constraints as well as assistance in developing practical and effective coupe size and green-up provisions.

Removing slash and what to do with it

76. As noted above, the word ‘slash’ can mean different things to different people, so it is important to have a clear definition. The NES-PF describes slash as: ‘any tree waste left behind after plantation forestry activities’. However, we know that slash comes in different forms, which need different management.

77. Slash, in and of itself, is not bad. It is organic matter that creates topsoil. Slash contains most of the nutrients the tree had stored, so it helps maintain or improve soil quality when it breaks down. Slash helps protects soil from erosion and sediment by being a ground cover until the site is vegetated again. Also, some wood in waterways improves habitat by creating shade, cover, and food.

78. In essence, slash is good when it is:

(a) in the right place;

(b) in the right amount;

[47] Roy C. Sidle and Hirotaka Ochiai. 2006. Landslides: processes, prediction and land use, American Geophysical Union. American Geophysical Union, Washington DC, 307.

(c) the right sort of slash; and

(d) unlikely to move.

This site has large volumes of slash left on the site. However, it is more of an aesthetic issue than a slash risk one because it is unlikely to move.

79. The challenge around slash, and what creates its social and environmental problems, is when it mobilises. It can mobilise due to things within and outside forestry companies' control.

80. If the harvest site has slash mobilisation risks from the landing, the slopes, or in/near waterways, then the slash needs to be carefully managed. The amount of slash left should be determined by environmental risk rather than solely economic drivers. The environmental and economic drivers are linked, but many companies do not consider the opportunity cost associated with an environmental incident. For example, a failure to conduct repairs on in-forest infrastructure, like waterway crossings, can lead to outside-forest damage, which can result in a reduction in the company's social licence to operate, civil legal action, or repair costs.

81. Progressive companies that recognise the cost of large woody debris on risky cutovers and, or in/near waterways are now extracting all larger woody debris, down to 2m and 10cm in diameter from the cutover, and all 'binwood' pieces from the landings. The challenge of removing slash with no viable bin wood market options is what to do with it all. This is a major challenge, especially in the steep hill country with limited safe and contained long-term storage areas. Although any woody / biomass material can be used for fuel and other products, the main issue is the availability of a market for residues, which in turn will be governed by quantity and quality requirements for the intended purpose, as well as distance to market.

82. Even in regions with well-established biomass markets, only billet-wood (typically >80cm length, >10cm dia – but specifications vary) will be successfully extracted from the landing – rarely from the cut-over. For it to break-even or create a small return to the forest owner, quantities of residues need to be carefully managed at time of harvest (accumulated and kept free of soil contamination), and delivered to a market less than 25 kilometres away. Removal of harvest residues outside of these parameters are likely to incur a direct cost. If

cost is to be incurred, most companies will prefer to follow best practice guidelines and store the residue in a stable location onsite.

83. Another important consideration, acknowledged by the safety caveat in the NES-PF, is the health and safety of workers. Having workers remove harvest residues from gully, especially steep or incised gullies, can readily be considered a dangerous task. Sending machinery down into gully or waterways to remove harvest residues, while effective, can result in soil disturbance that destabilises the streambank, increasing the risk of bank collapse.

84. Future research and investment that supports making value from large, otherwise non-merchantable, woody debris will also reduce future mobilisation issues.

Effectiveness of barriers, debris traps, and debris nets

85. Barriers or debris traps have been used to prevent harvest residues from moving off-site. While Ballie reported that many New Zealand companies had a 'just leave it' approach to managing slash,[48] Froelich reports on using barriers to reduce logging slash once it gets in streams in Western Oregon.[49] The ECoP also discusses using debris traps downstream of areas where it is difficult to carry out slash removal.[50]

86. It is recognised that woody debris will mobilise in steep catchments during large storm events, and that this cannot be wholly avoided. As such, debris traps do provide a mechanism to trap larger woody material prior to it being discharged further down the catchment. Catching debris early also prevents it from scouring additional material from the stream banks as it moves its way down.

87. Good planning will place a debris trap in a location where it can be readily cleared post-storm, as required by the NZFOA BPG for slash.[51] The installation of any structure in or around waterways will typically require a Resource Consent although the NES-PF allows for the installation of debris traps without consent in catchments area less than 20 hectares. Culvert crossings are readily consented because they are common, have good design manuals, and councils are comfortable with issuing a Resource Consent for them to be installed. For example, culvert sizing based on flow rate requirements is well established in the NZ Forest Road Engineering Manual (2018). However, there is no such design principle for debris traps – there is no way to calculate an expected debris load from a storm event, and engineers will be looking to provide a definitive answer for a specific design problem.

88. Most debris traps installed in New Zealand have been of simple design. They typically use railway irons driven into the ground at regular spacing (approximately 2 metres) and are supported by a wire rope that is anchored into the embankments (either using deadmen or stumps). While such simple designs may work effectively for smaller catchments, they are

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48 Baillie, B. 1999. Management of Logging Slash in Streams of New Zealand – Results of a Survey. Project Report 85. Liro Forestry Solutions. Rotorua, NZ. 31.

49 Froehlich HA. 1971: Logging debris managing a problem. In JT Krygier and J D Hall (eds), Forest Land Uses and Stream Environment, A symposium, Oregon State University, Corvallis, 112-117.

50 New Zealand Forest Owners' Association Environmental Code of Practice, 2007.

51 Forestry Owners' Association Forest Practice Guide, 2020 https://docs.nzfoa.org.nz/forest-practice-guides/ 6.4.

at risk of failing in larger storms. Such a failure can result in a sudden discharge of all the material that had previously been caught.

An example of a simple railway iron/cable debris trap anchored by deadmen.

An example of a newly constructed trap using wooden posts. While also capable of trapping mobilised residues, its main design feature is to drive the residues from the main flow path onto the embankment where it can settle.

A well anchored debris net that has successful trapped a large volume of large woody debris The image is from a Hawkes Bay. The company have noted their effectiveness, with the trap catching debris in even smaller storm events.

89. Debris nets have been installed in effectively in parts of New Zealand, but are not yet common. These structures are designed to allow water to continue to pass and to be over topped and remain intact. In general, nets have the greatest potential, as the European-based design manual has standard installation procedures, and, as the net is technically constructed above the waterway, no modification to the waterway is required as such.

90. Additional information on design principles for debris traps and nets will support future installation practices and acceptability.

APPENDIX 4

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04.04.2023

COMMERCIAL IN CONFIDENCE – Summary - Geobrugg Slash/debris flow barriers

1. Development History

Geobrugg is an international engineering company who specialises in geohazard and impact solutions. Geobrugg has over 60 years' experience with over 350 employees in more than 50 counties. In the last 10 years Geobrugg have installed over 250 debris flow barriers in more than 25 countries. Debris flow barriers are also used to contain driftwood or slash. The term slash is referring to the wooden debris from forest harvesting which has unintendingly migrated down slope and into the water channel. The wooden debris is commonly called driftwood in the European market but it will be referred to as slash in this report.

Geobrugg debris flow barriers began development in 2005 and proved successful retention in the large field tests. The design load approach was developed together with the WSL (Swiss Federal Institute for Forest, Snow and Landscape Research, which is a government research body). The debris barriers are made of high-strength steel wire nets and are fully established as a certified European product (EAD No. 340020-00-0106). Slash barriers were originally tested in 2015 at a test site in Füssen, Germany. The 1:1 testing confirmed that standard debris flow barriers were able to satisfy the dynamic and static loads exerted by wooden material.

In extreme weather events it is likely that there is also a large amount of debris in the river flow, so it's important to understand and to design for both scenarios. Slash and debris flow barriers are also commonly used post bush fire to mitigate the hazards associated with highly erodible slopes covered in post fire debris.

In 2021 the WSL released the 'Practical guide for debris flow and hillslope debris flow protection nets' which outlines the design process and considerations developed by the combined Geobrugg WSL research and testing over the last two decades. This guide is now used worldwide for applying slash and debris flow barriers.

Slash barriers are not designed to mitigate poor forestry practice but are useful tool in managing any waste material which was not able to be controlled at the source.

Figure 1 - Slash barrier examples

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1.1 Slash Barriers

A slash barrier is a secondary protection measure to contain wood debris which makes it way into the river during flood events. Slash in general should not be in the water way but can migrate down slope due to the force of water. The slash material often causes bridges to clog and downstream damage. Bridge clogging leads to higher water levels, break out of the river from its bed and the subsequent flooding of neighboring infrastructure. The best practice is to contain the slash at an intended location and have a management plan for access and clearing. A slash barrier also needs to be able to withstand any debris load from upstream erosion and slope failures.

The effectiveness of a slash barrier is limited to the retention volume. To maximise retention volumes the location of the barrier should be on a straight section of river, with sufficient bank height at either side for anchoring. At the entrance to a gorge or narrow section is a good location due to the increased retention upstream. Where topography limits the retention volume, several barriers can be installed. If the retention volume is exceeded, the barriers have edge protection on the upper ropes and are designed to be over topped and remain intact. Selecting a location where bedrock is shallow allows for more efficient anchoring and minimises bank erosion. For sites with erodible banks, stabilisation and anchor length redundancy is recommended. An example of bank stabilisation using a high tensile mesh is shown below (figure 2), rip rap or concrete can also be used if readily available.

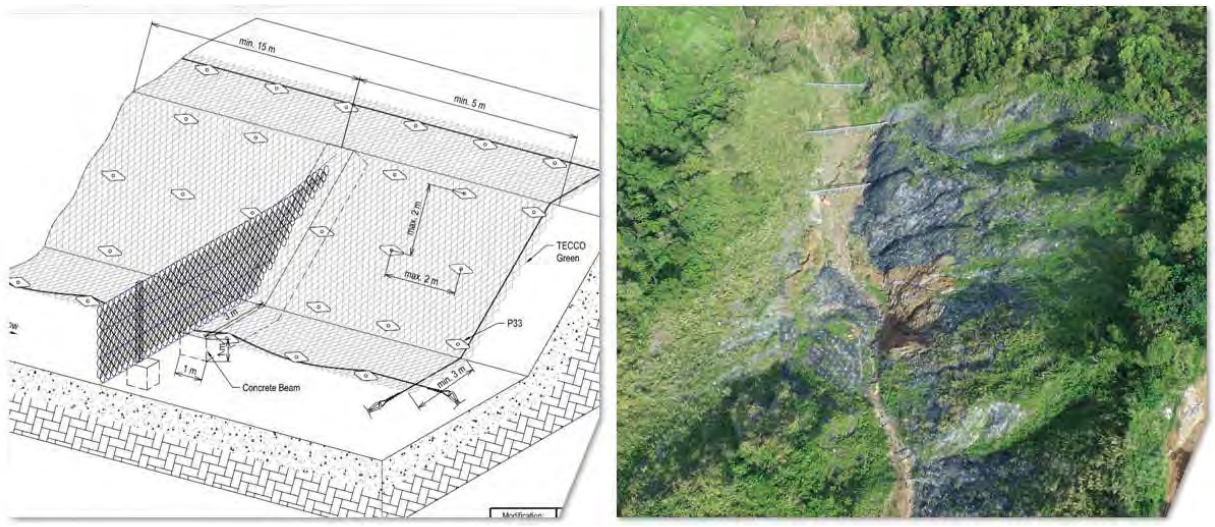

Figure 2 –Bank stabilisation using TECCO mesh in Carranglan - Philippines.

An advantage of the flexible Geobrugg slash barriers is their low weight and short installation time. This is important in steep, difficult terrain where access for large construction machinery is difficult and may cause damage to the environment. The high tensile net construction also has low visual impact (figure 3 and 4) and significantly less carbon pollution when compared to the concrete check dam. When the system is no longer required it can easily be removed and even re installed at a different location.

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Figure 3 - Three debris barriers systems installed in Switzerland with low visual impact

Figure 4 - VX 80 Shenandoah SH65 NZ with low visual impact

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1.2 Barrier Component Summary

Abrasion Protection – On top of each barrier along the support and winglet ropes an abrasion protection guard is installed to protect the upper support ropes during overtopping.

Ring nets – Flexible ring nets made out of high tensile strength steel have a high elastic/plastic energy absorbing capacity and are able to handle multiple impacts.

Winglets – At the top of every barrier a winglet extension rope concentrates the overtopping debris flow material to the middle of the barrier thus avoiding erosion of the torrent banks.

Brake elements – Plastically deforming brake ring elements reduce the peak loads in the ropes and absorb dynamic forces

Corrosion Protection – Geobrugg Supercoating (Zn-Al) and galvanization is provided on all components for long-life.

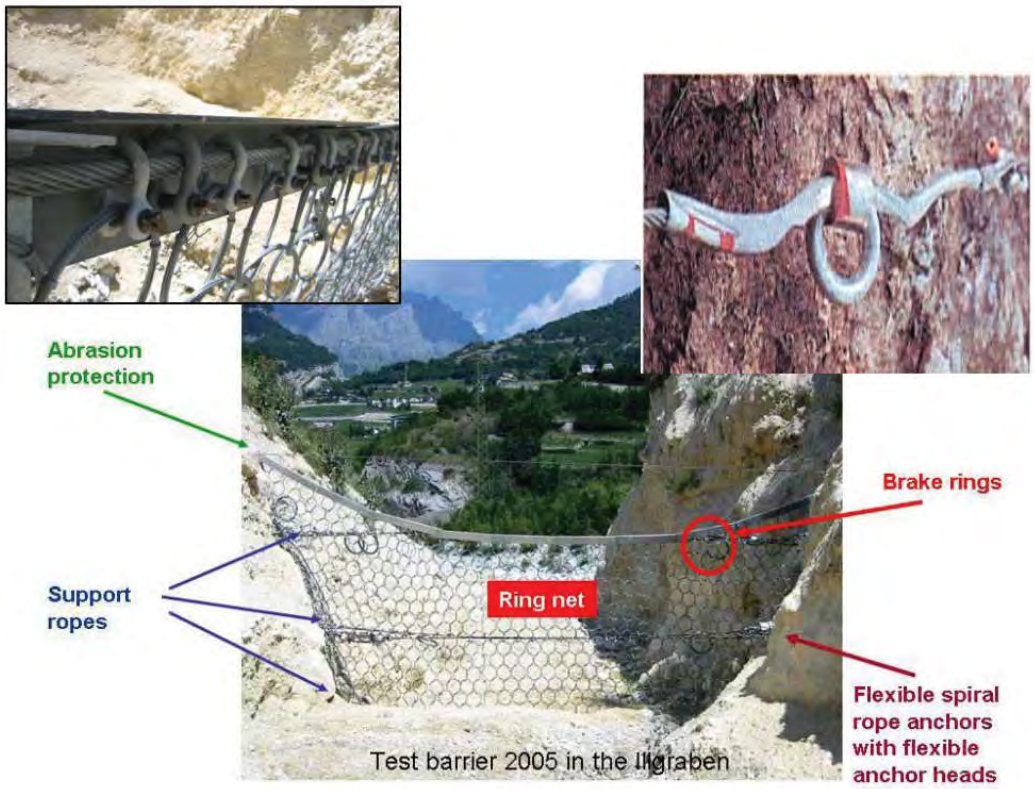

Figure 5 - Barrier components

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2. Local examples NZ

Five debris flow barriers have been installed in the last 5 years in New Zealand, with three more currently under construction. Geobrugg also had a significant role in the 2016 Kaikōura earthquake recovery with over 20 protection systems installed.
In 2021 the first dedicated slash barrier was installed in Napier in an 800Ha catchment. The barrier is a VX140 designed to withstand 140kN/m2. The system is 13.5m wide at the top, 8m wide at the bottom and 3.5m high. Wire rope anchors were used to transfer the loads back into the ground and provide design redundancy should some bank erosion occur. Edge protection was also installed on the top rope to protect the structure in the event of over topping.

Figure 6 - Slash barrier Napier

The slash barrier was first filled in March 2022 and successfully contained a combitantion of slash and landslide material. The system was then cleaned out and filled again in January 2023

Figure 7 - Left March 2022 filling.

Right - January 2023 filling

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The barrier was cleared again in February 2023 and 2-3 days later was filled again. The barrier was over topped and remains intact (note due to road closures this barrier has only been inspected from the air)

The force exerted on the structure can be measured by measuring brake ring activation. After three loading events there is no elongation on the brakes which suggest the structure has not reached its maximum load.

After this successful install and real event testing, larger systems are planned.

Figure 8 - February 2023 filling

2.1 Proposed systems Aratu Forests

In 2019 Geobrugg were requested by Aratu Forests to provide a debris flow/driftwood barrier design for the Waimanu and Te Marunga sites. The following information was provided.

- System design of the debris flow/driftwood
- Proof calculations based on 1:1 field testing,
- Material specifications and anchor forces,
- Barrier design drawing,
- Declaration of Performance Certificates

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The custom system drawings follow:

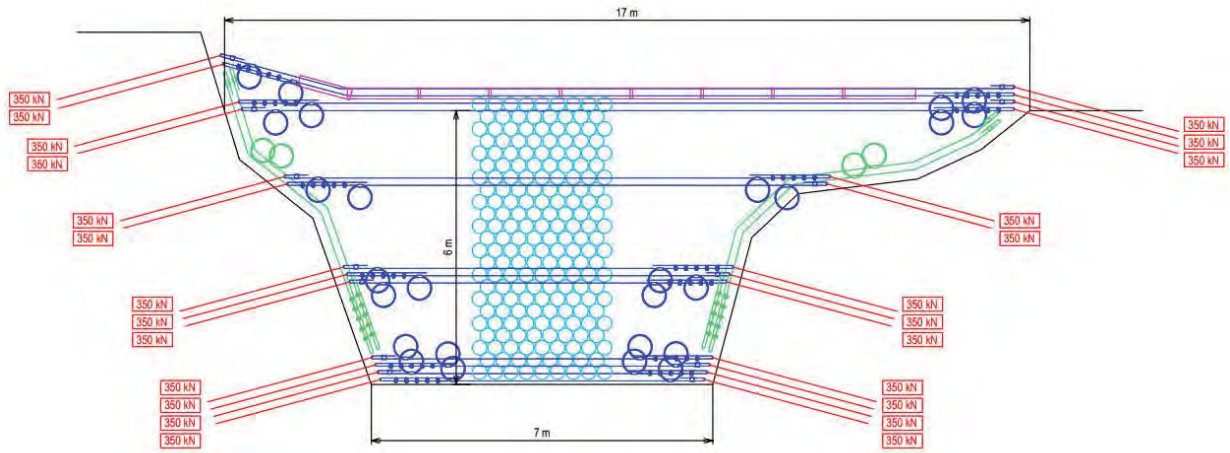

Figure 9 - Te Marunga rope assembly drawing

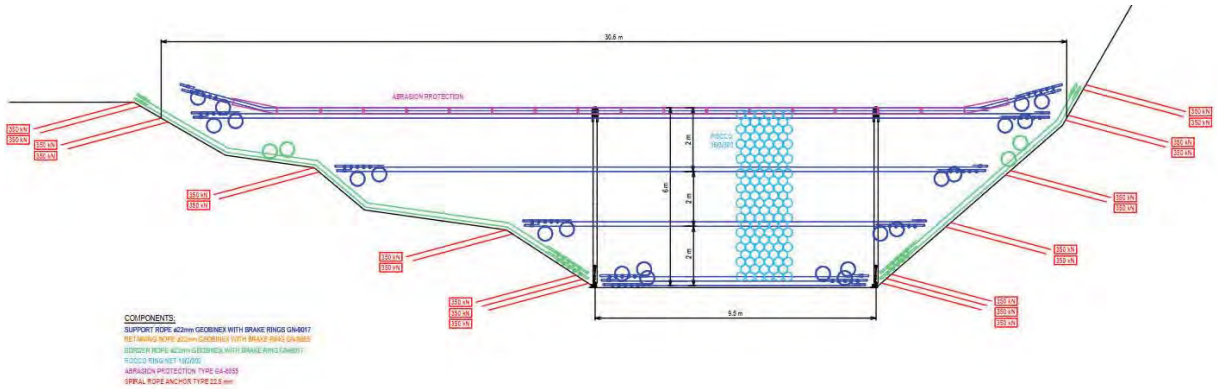

Figure 10 - Waimanu rope assembly drawing

Both systems were dimensioned to withstand a debris and slashing load including a dynamic puncturing load of a 15t tree stem traveling at 10m/s. The systems had edge protection to protect the top rope in the event they were over topped.

Geobrugg would recommend a design check with the latest data from the 2023 events prior to installing.

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3.0 International examples

As previously stated Geobrugg have installed over 250 debris flow barriers in more than 25 countries. The majority of these barriers are dominantly for debris flows. Structurally a debris flow barrier is the same as a slash barrier. Slash barriers should also be designed for debris loads as they have higher impact forces, given this, the following are all relevant design and test examples.

Sierra Nevada – VX Barrier

In August 2022 heavy rainfall post bush fire mobilised slashing material into the torrent.

Figure 11 - VX barrier in New Mexico

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Peru - UX barriers

To the east of Lima, Peru, El Niño rains caused multiple mudslides and landslides. In February 2016, Geobrugg installed 22 debris flow barriers to protect people and infrastructure in the nine valleys of the Chosica Region. A year after the installation the worst storms in the 30 years struck north of Peru.

The 22 barriers performed well. The below images show a 55 meters stretch, one of the 4 levels of the barrier system. Two of these barriers were filled to 95 percent capacity (10,000 m³ in retained material). The multilevel design increased the retention volume, meaning that there is still capacity in the downstream barriers. Most importantly the residential area below was protected.

Figure 12 - UX Barrier after construction.

Figure 13 - Same barrier filled

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Switzerland

Many systems have been installed in Switzerland. To demonstate Geobrugs capabilities a summary of the Hüpach barrier follows which is 40m wide and 10m high, the largest debris system in the world.

The barrier was planned and installed to protect a settlement below which was highly endangered by debris flow and flooding. The goal for the client, Geobrugg and the planner was to find a cost effective solution to save guard lives, buildings and property. The barrier has not yet been filled.

Key figures of the drainage basin:

- Retention capacity: 16´000 m³
- Average slope inclination in the flow channel: 32 %
- Length of the main channel: 4150 m
- The peak discharge for a return period of 300 years is 350 m³/s. Debris flow modelling was calculated using the software RAMMS from SLF / WSL (Switzerland).

Figure 14 - Hüpach System 40m wide 10m high

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Milibach Halisberg, Switzerland

In August 2005, a storm in the Weiler Reuti and in Meiringen caused serious debris coverage and severe damage. To protect the two settlements, a cascade comprised of 13 flexible debris flow barriers were installed to retain a cumulative volume of up to 10,000 m³.

On October 10, 2011, heavy rainfall triggered a shallow landslide containing a total of 2,000 m³ of schist into the drainage area of the Milibach river. Approximately 80mm of rain fell onto a 70 cm layer of existing snow in 12 hours. The Swiss Federal Office for Environment (FOEN) categorised these heavy rainfalls as the 100-year event.

The event filled barrier no. 2 completely and barrier no. 5 partially. Barrier 1, which was situated above where the shallow landslide was triggered and remained unaffected, while barriers 3 and 4 were not filled as they have a higher basal opening.

Stopping the 2,000 m³ of debris helped prevent further erosion along the unstable banks of the Milibach River and dissipated an event that could have caused damage to the settlements further downstream. After an in-depth investigation during an on-site inspection, the customer decided to leave barrier no. 2 filled to protect the riverbanks. The debris held by barrier no. 5 is also being left and should be carried away over time as the water drains naturally.

Figure 15 - Left VX Barrier.

Right - Filled VX barrier

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Illgraben Switzerland

After countless debris flow events in the Illgraben, concrete check dam No. 25 was completely eroded on its right bank and the concrete flanking walls were bypassed by debris material. To sustainably secure the channel course two debris flow barriers were installed.

Figure 16 - Illgraben Debris flow barrier

The frequent debris flows in the Illgraben due to its highly erodable catchment up stream make it the perfect location for Geobrugg and the WSL to use as test site. Systems are installed in the channel and are tested with natural debris flows and performance analyised. The 1:1 test information helps correctly dimention systems for different flow heights, velocities and compositions.

Figure 17 - WSL and Geobrugg test site

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North America - News articles from California after deadly 2018 fire and mudslides

https://www.independent.com/2023/01/18/did-the-steel-curtains-help-montecito/
'Back in 2018 at the time of Montecito's deadly debris flow, none of the steel nets or the Randall Road basin were even being considered. Thus there was nothing stopping its lethal path on January 9, which killed 23 people, destroyed or damaged 500 structures, and blocked Highway 101 for weeks.
Pushing for the installation of the steel curtains was a group of civic-minded Montecito residents who formed the private nonprofit, the Partnership for Resilient Communities, which raised nearly $6 million to make their dreams of steel netted safety become a reality.'

Figure 18 - Image from news article of Geobrugg debris flow barrier

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https://www.opb.org/article/2023/01/15/california-mudslides-defense-wet-weather-storms-damage/
'The best solution for the Montecito and Santa Barbara area is to have both nets and debris basins, according to Larry Gurrola, the engineering geologist hired by the organization.'

Netting made from mettle cables is visible above a creek in Montecito, Calif., on Jan. 12, 2023. With climate change predicted to produce more severe weather, officials are scrambling to put in basins, nets and improve predictions of where landslides might occur to keep homes and people safe.
Ty O'Neil / AP

Figure - 19 Image from news article of Geobrugg debris

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https://archive.vcstar.com/news/local/camarillo/project-in-camarillo-springs-builds-barriers-26f61ca4-dfc3-1195-e053-0100007f9ff4-362831161.html

KANE GeoTech worked with Geobrugg AG, a Swiss company that manufactures the barriers, which Kane said were "the best products out here, especially for debris flow."

Kane said that Geobrugg has spent millions of euros developing and engineering the debris flow barriers "so you can be pretty confident that they're going to work and perform well."

Project in Camarillo Springs builds barriers

ANTHONY PLASCENCIA/THE STAR Camarillo city officials tour a hillside in the Camarillo Springs area where a debris flow control system is being construction in culverts where heavy rains caused a massive mud flow late last year.

Figure 20 - Image from news article of Geobrugg debris

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4.0 Conclusions

Geobrugg are the pioneers and the most experienced with Debris and Slash barriers. If the barrier is dimensioned correctly and installed in a suitable location, they are an extremely useful tool to protect downstream assets.

Geobrugg work with industry leading consultants and contractors to ensure the finished product is installed as designed. Engineering calculations and proofs can be provided for specific examples if required.

If there are any specific question or concerns which are not outlined in the brief summary, please do not hesitate to contact Geobrugg for further clarification.

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Armin Roduner– MSc Civil Engineering.
Geobrugg Switzerland - Head of R&D Geohazard Solutions

Submission to the Ministerial Inquiry into Land Use (MILU) causing woody debris, including forestry slash, and sediment-related damage in Te Tairāwhiti, Tūranganui-a-Kiwa and Te Wairoa regions

Emeritus Professor David Norton
Te Kura Ngahere/School of Forestry
University of Canterbury
5 April 2023

Brief bio: I have over 40 years' experience in New Zealand ecology and conservation across public and private land. Over my career, my research, teaching and consultancy work has spanned several fields of ecology and conservation biology including the ecology of New Zealand's native forests, conservation and management of threatened plants, mistletoe biology, ecology of remnant habitats, restoration ecology, threat classification and significance assessment. Most recently I have researched the distribution and management of native biodiversity within primary production systems, especially sheep and beef farms, working closely with farmers, the farming community and sector groups to promote biodiversity conservation and find ways to build this into farm management. Together with postgraduate students and colleagues, I have authored over 150 scientific publications, including co-authoring a book on biodiversity conservation in farming landscapes with an Australian colleague. Since retiring from the University of Canterbury in 2022, I have continued to work actively with the farming sector helping farmers incorporate native biodiversity into farm management in a way that results in win-win outcomes for farming and native biodiversity. I also work as a strategic science advisor with Pure Advantage promoting native reforestation for building climate change resilience in Aotearoa.

Submission

This submission is a brief summary of the points that I made in an article that I had published on The Conversation on 22 February 2023 (https://theconversation.com/we-planted-pine-in-response-to-cyclone-bola-with-devastating-consequences-it-is-now-time-to-invest-in-natives-200060) after the impacts of Cyclone Hale and before Cyclone Gabrielle hit. These comments are even more pertinent now in the aftermath of Cyclone Gabrielle.

I should note that I have visited both Tairāwhiti and the Wairoa area on multiple occasions over the last two decades including viewing some of the damage caused by forestry slash during the 2018 storm event and I have worked on several farms through both districts.

I commented in the article in The Conversation that poor plantation management practices had again led to extensive damage in Tairāwhiti but suggested that the issues are more complex than just this. In particular I noted that:

- The immediate (proximate) causes are clearly intense rainfall events and poor forest management practices – the latter having resulted in court cases and prosecutions following the 2018 storm event.
- However, underpinning this are more complex ultimate causes – poor land management decision making in the past (both the original clearance of native forest and then the extensive post-Cyclone Bola planting of radiata pine) and changing climates. Changing climates are particularly pertinent to future decision making.

I suggested that while it is essential that we hold the forestry sector accountable in Tairāwhiti and elsewhere, we also need to urgently address the underlying causes because no matter how strict harvesting rules are, storm events are going to occur with increasing frequency and intensity.

Based on my more than 40 years' experience researching forest ecology and sustainable land management in Aotearoa, I suggested that there are four key areas where we need to urgently act to address these issues.

1. As a country we need to rapidly reduce greenhouse gas emissions and rapidly increase the draw-down of CO2 out of the atmosphere. These are national issues and not confined to Tairāwhiti but as a nation we seem to be sleepwalking in our response to the climate emergency.
2. We need a comprehensive catchment-by-catchment assessment across all of Tairāwhiti (and likely other areas of Aotearoa) to identify those plantations that are located in the wrong place in terms of potential harvesting impacts. There should be no further harvesting in Tairāwhiti plantations until this exercise has been completed. We also need to identify those areas that currently lack plantations but should never be planted in exotic tree crops (for any purpose).
3. The government then needs to buy out the current owners of these plantations and embark on a programme of careful conversion to native forest. This will come at a cost, but it needs to be done. We already have models for this in Tairāwhiti where the Gisborne District Council has started converting pine forests in its water supply catchment to native forests.
4. Finally, we need to establish substantially more native forests throughout all Tairāwhiti, and Aotearoa more generally, to help build resilience in our landscapes.

For too long we have been fixated in Aotearoa with maximising short-term returns from exotic tree crops without thinking about long-term consequences. The legacies of this fixation are now really starting to impact us as the climate emergency exposes the risks that poorly sited and managed exotic tree crops pose. And we are now making the same mistakes with exotic carbon tree crops, again leaving unacceptable legacies for future generations to deal with because of a focus on short-term financial gains. Exotic tree plantations have dominated forest policy in Aotearoa and we urgently need to shift this to a focus on diverse native forests.

I suggest that the current Ministerial Inquiry needs to focus on Points 2 and 3 above, but at the same time it also needs to acknowledge the importance of Points 1 and 4.

chapman tripp

The Aotearoa Circle

New Zealand director duties to manage nature-related risk and impact on natural capital

The alarming and accelerating rate of biodiversity loss and ecosystem breakdown is a global and local crisis – one that has the potential to outstrip the impact of the climate crisis. But, unlike risk from climate change, understanding of nature-based risks is at a relatively early stage for most New Zealand companies.

With directors facing an ever-growing agenda, Chapman Tripp's legal opinion seeks to highlight current and anticipated regulatory and market trends, supporting directors who are seeking to stay "ahead of the curve" to anticipate and be resilient to these issues when sitting on the boards of businesses that are particularly reliant on natural capital.

Key conclusion: New Zealand company directors' duties to exercise reasonable care require them to ensure that their businesses are identifying foreseeable and potentially material nature-related risks that could affect their companies, and equally to take nature-related risks with material impact into account in their decision-making.

Whether nature-related risks are foreseeable and material for a particular company will be impacted by:

- Emerging international mandatory corporate sustainability reporting obligations which go beyond climate and cover nature and biodiversity.
- Growing investor interest and voluntary corporate initiatives to spotlight nature and biodiversity risks.
- Anticipated regulatory protection of ecosystems and biodiversity as part of an wider transition to 'nature-positive' regulatory structures.
- Growing understanding of nature-related risk, including through mātauranga Māori.

Prudent directors in sectors highly dependent on nature and the environment for their business model should be starting on the path to ensure the business is in a position to:

Identify direct and indirect dependencies on natural capital, ecosystem services and biodiversity that are at risk or vulnerable

Assess exposure to nature-related risks and the financial materiality of such risk

Manage nature-related risks that may have a financially material impact

Nature-related risk assessment frameworks may be integrated into existing climate-related risk assessment processes

Examples of nature-related risks

Declining bee populations could financially impact companies dependent on pollinators, eg an SME producing Mānuka honey for export

Loss of wetlands and floodplains could financially impact sectors dependent on these ecosystems for flood, erosion and storm protection, eg construction, real estate and infrastructure companies in the aftermath of the Auckland floods and Cyclone Gabrielle

Degradation of soil could financially impact primary sector companies by pushing agriculture on to less productive land, resulting in lower yields or reliance on fertilisers

Kauri dieback has impacted the tourism sector (tour companies, cafes and accommodation providers) through activity and facility closure

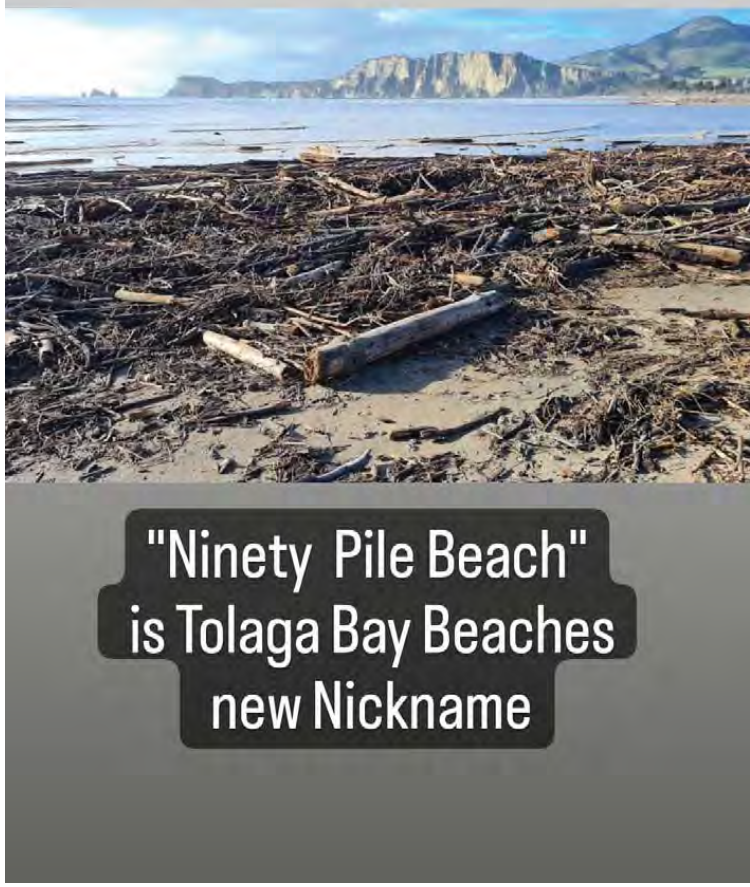
Chapman Tripp is proud to have had a long-standing pro bono relationship with The Aotearoa Circle.

Pictures from forestry cyclone events

- Pages 2 – 5 are our property, Narrowlands Ltd (corners Paroa & Tauwhareparae Roads)
- Pages 6 – 7 are around Tolaga Bay

Fences & maize flattened from pine slash (Hale)

Mangatokerau ‘river’ & Tolaga Beach



Wigan bridge

Map Tikapa

Map of Nga Rohe Moana O Nga Hapu o Ngati Porou

Ngā pou a Tāne (NPaT) Submission to Ministerial Inquiry into Land Use

Introduction

Ngā Pou ā Tāne is the National Māori Forestry Association (mai i Te Reinga ki Rakiura - with reach from Cape Reinga to Bluff)

Tirohanga Angamua

He whakatupu i te manawaroatanga tuku iho i ō tātou hapori mā te mahi ngahere.

Building intergenerational resilience in our communities through forestry.

Te Whaingaroa

He whanake, he pupuri hoki i tētahi hanganga tautoko whakakaurahi mā ngā rōpū ā-rohe, e taea ai te whakamana i te iwi Māori i roto i te raupapa uara mahi ngahere.

To develop and maintain an augmented support structure through regional branches that enable and empower Māori both in and into the forestry value chain.

He mahitahi i te taha o te Karauna hei reo mārohirohi, reo whai wheako, reo whaihua, hei māngai hoki mā ngā hapori Māori me ngā kaitiaki whenua Māori, ki te whakawhanake kaupapa here hei kōkiri i ngā wawata o aua hapori me te kaupare i ngā pāpātanga panonitanga ture, waeture hoki o nanahi, o nāianei, o āpōpō hoki.

To partner the Crown with a constructive and powerful voice, representing Māori communities and landowners to develop policy that furthers Māori aspirations in the forestry value chain and obviate negative policy impacts both prospective and retrospectively.

NPaT wish to speak to our submission.

Summary

Cyclone Gabrielle is a significant event that has had huge impacts across a broad geography from an environmental, economic, cultural, social and human well-being perspective.

Cyclone Gabrielle is a natural event that was not able to be controlled by human intervention. The macro impacts need to be recognised and plans made to minimise and mitigate the impacts on human welfare by retreating and relocating away from high risk areas. This needs to be done in conjunction with the communities affected.

The impacts of Cyclone Gabrielle that were related to human activity, need to be risk assessed to determine what improvements can be made to minimise and mitigate these

impacts as well determining what protective/ contingency measures need to be implemented to support the local communities.

Attributing blame to sections of society is not helpful, seeking to define and resolve root causes of impacts (where possible) will provide the most benefit to all involved.

The impact on communities needs to be at the fore front of our thinking, we need to solve for the people not just the environment.

Māori need to be at the table exercising their rangatiratanga for their lands as the review unfolds and decision as to the way forward are made, nothing less will be acceptable.

Discussion

For over a century national and local government policy settings have failed our people of te Tai Rāwhiti economically, socially, culturally, and environmentally. These policy settings have resulted in huge inequities for the people across the board.

The initial harvesting of native forest created a short term economic uptick, however what has followed has seen the depravation of the people as they have suffered and are still suffering despite living in a version of paradise.

Many policy settings have focused on singular issues and have failed to consider the holistic nature of the interconnectedness between Te Taiao and Tangata Whenua. This western approach is in direct contrast with a Māori approach that is holistic and seeks balance across the many competing facets that need be considered. Academics have labelled this multiple bottom-line outcomes and we know it as the integration of tikanga, kawa, whakapapa, and rangatiratanga.

Historically (in an overly simplistic and illustrative manner) the process has been cut down the native forest for financial gain, turn it into farm to feed the motherland and financial gain, cyclone Bola happens, plant what is left of the farm into pine forests and monetise this by selling the cutting rights to companies with a known expectation that they will be rotationally harvested.

Nga Pou ā Tane submits that this review should consider the interconnectedness of te Taiao and Tangata Whenua.

Aotearoa is a young country geologically; and our soils are continuing to move through natural processes. Anecdotally soil movement in New Zealand has historically been a consequence of two main factors – natural processes (80%) and human induced (20%).

Much of the East Coast land affected by Cyclone Gabrielle is highly erodible, it is some of the most highly erodible soil in New Zealand.

Pre- Human the soils of Aotearoa moved through natural processes and created the landscape that we now have. Most of the valleys and plains that we now inhabit were

formed before people arrived here. When this movement occurred, humans were not affected because we weren't here, we have not recognised this in many places where communities have been established.

Gabrielle as an event was a natural process that created huge movements of soil and debris, and on top of that we have the movement of soil and debris induced by the activity of humans. Whole hillsides of growing and grown trees mobilised as well as areas of cutover where slash was mobilised. (it is important to distinguish between slash from harvesting activities that was mobilised vs debris from unharvested areas that were mobilised due to a storm).

What can we do about the effects of the natural process? We can't control these processes. The best we can do is to minimise and mitigate the impacts by moving people and their homes out of high-risk areas i.e., Retreat and relocate and reconsider downstream land uses.

What can we do about the effect of human induced impacts? Quite a lot, however this is difficult as there are many human induced barriers to making change some of these are as follows.

Deforesting / Alternative species

Switching species of trees / deforesting / Continuous Cover forest / Multi-use forest / retiring high risk areas and revert to alternate land use– Deforestation liabilities / time taken to switch – 30 plus years / economic impacts / environmental impacts of alternative species / deforesting – are we going to make it worse than the situation we currently have? Will not prevent soils movement because of natural processes.
Forests reduce sediment load relative pastoral land uses over the long term – Paukuratahi Study amongst many others.

Slash Management

Reducing slash from harvesting activities – minimise production through equipment use and good practice / store in forest in a stable area so that it won't mobilise / create a biomass market that uses the slash – Government Incentives / Partnership with industry (Carbon / Economic and Environmental benefits)/ limits to slash in cutover.

Water controls

Minimise water coming onto landings by putting in drains / culverts to divert into cutover.
Ensure culverts disperse water into cutover away from road / landing edges use flumes and water socks to deenergise water.
Install sediment traps where possible.
Keep culverts clear check daily when harvesting check regularly when doing other operations planting inventory releasing thinning Quality Control
Build adequate bridges over streams.

Correctly size culverts

Increasing Riparian zone sizes and setbacks

Will work when rainfall is "normal" however vegetation that grows in riparian zones and set back areas can mobilise as debris in big storms.

Regulation and Monitoring

These are important to manage human activities but will not be able to overcome the effects of significant storms like Gabrielle – this has to be recognised. It may be that the regulations are not fit for purpose for the East Coast given the high percentage of highly erodible land. It also appears that the resources required to adequately monitor the activities are not in place.

Size of clear-fell area within a catchment

Debate as to best methodology so should be reviewed.
Other countries have smaller catchments in a large part to allow animal corridors for native species, we have birds that don't need corridors as much. Cutover is ideal breeding habitat for Kārearea (for example) , bigger is better so we need to keep people and machines away from them during breeding season.
Smaller = more visits to same place = more earthworks for same volume harvested
Bigger = less earthworks overall
Bigger = more focus on water controls required with follow ups post-harvest
At risk time is preharvest - roading and landing establishment through to age 4-5 post-harvest so say 5-6 years - focussed management

Conclusion

The single demand we make of the panel is to uphold our right as tangata whenua. This is our land and the consequences of the decades of government and external influences have resulted in almost irreparable damage and loss to our land, to our people, to our economy, and to our mana. It is time to meaningfully empower Māori to provide an intergenerational approach to healing our land and our people. One that doesn't result in another "lurch" to a singular conservation view that seems to be what well intended non-Māori and some uninformed Māori propose.

"Ko the whenua te waiu mo nga uri whakatipu" – Dr Koro Dewes.
Our land is the source of our wellbeing/ wealth/ sustenance for all our descendants.

No reira, kua mutu te kōrero nāianei, heoi ka whai tonu mātou i te tutuki pai mō ngā uri o ngā rohe nei

Lees Seymour
Ngā Pou a Tāne
6 April 2023

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Richmond Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Highgate Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
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RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
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While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

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Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
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- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Ashdown Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Ormsby Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

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How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

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The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

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History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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Sedimentation

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Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

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Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

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In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

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1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
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Why Production Forestry

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- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

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- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

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This submission is made on behalf of Wellwood Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Pine Ridge Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

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The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

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Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

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How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Belmont Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Crosswood Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
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RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

-

The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Long Ridge Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

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We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Hereford Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
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RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Hunter Valley Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
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Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

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We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Windermere Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

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How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

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History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

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While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

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Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
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Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

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Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Brentwood Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

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We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Castle Rock Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

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How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

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RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

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History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

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Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

-

The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Woodside Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Malthouse Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

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In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

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History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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Sedimentation

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Woody Debris & Harvest Slash

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Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

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Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

-

The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Turnbridge Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

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Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Young Nicks Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

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How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

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History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Portobello Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

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In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

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1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
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Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

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April 2023

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This submission is made on behalf of Monterey Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

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Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Millbrook Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

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We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Windsor Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

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How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

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The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Kingswood Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
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While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

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Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
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We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Hyde Park Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

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In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

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- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Stableford Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

Forest feasibility reports prepared for us by independent forest consultants project expenditure of more than $2,500 per ha average over the 28-to-30-year forest rotation, this expenditure is for management, harvesting and transport of our forests and does not include off farm added value at timber mills and export operations. Many of our forests that have completed harvesting have exceeded this expenditure figure. In contrast independent surveys in the Wairoa area have stated that average annual expenditure per ha over a 30-year period is $500 to $700 per ha (approximately 1/3 of forest expenditure).

In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
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RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

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The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
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While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

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Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

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Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

April 2023

Submission Document

Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairāwhiti/Gisborne District and Wairoa District

This submission is made on behalf of Winchester Forest Partnership, managed by Roger Dickie NZ ltd

Submitter Background

Roger Dickie (N.Z.) Limited (RDNZ) is a forestry investment manager and licensed Managed Investment Scheme provider under the FMCA 2013. RDNZ's forest investment dates back more than 30 years including significant concentration of investment in the strong forest growing regions of New Zealand, namely the Gisborne and Wairoa districts.

RDNZ manages a total of 38,000 hectares including 21,200 hectares in the Gisborne and Wairoa districts, the subject of this enquiry. Of those investments, 10,275 hectares are retail syndicate (Partnership) investments owned by more than 1,100 investors, predominantly New Zealand Mum and Dad investors, the remaining properties are owned by family office and institutions of local and foreign origin.

The activities of RDNZ and its investors have materially contributed in a positive manner to the economy, employment, and the environment within these regions, as well, our managed area equates to 9.6% of the total forest area within the enquiry regions, making our forests and the investors we represent a significant forestry voice and related party to the enquiry.

Executive Summary

Forestry is a long-term investment that has from time to time been incentivised via the Government and regional councils to combat erosion and soil degradation, as well, to increase the productivity of some classes of land. The decision to invest in forestry has often been motivated by those prerogatives on top of forestry's alignment with the investors long-term investment drivers.

The heightening of weather events, which many associate with climate change, is the very reason greater levels of afforestation are necessary, especially in temperate and high rainfall areas where there is strong tree growth coupled with erodible land. A study by the Waikato District Council recommended that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes.

Other comparisons of production forestry and farming on hill country land are often made, with the results showing that forestry far exceeds farming with respect to expenditures, employment, export receipts and environmental impacts, including carbon sequestration and soil stabilisation.

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In large weather events, mobilisation of debris will always happen, whether it be from forestry planted for production purposes, permanent crops, natives, riparian plantings, shelterbelts, fences, buildings etc. Take the Esk Valley for example, production forestry did not occur in this catchment in 1938, however the Esk Valley was severely impacted at this time by a weather event that caused three meters of silting and destroyed bridges from debris mobilisation.

Is forestry doing better, yes, can forestry do better, yes. The changes implemented by the National Environmental Standards for Plantation Forestry (NES-PF) mitigate debris left on slopes and ensure waterways are better protected; however, at the same time it can be argued that weather events are becoming more frequent and more severe.

The consenting obligations and practices required to uphold consents already impose significant costs on forest owners, those significant costs come on top of targeted forestry rates applied by the Councils in the enquiry regions. Forestry by-in-large is meeting these consenting requirements while paying higher (targeted) rates, begging the question, is forestry being provided the appropriate public infrastructure commensurate to its contribution to the regions.

How do we do more, there are short- and long-term solutions that need to be worked towards in conjunction with one another, RDNZ recommends the following:

- <u>Short Term Solutions:</u>

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap consenting requirements reduced, allowing slash traps to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- Standardisation of the interpretation of the NES-PF
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Hauling more of the non-saleable logs and slash to the skid site and burning it.

RDNZ is strongly opposed to any recommendations of a move of production forests towards permanent forestry, select (non-clear fell) harvesting and harvest catchment restraints. Each of those strategies have dire consequences, including the destruction of statutory property rights.

The future of forestry needs to be supported here to retain investment in the subject regions. Production forestry is a major contributor to both GDP and employment in these regions and we as forest owners and managers are very aware of our social license to operate. You will be aware of many stories of forest companies helping the clean-up, some instances not remotely related to forestry, meanwhile we are yet to see a story of a farmer helping to remove the sedimentation deposited onto crops and homes.

RDNZ urges the Ministerial review to refrain from allowing the emotional element to supersede the economic, employment and environmental considerations of this matter. It is evident that the media and narrow voices can be powerful whilst ill informed. The New Zealand Government is responsible for seeing through emotional statements and to make decisions that protect the economic aspirations of the country whilst aligning to its policies and the policies that such forestry activities were implemented under.

History of the Land

For hundreds of years New Zealand underwent deforestation with much of this occurring in the 1800's and early 1900's, making way for what was thought to be productive farmland. For the Gisborne and Wairoa regions this was not always the case, with many highly erodible soils unable to withstand large precipitation events.

By the 1930's the Government was already embarking on a large-scale afforestation program under the State Forest Service to address issues of soil erosion and land degradation, and more recently in 1992, the Gisborne region established the 'Erosion Control Funding Programme' or 'ECFP', providing grants for production forestry to be established on erodible parts of farmland.

The ECFP never envisaged that these trees should be established on a permanent basis, in fact, the payments received under the ECFP were staggered as progress payments to make sure that trees established under the ECFP were appropriately tended (I.e., Thinned to a final crop stocking suitable for production harvest), implying that those trees should be harvested.

Volume of Water

The media and public opinion are quick to dismiss the severity of the weather events that are being endured, instead looking for the scapegoat. Any area of land or large catchment that receives +500mm of rainfall in a 24-hour period is going to have a high degree of sedimentation and debris mobilisation, if you then apply this rainfall to already water ladened soils, as we have seen, this delivers severe mid-slope failure.

Sedimentation

Afforestation of farmland was incentivised to help prevent mass erosion and sedimentation from farms into waterways which is then deposited onto other farmland, crops, and residential areas. As we have recently seen, this sedimentation is also responsible for damaging aquatic ecosystems such as the destruction of crustacean habitats near river mouths.

Sedimentation is driven mainly by precipitation, with geology and land use explaining much of the residual difference between sites. Studies by the Waikato District Council with reference to other independent reports, recommend that pasture slopes generate 2 to 5 times more sediment than comparable forestry slopes except for during harvest periods, however sediment loss, with good forest management is said to be restored to pre-harvest levels within one to two years.

While we are happy to support cost effective changes in the forestry sector that drive improved results, we are also acutely aware that this is a Land Use enquiry in the broader sense. We are confident when comparing farmland and forestry, that sedimentation arising from farmland has played a significant role in the damages resulting from Cyclone Gabrielle. Therefore, any result of this enquiry could not unjustly impact forestry without imposing consequences for sedimentation caused by farming.

Woody Debris & Harvest Slash

Woody debris can be defined as any dead, woody plant material, including logs, branches, standing dead trees, and root wads. Within the definition of woody debris are harvest residues, known as forestry slash.

Slash is a by-product of harvesting operations, ranging from the branches removed from logs to trees which don't meet commercial specs. Slash proves useful in returning nutrients to soils and assisting in providing cover for ground erosion, particularly in areas of highly erodible soil.

Woody debris left on stable ground present low risk of moving, however given the increasing effects of climate change and increasing likelihood of high-intensity rainfall events, managing debris such as harvest slash will continue to be an important topic in the forestry sector.

In large rainfall events, soil mobilisation, slope failure and rising water currents can all dislodge woody debris, moving them down slopes that lead to tributaries and rivers. The sheer volume of rainfall has dislodged Pine, Poplar, Regional Council Riparian plantings and native vegetation alike.

Land Use

It is important to consider the outcomes of different land uses when subject to extreme weather events such as January and February 2023. For the purpose of this, let's consider the three land uses below:

1) Farmland – Land solely used for farming has less root matter to bind the soil and allows water to quickly flow and carry high levels of sedimentation. The weight of sediment and speed of water would be expected to cause infrastructure washouts and high levels of sedimentation downstream.
2) Native Bush – Land solely in native bush will be able to sustain a level of rainfall by slowing movement, eventually mid-slope failure would happen, sedimentation levels would be low, but debris may include large trees that are likely to cause infrastructure washouts.
3) Harvesting Forests – The result would strike the middle ground as stumps help to bind the soils reducing sedimentation when compared with farmland, while smaller debris and logs may mobilise, causing infrastructure washouts.
4) Growing non harvested exotic forests (Radiata Pine). From the age of 3 or 4 years until harvest at 28 to 30 years a Radiata Pine production forest has showed many times in the past and again in Cyclone Gabrielle that there is little damage by way of washouts and off farm sedimentation. Photographs from Cyclone Gabrielle prove this, and our Sovereign Forest in the Wairoa area is a prime example. This forest is more than 20 years old and had a very low percentage of erosion during Cyclone Gabrielle, this is in contrast to the surrounding farmland which had massive slipping and slope movement resulting in huge volumes of sediment leaving the farms and entering waterways and damaging flood plains further down.

While the above analysis isn't scientifically proven for the purpose of this submission, it is plain to see that each land use has its own set of consequences. We must then include economic, employment and environmental considerations along with those results, to get the full picture.

Strongly Oppose - Permanent Forestry

Permanent forestry in the form of plantation (exotic) forestry or native forestry will ultimately have an undesirable set of consequences. If harsh rules were applied to foresters when managing their harvest, then the obvious choice would be for foresters to move away from production forestry to permanent carbon forestry, using the Emissions Trading Scheme to monetise additional stored carbon.

Permanent forestry will have a diminished benefit to the forest owner; however, it will have dire consequences both socially and environmentally. The harvest of forests would diminish in favour of low-cost forestry, diminishing employment and devaluing the land to zero or worse. Eventually those exotic trees will give way, becoming too heavy for the erodible soils, making it highly likely that much larger debris will mobilise.

Native permanent forestry is not feasible due to the very high costs of establishment and slow rate of carbon sequestration, such a mechanism to force native forestry without incentives or subsidies would drive foresters to relinquish land.

Strongly Oppose – Select (Non-Clear-Fell) Harvest

Select harvesting happens globally on land that is easy in contour allowing machinery to move through the forest or access stems from road carriages. The topography of land in the subject regions means that harvesting is almost always carried out via cable-based systems. Harvesting in these regions under cable-based systems is already hugely expensive and to work effectively, needs to allow for entire settings (faces) to be cleared. Any restriction to this activity would make the activity unsafe due to the confined zone of operation on erosion prone slopes requiring harvesting personnel to be present on the slopes. As well, forests opened up in strips allow for windthrow damage and potential mobilisation in forested areas alongside any strip harvesting. Any such restriction would not be feasible and would cause harvesting to cease in these areas, as well, such a restriction would slow the rate of harvest which removes the forester's ability to react to the commodity driven market.

Strongly Oppose – Catchment Restraints

Any maximum rate of harvest applied to any one catchment would considerably impede the forester's ability to optimise harvest age, act within financial covenants and react to financial markets, thus taking away fundamental property rights that go against freehold ownership of land. Any type of decision would drive large legal proceedings and seriously undermine confidence in freehold land rights and investment into forestry and other assets. Any catchment restraints would restrict forest owners' ability to harvest their forest in times when this is suitable weather (i.e., summer vs winter) or financial objectives. (i.e., a forest might be consented for only a part of the year where log prices are reduced).

Why Production Forestry

While the harvest process creates a short-term debris and sedimentation issue, the public have been very quick to dismiss the substantial environmental, social, and economic benefits of forestry, such as:

- Soil Conservation: Trees help to prevent soil erosion and maintain soil quality.
- Water Conservation: Forests help to regulate water flows and maintain water quality.
- Carbon Sequestration: Trees absorb and store carbon dioxide from the atmosphere, which helps to mitigate climate change.
- Biodiversity Conservation: Forests provide habitats for a wide range of plant and animal species, which helps to preserve biodiversity.
- Employment: Production forestry provides substantially more employment than comparative hill country farming operations. Forestry is said to employ one in four families in the Gisborne region, placing a huge importance of renewable and sustainable practices.

- Timber Production: Forests provide a renewable source of wood products, generating a perpetual supply of revenue through the rotational harvest of forests.
- Economic Contribution: Forestry is a significant primary sector, establishing large services sector expenditures and generating export receipts well in advance of comparative hill country farming.

Proposed Changes

While we are strongly against changes that only adhere to social drivers or that simply create further costs or barriers of entry in the form of consents, rates, or other inefficient taxations, we would be open to making pragmatic changes that further reduce or mitigate the likelihood of debris mobilising.

RDNZ suggests there are solutions that should be managed in conjunction with one another in order to achieve short term mitigation while incentivising programs and operations that form a solution while creating value. The movement toward biofuels and other fibre-based solutions coupled with the lack of pulp/woodchip processing facilities in the subject regions appears to present a real opportunity for the government to create positive solutions.

- Short Term Solutions:

- Harvest activities that occur on high-risk areas (High-LUC, High-ESC) where slopes are immediately adjacent to waterways or host upstream catchments exceeding a minimum threshold should require a riparian buffer zone be maintained at harvest.
- Slash-Trap requirements to be implemented with lower thresholds and greater carrying capacity to sustain higher intensity weather events.
- The NES-PF has been established in relation to the events of 2018 in Gisborne. Our view is that the rules under the NES-PF are suitable to produce the desired outcome with respects to debris management. There needs to be stronger controls in the checks and balances as they relate to monitoring of consents and harvesting in all forests, but particularly red zoned land, which encompasses most of the forest in the Gisborne region. If all harvesting entities and forest managers complied at the higher level of the NES-PF we would significantly reduce the chance of debris mobilisation and the consideration of future land use changes.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

- Long Term Solutions:

- The Forestry Transformational Plan intends to incentivise greater domestic processing, clearly the Government should incentivise or co-invest in woodchip and fibre projects to encourage removal of debris and supply the increasing biofuel markets.
- The Emissions Trading Scheme to recognise debris with nil commercial value that are buried on site. Trapping of carbon in soils can be quantified and emission units received to help offset the cost of removing debris from the slope and burying them.
- Burning the non-saleable wood and debris on the skid sites immediately after harvest is completed.

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The first two of these solutions enhance the climate obligations of New Zealand, one through the circular economy and the use of renewable energy, and the other by the reduction of carbon being released to the atmosphere. At the same time, they remove some or all of the financial burden to extract the material from harvested slopes. The third solution is carbon neutral.

Roger Dickie NZ Ltd and the 21,600 hectares for forestry that we manage though the enquiry area, remain strong focused on delivering the best economic, environmental, and social outcomes for the region and are committed to continued improvement in these aspects.

We would welcome the opportunity to speak to our submissions and are happy to be contacted for further information as required.

Regards,

Roger Dickie, Will Dickie, Jeff Dickie,

Submission on the

Ministerial Inquiry into Land Use in Te Tairāwhiti, Tūranganui-a-Kiwa and Te Wairoa

Submitter: Carolyn Campbell

9(2)(a)

[redacted]

Topic: Sedimentation (other submitters can cover the forestry slash issue at the Opoiti Bridge).

Time period: Primarily the two flood events of March 2022 and February 2023,, but including many earlier flood events.

1. Land use should relate closely to soil type. Wairoa has highly erodible soils, and many of the current land uses are resulting in excessive erosion, multiple land slips and the consequential sedimentation into the rivers.
2. My observations of very poor land use include:
   - Pasture-only on steep hillsides,
   - Inadequate vegetative cover on/above road embankments,
   - Inadequate/absent vegetative cover on riparian margins and bridge approaches.
3. I consider that inadequate vegetative cover on steep pasture is the grass-only cover. My visual assessment of farmland areas showing multiple slips, and those areas with very few slips indicates that the difference is trees. I observe that the farmland with a smattering of trees holds the land far better than the grass-only regime. I believe that the loss of grass growth from planting a few trees would outweigh the large scale loss of grass from multiple slips. Farmers should be required to plant a few trees in strategic places on steep farmland, and above roads and rivers to reduce slips and sedimentation into the rivers.
4. Each flood I see the Council having to clear many roads, including Tiniroto Road multiple times as the land keeps slipping onto the road. Examining the vegetative cover above these slips shows inadequate cover on the road cuttings, and pasture-only on the farmland above. While there may be some trees present on the bank, in-between these trees there is often only pampas, or nothing at all, which does not hold. Attention to the vegetation in the places that constantly slip would save the Council money and help reduce the massive sedimentation into the rivers.
5. The confluence of the Mangaone stream (including Kotare No.1 bridge), Mangapoike River (and including Opoiti Bridge), and the Wairoa River forms a massive ponding basin during high rainfall events. The vegetative cover in these riparian areas is observed to be:
   - a few large trees, including willow and gum, most of which have now been swept away.
   - Large areas of pampas, similarly disappearing fast as it cannot hold either.

- Predominantly no vegetation at all.

This vegetative cover o lack of it is hopeless at holding this highly erodible land. The ponding effect at this confluence of waterways brings the soil to saturation, and it just slumps into the river. This ponding effect raises the water level by the order of 10 metres, and engulfs a portion of Kotare Road. This last flood went over the road of Opoiti Bridge.

6. A portion of Kotare Road dropped in the Mangapoike River last March, and had to be re-built by cutting into the bank. The river bank along Kotare Road was reduced by **metres** last March, and by more **metres** this flood. One drop out is very close to this road, and will probably fail next time. And still nothing is done to curb this erosion.
7. The bridge approaches for Kotare No.1 Bridge and the Opoiti Bridge have no vegetation. The water action during ponding has caused the total failure of one approach of the Opoiti Bridge, which now has a Bailey Bridge installed. Major infrastructure works will be required to reinstate this bridge. Similarly, both approaches for the Kotare No.1 Bridge have significantly worsened with the two floods, and works are currently underway to address this.
8. Major infrastructure works can address the bridge approach issue and road drop-outs. Similarly, the constant use if diggers can clear the roads and embankments, but this takes time and money. Plus all the silt just gets stacked up on the edge of the road/river bank, to fall in the river next time.
9. The right tree/plant could greatly reduce the need for such expensive and time consuming works. I have had experience with Coast Care, were vegetative cover on the dunes does far better than infrastructure in protective the shoreline. Rivers are different, but I believe that short (not tall) but deep rooting species of trees/plants could save the land, reduce sedimentation and give a sustainable outcome. I would like to know what species are suitable so we can get planting before the next flood.

Guaranteed Income as the Enabler of Economic Contraction

Of all the arguments for Universal Basic Income, the greatest has until now received the least attention. That argument is climate change. The increasing urgency of climate action leaves official carbon-net-zero targets somewhere on a spectrum between precarious and hopeless, while a guaranteed income could bring about a rapid reduction of consumption, by widespread individual choice and with a minimum of legislation.

UBI has been promoted, quite correctly, on practical and ethical grounds, including equity, loss of job precarity, and administrative simplicity. However the arguments are conflicted on the subject of employment, with one side welcoming the trial results that show people so empowered by a guaranteed income that they seek better education and employment, and the other seeking a freer, less job-bound society.

The first is simply orthodox; the second is transformative. Reduced employment and more leisure is the dream that, for two hundred years since the protest of the Luddites, technology has consistently failed to turn into reality.

Imagine if a truly universal basic income scheme was put in place, in your country or mine.[1] There is no guessing how many families would decide that they no longer need two incomes; and no guessing how many individuals would give up a job they knew to be pointless, wasteful, or in any way destructive; but there is certainty that many would like to do so, when were given the chance, and that a guaranteed income is the only policy that enables such widespread individual action.

Hence climate change is set to become the overwhelming argument for UBI, and UBI to be recognised as the only economic tool that can bring a sufficiently rapid end to climate and habitat destruction. Climate action and guaranteed income are intimately connected.

This essay is about that connection. I will briefly survey the urgency of climate action and the orthodox response, the importance of contraction and convergence, and the evolution of a more informal economy in the short and long terms as people are liberated from over-employment.

Recession as First Response to the Climate Crisis [a]

The first step in reducing damage is to stop causing it. This means contraction: scaling down industries and consumption. Energy alternatives are too small and too slow to meet the crisis without industrial de-escalation, although they should be developed concurrently as the second response.[2]

Industries that are toxic, wasteful or useless, and those that exist only to serve them, can be abandoned with no macroeconomic cost, that is, no loss of wellbeing, and considerable environmental benefit. This could quickly cut direct emissions and commuting by a major fraction—for argument's sake I suggest fifty percent—and liberate buildings and resources for better uses.[3]

In contrast, gradualist government strategies now being proposed are precarious, as they depend on projections that may not be accurate and marginal targets that could prove inadequate. They risk losing their year-by-year margin ahead of global warming for a number of reasons. Responses to contingencies of storms, fires, earthquakes, pandemics, and to breakdowns political, financial and technical, all generally involve unplanned energy and pollution costs. While these "Black Swan" events are individually unpredictable, we do know

that some combination of them is more or less inevitable[4]. At the same time, successive IPCC reports have a consistent trend of raising the goalposts, or in other words shortening the timescale for action.

Decoupling of carbon emissions from economic growth, however successful on its own terms, is of limited value for three reasons. First, the decoupling is never complete: commuting to the most environmentally harmless job is still commuting, and trading earth-friendly commodities, if it is not localised, still means packaging, storage, transport, and marketing, all of which use energy, materials, buildings, and commuting to an unnecessary degree.

Secondly, mere decoupling in the formal economy overlooks the present scale of the informal economy and its potential for future increase. It assumes you have to give people things to do, via formal jobs, when human activity is actually unstoppably creative.

Thirdly, clinging to growth as an economic good sends the wrong message. It is perilously expansionary, when we need shrinkage of consumption and ultimately of sheer numbers—what David Attenborough calls Peak Human—to restore biodiversity, and through biodiversity, our sustaining environment.

Perhaps most misleading is talk about cost, the so-called costs of climate-action policies. The irony is that doing nothing costs nothing. Using fewer resources is not a net cost. In real terms, it cannot possibly be so. Doing less costs less, automatically.

The apparent costs we are warned of, to offset or adapt to climate change, are not so much material costs as payments: payments to somebody, often nameless creditors, to fund research and development. Of course we need that progress, to some degree, but the rapid and powerful response is reduction, pure and simple—and free. Economic contraction, degrowth, is free.

The cost of good climate action is not money. Money is an inequality between people, and at best a trusting expression of that. It works on the small scale, but on the global scale there is no such thing as financial cost to the whole world. You can't pretend wealth is "lost" without saying where it has gone—to whom it has passed. The creditors are not Martians. You can't bankrupt the entire planet in financial terms, as the scaremongering economists foretell; but unfortunately, in environmental terms, you can.

The strategy of contraction, via guaranteed incomes, is more powerful than gradualist strategies by an order of magnitude. It can leap "ahead of the curve" and create a safety margin of time (perhaps a whole decade) for social and economic adaptation, while also unlocking a global think-tank, through the increased freedom and decreased stress of people who choose fewer hours of formal employment, to find creative solutions of local or even general value.

Degrowth is good, positive news, and better if planned rather than forced by strings of calamities. However, in economic language it is recession, and to economists, politicians and even journalists recession is unspeakably bad, and hence not spoken of.

It could be called the glorious recession. The challenge now is to generate cultural change through talking about it, so that recession is no longer feared as blasphemy or a recipe for chaos. Chaos is what we already have, and what will keep growing if business-as-usual prevails. The policy of UBI is the instrument of that cultural change.

Contraction and Convergence [b]

Important concepts have slipped away from public discourse. The environmental movement emerged in the 1970s with frequent reference to the "post-industrial society,"[5] but today's love-affair with technology makes commentators afraid of the expression, lest they look like Luddites. Another basic concept is "contraction and convergence," introduced in the 1990s by the Global Commons Institute. To make energy emissions converge to, say, two tonnes per person, some countries like Australia and United States would have needed (on 1990 figures) to reduce energy consumption by almost ninety percent, while Uganda could afford to increase by a factor of twenty.

Although the concept has lost currency since then, it has actually gained relevance, applying to inequalities of spending as well as to resource consumption. Its two words form a syndrome, as converging, or reducing inequality, must involve contraction: we cannot all live like billionaires. Conversely, contraction must entail convergence: the poorest cannot sink below zero, so the gaps must close.

A guaranteed income that provides for basic living is the economic tool to maximise contraction and convergence. All other economic policies are trivial in comparison.

I have used the word "contraction" to tackle the irrational fear of recession that pervades economic orthodoxy. However, the term most likely to catch the public imagination is probably "degrowth." Degrowth is admirably explored in Jason Hickel's book *Less is More* (2020).

The Distinction between Jobs and Work

A guaranteed income highlights the difference between jobs and work. Formal employment, the so-called job, has been taken too far, and failed on two fronts. Socially, the job has proved an inefficient and unfair way of apportioning and even denying incomes; economically, it has proved a random and now positively lethal way of directing industrial development. The industrial experiment has run its course.

In *Bullshit Jobs* (2018) the late David Graeber estimated that half of all jobs (writing in North America) were pointless. He detailed types of self-serving, pernicious and wasteful jobs, and his book is a valuable reference. I propose an even wider category of what I call "WASTE" industries—Wasteful, Alienating, Stressful, Toxic or Exploiting [c]—which renders his estimate of fifty percent clearly conservative.[7] We could reduce consumption by far more than fifty percent; but for the sake of argument, just to cut industrial production by half, with a commensurate rise in the informal economy, is a sufficiently dramatic yet achievable goal.

Stopping the most destructive industries, and slowing others, reverses growth and slows the economy. This is essential. An engine, or any system, that cannot be slowed, stopped or reversed at will—in other words, controlled—is fundamentally flawed and requires radical revision. The responses of various countries to Covid-19 showed that we have some way to go in the art of slowing down without causing unequal degrees of suffering through loss of incomes.

Many jobs, and entire industries, exist just to prop up others.[8] Creating jobs might boost "the economy," but does nothing for wellbeing, and nothing for the planet. Jobs exist, not to do basic work for home, health, community or environment, but to dish out spending power, inefficiently, unequally, and unfairly. The effect on the majority, paradoxically, is to reduce

spending power and living power. Inventing jobs is inventing problems for people to solve, instead of solving the problems we already have.

Inventing jobs is negative; doing work is positive. Jobs and work are not the same.

Good work, work that is useful and satisfying, is weakly, and often negatively, correlated with financial rewards; yet by definition good work is the source of wellbeing and real wealth. In *Utopia for Realists* (2016) Rutger Bregman refers to the earning of money without contributing anything to society as "the paradox of progress… the richer and smarter we get, the more expendable we become." He quotes a study for the New Economics Foundation in 2009, in which Susan Steed and Helen Kersley estimated that for every pound earned by advertising executives they destroy an equivalent of seven pounds in the form of stress, overconsumption, pollution and debt, while each pound paid to a trash-collector creates an equivalent of twelve pounds in terms of health and sustainability.[9]

The psychology of job dependence, along with wage differentials, is historically recent, dating from the Industrial Revolution, yet it is entrenched across the political spectrum and up the financial ladder to a religious degree, and only a crisis can change it. The differential economy has no basis for ranking the value of jobs, other than historical precedent.

If instead we share the wealth, we liberate people to do good things. The idea of communities that share, where people actually feel they belong, is older than civilisation—a civilisation that now alienates them and can't even house them.

Creating jobs as an end in itself is a destructive goal: inventing problems so people can be paid to fix them. In a more informal economy, where income is guaranteed and decoupled from employment, people work to meet needs instead of to earn money. Hence orderly degrowth is the key not only to minimising climate change, but to meaningful work and fulfilling lives.

In contrast to WASTE jobs, we could promote DECENT [d] work: Dedicated, Environmental, Community-building, Enterprising, Novel, and Transformative. The crucial decoupling we need to make is between work and jobs.

Since planning and regulation of an orderly recession are impossible in detail, transformative economic policies are needed, to act as invisible hands, guiding the contraction of industry and the localisation of markets. The principal policy in this category is guaranteed income.[10]

The Evidence from Basic Income Experiments [e]

UBI trials generally give no indication of macroeconomic effects: the effects of a truly universal basic income on an entire economy. Kate McFarland, writing for the BIEN newsletter in 2018, has suggested that the important question to ask people is not "What would you do if your income were taken care of?" but "What would you do if *everyone's* income were taken care of?" and explained that:

> "What a financially self-sufficient individual would choose to do *in a society of full-time workers* is not necessarily identical to what that same financially self-sufficient individual would choose to do *in a society in which everyone could afford to live without a job*."

She has also listed the limitations of pilot studies. Experiments in UBI are limited in duration, are not "universal" in scope, exclude net contributors, are restricted to low-income populations, and experimental subjects have already "come of age" in the culture of work.

Like her, I suspect the trials were (and are) motivated partly to show orthodox results for orthodox thinkers, since it is they who need winning over to UBI. For example, it appears from pilot studies that people given an income will not prove idle, but undertake more formal education and more formal jobs, even long after the trial period is over. Her comment is "This attitude toward basic income experiments only recapitulates society's overvaluation of paid work." Indeed, it suggests a dangerous falsehood, that society can possibly enjoy convergence without contraction: elevating the needy, certainly, but without lowering either the over-affluent or the consumptive system, and indeed encouraging the falsehood that such a system is in some way sustainable.

I also think it is fruitless trying to satisfy the conventional desire for evidence, and the fashionable drive, however well-meaning, for economic policies that are "evidence-based." Real change can never be evidence-based in this sense. If it could, it would require no courage, imagination, or vision. Limited pilot studies trials give no evidence at all of macroeconomic or long-term results, for the reasons given above.

However, there are two large bodies of hard evidence that is relevant; one positive and one negative. The first is in the history of past centuries and millennia, and also in surviving vestiges of ancient cultures in some ethnic groups. In both areas we see members of society embraced and included, with guaranteed security and dignity [e].

The negative evidence is the world-wide experiment that is more or less completed: the destruction of society and its surroundings by the present system, particularly since the great acceleration from the 1980s to the present.

The Koha Economy

"Koha" is the New Zealand Maori word for "gift," although like so much of their language, it has a richer meaning than that single word. Giving is a way of life, a source of personal status, and of course means receiving and giving with equal grace. The koha or gift economy is an informal economy. The present system is a combination of formal and informal, with the latter largely undervalued and underpaid.

Charles Eisenstein, in *Sacred Economics* (2011), gives a detailed historical description of the gift economy that is truly inspiring.[11] In the mix that makes up our economy, the formal component needs to be reduced, not totally but partially, with a corresponding increase in the informal, in the direction of that vision.[12]

In a less formal economy, where income is guaranteed and decoupled from employment, people work to meet real needs instead of to earn money. Problems are solved instead of being manufactured. DECENT work addresses real needs without having to return a profit. The guaranteed income cuts to the heart of this issue, and enables an altogether more inclusive, rational and feminist economics.

Money and trade, the trappings of formal economics, are then relegated to their original purpose and proper domain, which is dealing with surpluses and luxuries, while the basics of life are shared in a more controlled and cooperative way. These are food, land, housing, health, freedom and dignity—the things that the free market makes scarce by exploitation.

More informality, facilitated by a universal income, leads not just to a more mixed economy, but an ecosystem of diverse local mixed economies. Degrowth can settle into various attractor states of increased equality, peace, and sustainability, with all that these mean for creativity and family life as well as the big and dirty problems on the world stage. Such a system would be more fair, reliable and sustainable, than the enslaving market system. It would use national and global protection to maximise local freedom and diversity.

Evolution

The beauty of the guaranteed income is the combination of administrative simplicity and diverse results. It is adaptable to different regions and the changing culture of the times. It enables people to take more action in the interest of the planet, as they see fit, and as their sense of urgency develops, regardless of the glacial development of official regulations.

This development could justifiably be called free enterprise. As a stratagem for the short-term, it bypasses the long-winded, costly and precarious legislation of progressive targets of uncertain accuracy.

For the long-term effects, there is only one possible experiment, and that is to make it a large-scale reality.[13] The major transformation of the labour market, for example, is impossible to predict.[14] What can be predicted is a long evolution, through the liberation of human caring and creativity, into new structures, which I have dubbed with the chaos-theory expression "attractors"; and a combination of higher, lower, and ancient timeless technologies.

The prospects are relatively simple to envisage for a country in isolation, or in a broad-brush way for the world at large, but much harder for a country with neighbours or trading partners that do not change. Clearly, unilateral action takes political courage. The greatest obstacle to such action, whether isolated or multilateral, seems right now to be lack of imagination.

Lessons from the Pandemic

The Covid-19 pandemic brought the craving for guaranteed incomes into public debate as never before. Much personal and business suffering could have been averted if a guaranteed income had been in place. The lockdowns also brought into sharp relief some advantages of reducing industry: improved air quality, return of wildlife, and resurgence of human connectivity and creativity. Here, in brief and partial form, was evidence that slowing can be good.

The direct suffering caused by illness and death is one thing, but the economic hardship of the lockdowns was (and still is) caused almost entirely by the inequality of the economic status quo—the differential economy. To all this suffering the pandemic was just a trigger, not the prime cause. Opening our eyes to this fact, with a glimpse of future possibilities to cope with other Black Swan events, is another silver lining to the dark cloud of the pandemic.

Three major mistakes caused unnecessary stress and financial losses: failure to plan for Black Swan systemic breakdowns in advance; making differential compensations differentially based on businesses and wages instead of equitably citizen-based[15]; and failure to include, among the inessential industries to be locked down, the extractive sector, which by definition

is unproductive, of rents, debt-repayments and interest-payments (interest payments are logically not repayments but additions to debts).

The lessons of the Covid-19 pandemic lockdowns were adaptation, creativity, and environmental relief. If we don't heed the lessons, all those victims of the pandemic will have died in vain.

People adapted readily to such a clear emergency; to the creeping emergency of climate change, they want to react but need systemic help.

Commentators around the world, faced with climate change and a host of economic problems, are calling with increased urgency for radical systemic change, but mostly fail to say what it should be. The connection between universal basic income and climate action answers that call with a practical response to the crisis. A guaranteed income is a necessary economic policy if not a sufficient one, but it is the only one that is sufficiently rapid to give genuine hope.

Gavin Maclean, June 2021

6 April 2023

Ministerial Inquiry into Land Use
Ministry for the Environment

FMG
Advice & Insurance

Level 1, PwC Centre
10 Waterloo Quay, Wellington 6011
PO Box 521
tel 0800 366 466 fax 0800 366 455
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Appendix to Farmers' Mutual Group submission

FMG – an overview

- FMG Insurance has a long history of serving rural New Zealand - 118 years.
- We are the largest 100% New Zealand owned insurer that was formed to help rural New Zealanders protect their farms and livelihoods.
- We are also a mutual, which means that our clients with a rural connection are also our members – akin to shareholders.
- Today, FMG is still 100% New Zealand owned and operated, with 30 local offices throughout regional New Zealand.
- Our team of more than 850 employees supports rural New Zealand to grow, innovate, and thrive.
- FMG does not use brokers but has staff in local offices which offers several advantages, including building trust and enduring relationships with clients, providing tailored support, products and services to better meet the unique needs of our rural clients.

FMG – Cyclone and severe weather event recovery

- Our intention is to aid the Ministerial Inquiry into Land Use in the Te Tairāwhiti, Tūranganui-a-Kiwa and Te Wairoa regions by sharing our insights, experience, and real-time information. Doing this we hope to contribute to a successful recovery for those impacted and to assist the Inquiry to better understanding the local-level recovery efforts.
- FMG is proactively contributing to the recovery efforts in the regions affected by Cyclones Gabrielle and Hale, using our local offices to provide on the ground support in an incredibly stressful time for those affected.
- Because of our unique distribution of offices in regions affected we can provide real-time information to better understand the recovery efforts at the local level – and particularly for farmers and growers.
- FMG has had hundreds of face-to-face interactions with its clients in the affected areas.

"It's heart-breaking to see and hear of how people's lives and livelihoods have been impacted by these storms," FMG's Head of Claims, Nicki Mackay.

- As of 27 March 2023, FMG has paid out about $23 million in insurance claims following Cyclone Gabrielle and other recent storms. This is just the tip of things and there's some way to go yet.

- For context Cyclone Bola in 1988, FMG paid out claims amounting to about $2.3 million (approximately $5 million when adjusted for inflation).
- Where it can, FMG is making quick and considered decisions on settling simpler claims.
- The number of claims from Gisborne and Hawkes Bay related to Cyclone Gabrielle has seen a massive increase.
- February 2023, we have experienced a staggering rise of about 785% in Cyclone-related claims and in March a significant increase of around 264% compared to a normal month.
- What our data shows is that damage from silt, flooding, landslip, debris, and woody debris is enormous.

Working together towards pragmatic and enduring solutions

Resources: FMG has a small team of EQC assessors. Having its own team who are trained and certified by EQC provides several advantages. It has enabled FMG to assess EQC settlements on behalf of EQC, which streamlines the claims process and reduces the time taken to settle claims. During these severe weather events, having an in-house team of EQC assessors allows FMG to quickly respond to claims that include landslips, storms, and floods instead of waiting for EQC auditors. Cooperative initiatives to build this type of resource capability would be extremely useful.

Cyclone Gabrielle Recovery Taskforce: Adam Heath, CEO of FMG, is a member on the ICNZ Executive (CE) sub-group of the Taskforce.

Risk Assessment and Data Sharing: Insurance companies possess valuable data on natural disasters and their impact on rural areas. They can share this data with the government and regulators, helping them make informed decisions on legislation and initiatives aimed at enhancing resilience and risk reduction in rural communities.

Financial Literacy and Access to Insurance: Rural insurance companies could work with the government to improve financial literacy among rural communities, emphasising the importance of insurance and helping them understand and access appropriate insurance products.

ENDS

Submission to the Ministerial Inquiry into Land Use

Date 6 April 2023

Submission of the Human Rights Commission

Submission of the Human Rights Commission to the Ministerial Inquiry into Land Use

Date 6 April 2023

The New Zealand Human Rights Commission (the Commission) is established and operates under the Crown Entities Act 2004 and the Human Rights Act 1993. The Commission is accredited as an 'A status' national human rights institution under the Paris Principles. Information about the Commission's activities can be found on our website: www.hrc.co.nz

NZ Human Rights.
Human Rights Commission
Te Kāhui Tika Tangata

Introduction

1. The Human Rights Commission (the Commission) welcomes the opportunity to make a submission to the Ministerial Inquiry into Land Use causing woody debris, including forestry slash, and sediment-related damage in Tairāwhiti/Gisborne and Wairoa (the Inquiry).

2. The purpose of this submission is to encourage the Inquiry to apply a human rights approach and uphold the Crown's obligations under te Tiriti o Waitangi (te Tiriti) by identifying the applicable human rights and te Tiriti principles. It does not respond to the specific areas set out in 12.3.1-12.3.6 of the Inquiry terms of reference.

3. Many people have lost homes, livelihoods, livestock and, in some instances, family members. Communities are shocked and angered to see the devastating scale and impact of wood debris and sediment unleashed by Cyclone Gabrielle.

4. The recovery efforts that follow have a wide range of human rights and te Tiriti implications. The displacement and isolation of people and communities, the destruction of homes and property, the damage to critical infrastructure and the ongoing socio-economic impacts, create new human rights challenges and exacerbate existing human rights problems and inequities experienced by tangata whenua and by vulnerable groups. These issues directly engage the government's human rights and te Tiriti obligations to people in the affected communities, their whānau, hapū and iwi.

5. These people have suffered human rights violations, including their right to a decent home, and rights to a clean, healthy, and sustainable environment, as well as breaches of te Tiriti o Waitangi.

6. These are extremely grave issues which disproportionately impact the most disadvantaged, and many are blaming forestry companies, central and local government for failing to address the risks posed by forestry slash.

A human rights approach

7. Aotearoa New Zealand has obligations under international law to protect the human right to a healthy environment, as well as other related human rights such as the right to the enjoyment of the highest attainable standard of physical and mental health, the right to an adequate standard of living and the rights of Indigenous Peoples. These rights also exist alongside and uphold the Crown's obligations under te Tiriti o Waitangi.

8. The New Zealand Government, together with the international community, has recently adopted United Nations (UN) resolutions, which recognise the right of everyone to a clean, healthy and sustainable environment.[1] These affirm other human rights obligations, including

[1] United Nations Human Rights Council (UNHRC) 'The human right to a clean, healthy and sustainable environment' (18 October 2021, A/HRC/RES/48/13) at [1]; United Nations General Assembly (UNGA) 'The human right to a clean, healthy and sustainable environment' (1 August 2022, UN Doc A/RES/76/300), at [1]. The recognition of this right is a recent development, in response to the "alarming decline of the natural world" and observations that "human beings are wholly dependent on a healthy environment in order to lead dignified, healthy and fulfilling lives". See United Nations Environment Programme 'In historic move, UN declares healthy environment a human right' (28 July 2022); Report of the Special Rapporteur on 'Human

those set out in the UN Declaration on the Rights of Indigenous Peoples. The right to a healthy environment obliges states to protect against environmental harm, provide equal access to environmental benefits and ensure a minimum standard of environmental quality for everyone to enjoy.

9. The former United Nations Special Rapporteur on human rights and the environment (SR on the environment) has emphasised the interdependence of human rights and environmental protection, given that a safe, clean, healthy and sustainable environment is necessary for the full enjoyment of human rights.[2] The right thus encompasses and is vital to the enjoyment of a range of fundamental human rights including the right to life, to the enjoyment of the highest attainable standard of physical and mental health, to an adequate standard of living, to adequate food, to safe drinking water and sanitation and to housing, and to cultural and indigenous rights.[3] The latter include Indigenous Peoples' rights to lands, territories and resources; to equality and non-discrimination; to participate in decision-making and to exercise self-determination.[4] These rights entail obligations on government to both include Māori in any response planning as well as to enable and support Māori-led responses.

10. Equally, the exercise of human rights, including participation and effective remedies, is vital to environmental protection.[5] A human rights approach to the environment thus necessitates a holistic approach, ensuring that both the processes and outcomes of the Inquiry's work are consistent with human rights obligations.

11. The NZBORA and Human Rights Act 1993 also guarantee the right to be free from discrimination,[6] which requires states to eliminate *all* forms of discrimination, including indirect and structural discrimination.[7] The government risks perpetuating systemic discrimination if it fails to adequately recognise and address the needs of tangata whenua and of various marginalised groups within Aotearoa. The government should therefore take active steps to prevent existing inequities from being reinforced and exacerbated, through upholding a human rights approach.

12. A human rights approach is recognised internationally as central to disaster risk reduction. The *Guiding Principles of the UN Sendai Framework for Disaster Risk Reduction 2015-2030* provide that the management of disaster risk must promote and protect all human rights, and requires

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rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment' (A/73/188, 19 July 2018), at [37].

[2] John H. Knox 'Framework Principles on Human Rights and the Environment - The main human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment' (UN Doc A/HRC/37/59, 24 January 2018), at [4].

[3] UNHRC, 'Human rights and the environment' (9 April 2018, UN Doc A/HRC/RES/37/8), Preamble.

[4] United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (adopted by UNGA 13 September 2007, endorsed by New Zealand 20 April 2010).

[5] Knox 'Framework Principles', above n 2.

[6] NZBORA, s19; HRA 1993, s21. This is consistent with the fundamental international human rights of equality and non-discrimination as recognised in the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD) (adopted 21 December 1965, entered into force 4 January 1969); International Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) (adopted 18 December 1979, entered into force 3 September 1981); International Covenant on Civil and Political Rights (ICCPR) (adopted 16 December 1966, entered into force 23 March 1976), art 26; International Covenant on Economic, Social and Cultural Rights (ICESCR) (adopted 16 December 1966, entered into force 3 January 1976) , art 2(2); International Convention on the Rights of the Child (CRC) (adopted 20 November 1989, entered into force 2 September 1990), art 2; and International Convention on the Rights of Persons with Disabilities (CRPD) (adopted 13 December 2006, entered into force 3 May 2008), art 5.

[7] HRA 1993, s 65.

all-of-society engagement, partnership and empowerment, and inclusive, accessible and non-discriminatory participation.[8]

13. A human rights approach requires recognition of the different roles played by various stakeholders in response to disaster relief, risk reduction, and climate change. In the context of Cyclone Gabrielle:

    - There are 'rights-holders', that is individuals, communities and peoples, with reasonable expectations and basic rights, living downstream from logging operations.

    - There are 'duty-bearers' with human rights responsibilities, such as forestry companies who operate or contract logging operations and create slash.

    - The other 'duty-bearer' in this instance is the government, who has a duty to protect individuals and communities from business practices that violate human rights.

14. Adopting a human rights approach to disaster risk reduction and climate change will fortify much of the work the government has already commenced in its ongoing response to Cyclone Gabrielle. Early consideration of human rights in planning and policy making going forward will be an asset to local and central government and will support 'rights-holders' and 'duty-bearers' to understand their rights and responsibilities during the response to the impact of wood debris and sediment.

15. The Inquiry must address the whole picture, including questions like whether planting Pinus radiata in such locations was appropriate in the first place. However, the risk of this approach is that we find fault with many and hold none to account.

16. New Zealand needs companies, so the state grants them a social licence to operate. The licence is to work and enhance shareholder value. The licence has conditions. The most basic condition is simple: respect human rights and do no harm.

17. The *United Nations Guiding Principles on Business and Human Rights*, supported by New Zealand, require companies (as a minimum) to assess their potential and actual human rights impacts; take action to prevent or mitigate harmful impacts; and provide remedies if a company causes or contributes to human rights failings. Further useful guidance on these standards and their practical application, including specific obligations on businesses to respect and uphold the rights of Indigenous Peoples, is also provided by the OECD,[9] and initiatives such as the UN Global Compact.[10]

Te Tiriti o Waitangi obligations

18. A human rights approach to disaster recovery and risk reduction, including consideration of adaption plans such as the "managed retreat" of communities from at-risk locations, must also reflect the government's duties under te Tiriti. These duties include both the active protection of the human rights of tangata whenua affected by Cyclone Gabrielle and the upholding of tino rangatiratanga and self-determination in the decision-making processes that take place.

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[8] United Nations, *Sendai Framework for Disaster Risk Reduction 2015-2030*, p 13, para 19(c), 19(d).
[9] OECD (2011), OECD Guidelines for Multinational Enterprises, OECD Publishing, available at http://dx.doi.org/10.1787/9789264115415-en.
[10] See https://unglobalcompact.org/what-is-gc.

19. Under article 2, te Tiriti o Waitangi guaranteed Māori tino rangatiratanga.[11] This was a guarantee that Māori would be able to continue to exercise full authority over lands, homes, and all matters of importance to them.

20. Alongside this guarantee, article 1 of te Tiriti affirmed the principle of kāwanatanga, described by the Waitangi Tribunal as: [12]

> "a power to govern and make laws, but it was a power that particularly applied to settlers, settlement and international relations, and – to the extent that it might apply to Māori – was to be used for the protection of Māori interests, and in a manner that was consistent with Māori views about what was beneficial to them".

21. Given the overlapping nature of the respective authorities of the Crown and Māori, the relationship between the parties must be "conducted honestly, fairly, and in good faith in the spirit of cooperation and partnership".[13]

22. Article 3 of te Tiriti also guarantees Tangata Whenua all the rights and privileges of British subjects, including the right to equity of outcomes. The Waitangi Tribunal thus recognises the principle of "equity" under te Tiriti,[14] which obliges the government to ensure equitable outcomes for Tangata Whenua in respect of measures to address disaster recovery, risk reduction and climate changes. This is particularly important in light of existing inequalities exacerbated by the disaster, as well as its disproportionate impacts on Māori. Māori are more likely to be poor, to be less healthy, to be uninsured, to be homeless or live in substandard housing and to live in climate change vulnerable places that require major infrastructural investment to withstand ongoing climate change impacts, or managed retreat.

23. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) is the most comprehensive and authoritative international human rights instrument dealing with indigenous peoples' rights. Reflecting an elaboration of binding norms and a global commitment to minimum standards, it has "significant normative weight",[15] and reinforces the Crown's obligations under te Tiriti.

24. Adopted in 2007, the UNDRIP elaborates on the universal right to self-determination already affirmed under articles 1 of the International Covenant on Civil and Political Rights (ICCPR) and International Covenant on Economic, Social and Cultural Rights (ICESCR), by confirming that "Indigenous peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development."[16]

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[11] Tino rangatiratanga stems from inherent rights and whakapapa connections to land and the natural environment. It entails the authority and ability to exercise Kaitiakitanga rights and responsibilities, uphold intergenerational obligations and maintain spiritual connections to lands and waters. Its underpinning core values speak to an indivisible relationship between Māori and whenua.

[12] Waitangi Tribunal (2021) *He Pāharakeke, he Rito Whakakīkīnga Whāruarua – Oranga Tamariki Urgent Inquiry – Pre-publication Version* (Wai 2915) at 17.

[13] Ibid.

[14] Waitangi Tribunal (2008) *Te Tau Ihu o Te Waka a Maui: Report on Northern South Island Claims* (Wai 785, Vol 1) at 5.

[15] Waitangi Tribunal *Whaia te Mana Motuhake - In Pursuit of Mana Motuhake*: *Report on the Maori Community Development Act Claim* (Wai 2417, 2015) at 34.

[16] UNDRIP, art 3. See also preamble which "[a]cknowledg[es] that the Charter of the United Nations, the International Covenant on Economic, Social and Cultural Rights and the International Covenant on Civil and Political Rights, as well as the Vienna Declaration and Programme of Action, affirm the fundamental

25. To uphold their UNDRIP obligations, the UN Expert Mechanism on the Rights for Indigenous Peoples has advised that states should:[17]

- Commit to ensuring the full and effective participation of indigenous peoples, partnering with indigenous peoples in national strategies for disaster risk reduction.
- Scale up disaster risk management efforts to reach the many risk-prone indigenous peoples and other vulnerable groups.
- Take measures, in cooperation with indigenous peoples, to promote sustainable land use and ensure the security of water resources.
- Consult with indigenous peoples and obtain their free, prior and informed consent when implementing disaster risk reduction measures that may affect their lands, territories and natural resources.
- Develop and implement resource extraction policies that aim to measure and reduce risk. This may include prohibiting resource extraction development where such development could lead to an increase in disaster risk.

Impacts of climate change

26. Lastly, Cyclone Gabrielle has brought into stark relief the potential future impact of climate change on communities in Aotearoa New Zealand. Climate change brings with it profound consequences for human rights. The UN recognises this and, through the Office of the High Commissioner for Human Rights, seeks to promote a human rights-based approach to climate action. This approach aligns with the 2030 Sustainable Development Goals and the Paris Agreement, both of which Aotearoa New Zealand has committed to meeting.

27. Climate change threatens the effective enjoyment of all human rights and thus it is essential that the response to climate change ensures consideration and protection of human rights.[18] Climate change impacts, directly or indirectly, the human rights to a healthy environment, life, access to water, sanitation and food, human health, housing, self-determination, culture, accessibility and inclusion, security, and economic and social development. States, through domestic and regional laws and policies, have obligations under human rights to do all they can to prevent the foreseeable adverse effects of climate change and ensure that those affected by

importance of the right to self-determination of all peoples, by virtue of which they freely determine their political status and freely pursue their economic, social and cultural development".

[17] Expert Mechanism on the Rights of Indigenous Peoples, *Promotion and protection of the rights of indigenous peoples in disaster risk reduction, prevention and preparedness initiatives*, 28 April 2014, A/HRC/EMRIP/2014/2.

[18] As emphasised by the UNHRC in a 2011 resolution: "climate change-related impacts have a range of implications, both direct and indirect, for the effective enjoyment of human rights." UNHRC 'Human rights and climate change' (26 September 2011, A/HRC/18/L.26), at Preamble. See also UN Office of the High Commissioner on Human Rights (OHCHR) Statement of the United Nations Special Procedures Mandate Holders on the occasion of the Human Rights Day Geneva (10 December 2014).

it, particularly those in vulnerable situations, have access to effective remedies and means of adaptation to enjoy lives of human dignity.[19]

Conclusion and Recommendations

28. As we tackle forestry slash - and the more enduring problem of climate change - human rights and te Tiriti must be front and centre.

29. It is imperative that Tangata Whenua are involved as partners with Government through the response, that they are enabled and supported to exercise their rangatiratanga and that their free, prior and informed consent is obtained where their rights and lands are affected. This will in turn help to ensure that responses adequately meet Māori needs and address the inequalities that Māori already experience and which risk being further exacerbated.

30. The Commission urges the Inquiry to engage closely with Tangata Whenua and to consult with all segments of the population who are already in vulnerable situations. Groups that are already marginalised and living in vulnerable situations, as a result of pre-existing inequalities and inequities, will continue to be the most affected and have less favourable conditions or reduced capacities to adapt to and to mitigate the consequences of climate change. Factors such as geography, poverty, gender, age, ethnicity or race, nationality of birth or social status, indigenous or minority status and disability may further aggravate those consequences.[20]

31. The Commission further urges the Inquiry to consider the *United Nations Guiding Principles on Business and Human Rights*, which recognises corporate social responsibility to identify, prevent, mitigate, and account for damage caused to human rights, and to establish procedures for remedying the negative consequences on human rights they cause or contribute to causing. The state should only contract with entities that meet human rights and te Tiriti obligations.

32. The Commission finally urges the Inquiry, through its response, to encourage forestry companies to grasp their human rights responsibilities, comply with their social licence to operate (or lose it), provide remedies where they are due, build back better, and ensure the tsunami of debris and silt never happens again – in Tairāwhiti and Wairoa, or anywhere in Aotearoa.

33. To uphold human rights and te Tiriti obligations, the Commission makes the following key recommendations to the Inquiry:

    a) Engage closely with Tangata Whenua throughout its processes, and consider recommendations that will enable iwi and hapū to exercise their rangatiratanga and ensure their free, prior and informed consent is required where their rights and lands are affected.

    b) Consider whether decisions to plant pinus radiata in these locations was appropriate given the impact on the fundamental rights of peoples and communities downstream from logging sites. Following such assessment, recommend mechanisms to provide redress to affected peoples and communities for human rights breaches that have occurred to date, and to hold responsible public and private agencies to account as duty-bearers.

[19] OHCHR 'OHCHR and climate change'.
[20] UNHRC, 'Human rights and climate change', above n 11.

c) Recommend that human rights and te Tiriti principles be embedded in all policies governing ongoing and future land use management. Policies should require decision-making authorities to consider the full spectrum of human rights impacts for affected communities, including economic, social and cultural rights, and rights to non-discrimination.

d) Require all corporate entities contracting with government, including forestry and logging companies, to conduct human rights due diligence assessments and periodically report to government on the human rights impacts of their planning and operations, and steps they are taking to mitigate any identified human rights issues.

e) Recommend that human rights and te Tiriti principles be embedded in the Resource Management Act 1991 (and its successor legislation), including by:

    i) Requiring that the use and development of land, and protection of the environment is enabled in a way that is consistent with domestic and international human rights obligations.

    ii) Requiring that all provisions empowering delegated decision-making recognise and give full effect to te Tiriti and public participation.

Maraetaha -Toi tu te whenua, hei oranga mo te tangata

Purpose:	Ministerial Land Use Inquiry
From:	On behalf of Maraetaha Inc Trustees
Date:	28 March 2023
Author:	9(2)(a)

Purpose of Inquiry

1 The purpose of the Inquiry is to describe the history of land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in the Tairāwhiti/Gisborne District and Wairoa District, and to make recommendations about the further work needed to address land use impacts of storms.

1. Historical Land Use

9(2)(a)

In 1988 Cyclone Bola struck the Mangapoike and Waingake Valley and the Gisborne District water supply pipeline was broken. This resulted in two weeks of repairs to the pipeline system. This pipeline traverses through our whenua, our farming operation. 9(2)(a)

9(2)(a)

Ironically, 35 years later Cyclone Gabrielle struck and the whenua that was planted as part of the GDC JV has now created the destruction of 8 major breaks in the water supply pipeline to Gisborne City / Turanganui A Kiwa. Whole trees and land slips were mobilised creating major destruction. When this occurred the GDC then came to us, as Maori land owners to request the use of our whenua, Patemaru Station, to repair the pipeline. We currently have a Relationship MOU with GDC on our historical issues, this Cyclone has brought more awareness to GDC of our history and whakapapa.

Maraetaha -Toi tu te whenua, hei oranga mo te tangata

2. Relational Impact on our key stakeholders/partners - Slash

- Established a mandate from Maraetaha Inc with GDC to support whatever was needed to repair the pipeline on our whenua.
- Fed the engineers, network serviceman and contractors to fix the water pipeline.
- Demonstrating tikanga as Ngai Tamanuhiri to manaaki and awhi GDC to reconnect this major arterial line to supply Gisborne / Turanganui A Kiwa with water.
- Today the water line is being switched on - karakia was held yesterday.

3. Biodiversity Impact - Silt

- In 2021 we were supported by ***TPK to complete our Farm Environmental Plans, FWP and 'GHG Know your number' to help our declining environment and raise our awareness of Climate change through improving our farming systems and practices. (B & L NZ Environmental Strategy 2022).***
- Evidence gathered from the surrounding forests show a fine 'silty slime sludge' from harvest runoff from the forests that bound Patemaru Station.
- This sludge has impacted on our freshwater koura and freshwater ecology, it is then swept out to sea creating more silt in our Moana.
- The water level within our river has reduced to a ⅓ of its potential flow.
- Rocks exposed with this sludge has dried like fine silt. These rocks are now heating up through sun exposure, also contributing to raising our climate impact.
- Massive destruction to access, fencing and stock exclusion has occurred on Patemaru Station.

4. Recommendations

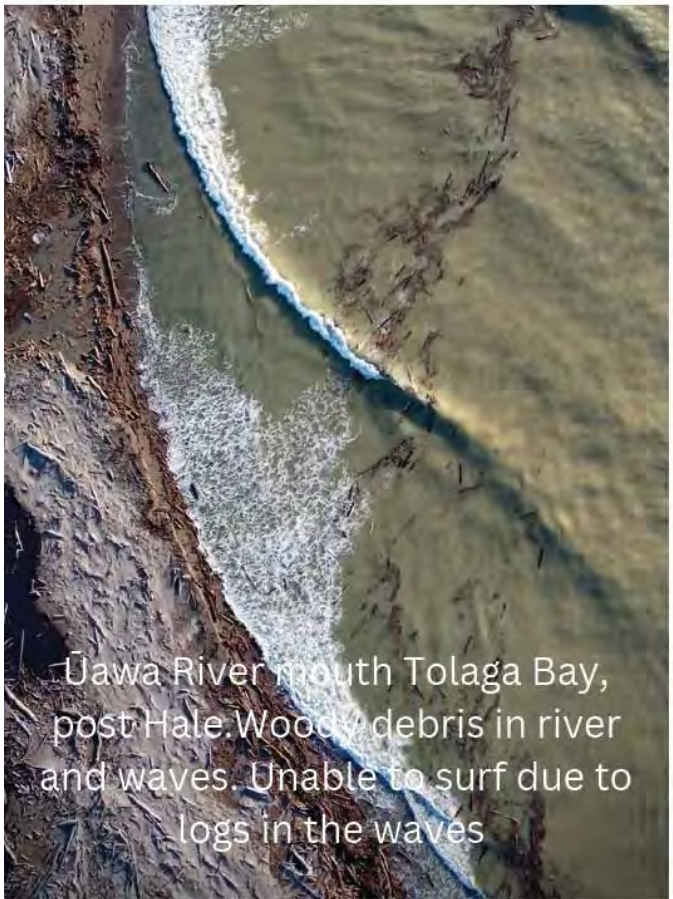
- We as landowners want to regulate or be responsible for checking / auditing GDC on their practices on our whenua biannually - the GDC system has failed us!
- The forest trees bounding our farm operation and the pipeline - we would like these to be removed and a buffer of at least 30mtrs planted in native - we want to oversee this action and the forester's pay for this to prevent further ongoing destruction.
- More engagement in how we care for our whenua as kaitieki with the neigbouring foresters and GDC.

On behalf of the Maraetaha Inc Trustees

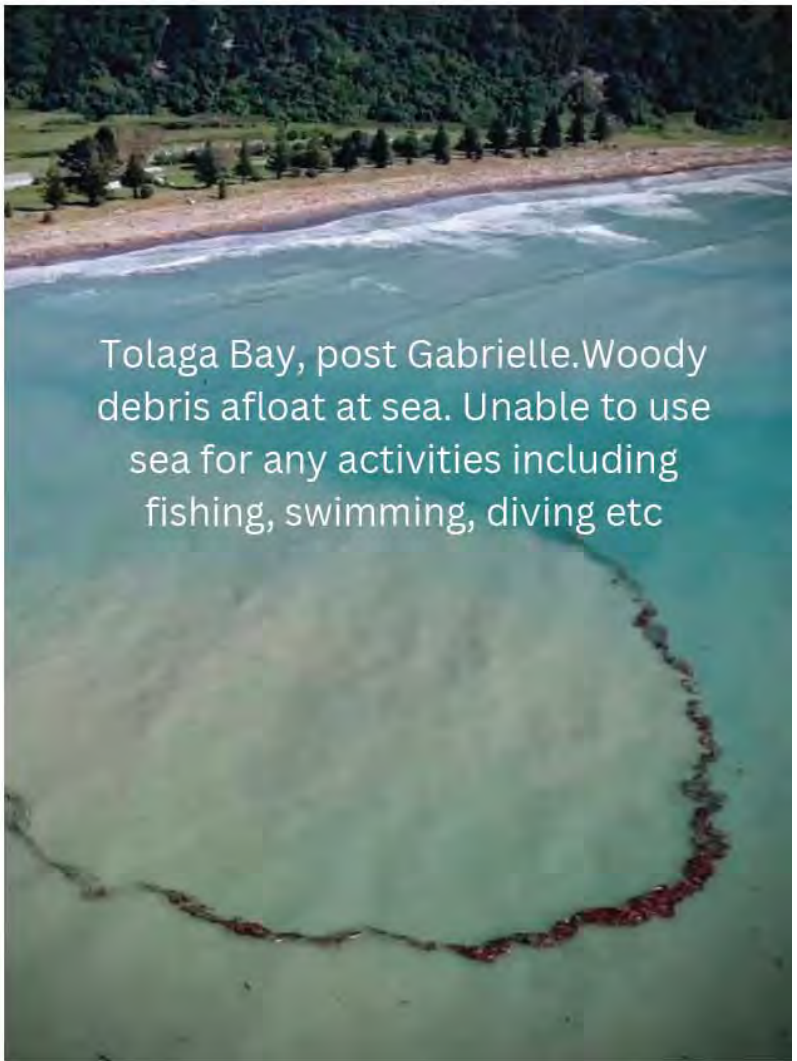
Ūawa River Tolaga Bay, post Gabrielle.Woody debris in river outside Tolaga Bay Area School. Unable to access Ocean via school boat ramp

Tolaga Bay, post Gabrielle. My kids with no beach and no sea to utilise

Tatarahake, Tolaga Bay, post Gabrielle.Woody debris covering over 3kms of beach. Unable to use beach for any activities



Ūawa River mouth Tolaga Bay, post Hale.Woody debris in river and waves. Unable to surf due to logs in the waves



Tolaga Bay, post Gabrielle.Woody debris afloat at sea. Unable to use sea for any activities including fishing, swimming, diving etc

NATIVE BURN OFF AND SLIPPING EXAMPLES

We finally got a weather window over the weekend to to burn 1000 acres of scrub. The job isn't over yet, we'll be back in the next few days to apply the new grass seed. Happy Easter!

Not Secure — gisborneherald.co.nz

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Controlled burn

Published March 26, 2020 4:03PM

Tweet

Picture by Liam Clayton

The towering plume of smoke in the sky west-southwest of the city yesterday came from a major controlled burnoff of grass and scrub in a land clearing operation on Tukemokihi Station, inland from Whakaki.

"It involved the clearing of 45 hectares of land to be resown in new grass," said Wairoa deputy district principal rural fire officer Tim Allan.

"There was a lot of smoke generated but the burnoff was fully under control. It was a spectacular volume of smoke but there was absolutely no risk."

Rabobank New Zealand Ltd

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Ministerial Inquiry Into Land Use
Ministry for the Environment
PO Box 10362
WELLINGTON 6143

6 April 2023

RABOBANK NEW ZEALAND SUBMISSION TO THE MINISTERIAL INQUIRY INTO LAND USE

Introduction

Rabobank is New Zealand's only specialist food and agribusiness bank. We are part of an international co-operative group based in the Netherlands, with over 500 staff working from 28 offices across New Zealand.

Bringing together our deep connections to the New Zealand rural sector, our specialist research expertise and our extensive international reach, we work closely with our rural and institutional clients under our global mission of 'Growing a Better World Together'.

With our co-operative roots and longstanding relationships with food and agribusinesses, Rabobank takes a long-term view of supporting farmers and food producers, who are critical to New Zealand's wider economic and social success.

This is very much the case across the Te Tairāwhiti, Tūranganui-a-Kiwa and Te Wairoa regions, which are the focus of this Inquiry.

As part of our active strategy as a food and agri thought leader, we provide constructive feedback and input for policymakers and government agencies, with a view to improving outcomes for our clients and their rural communities.

It is within this context that we welcome the opportunity to make a submission on the Ministerial Inquiry Into Land Use.

Key issues

As the Inquiry Chair says in her introductory message, the devastation brought on by successive significant weather events - with Cyclones Hale and Gabrielle in this year alone - have caused irreparable damage to people, land, property, infrastructure, and most tragically, took lives and livelihoods.

As the Chair says, it is vital that the collective knowledge and experience of our people, leaders and industries are heard and reflected to ensure we make the strongest and most well-rounded set of recommendations to the Government.

We agree that this is our opportunity to understand exactly how we got to this position and how we can help the affected regions to move forward.

Rabobank New Zealand is pleased that the inquiry is wide ranging. We are encouraged that its terms of reference include investigating the impact of storm damage caused by woody debris (including forestry slash) and sediment on communities, livestock, buildings, and the environment. It will also look at associated economic drivers and constraints.

These are critical issues for our clients in the regions affected by the Cyclone.

In summary, on behalf of our clients Rabobank New Zealand raises the following urgent issues for consideration by the Inquiry:

1. Significant damage has occurred to farmers and growers as a result of slash. This has occurred over multiple weather events, with now large deposits littered along waterways that are expected to continue causing damage in future weather events.

2. Concerns have rightly been raised by our clients regarding who is liable for the clean-up and the damage caused by forestry slash. For example, slash that originated from forestry land has caused considerable damage to permanent orchards, properties assigned to grazing and annual cropping, and inflicted permanent damage to infrastructure (buildings, fences, roading, bridges, and orchard structures are just some examples).

3. Our clients' concerns about who should pay for repairing this damage are consistent with the principle that a landowner is liable for damage caused by livestock leaving the landowner's property – for example, if a resulting road accident causes damage to people or property. Therefore, farmers and growers should not be required to pay for damage caused by material that originated from outside their property.

Rabobank submits that an agreed framework for addressing the cost of these repairs, and the process for completing them in a timely fashion, should be at the heart of the Inquiry's recommendations.

Finally, we encourage the Inquiry to engage with and listen carefully to individuals, communities and sector organisations on the ground in the affected regions. It is important that recommendations to the Government are practical, workable and based on what those

communities, farmers and growers actually need, rather than being driven from the Wellington bureaucracy.

Thank you for the opportunity to make a submission to the Ministerial Inquiry Into Land Use.

Rabobank New Zealand would be very happy to work with the Inquiry, government agencies and officials in finding workable and durable solutions to the significant challenges being addressed by the Inquiry.

Todd Charteris
Chief Executive Officer
Rabobank New Zealand

Carbon economics of natural regeneration at scale

Sean Weaver

Abstract

Natural regeneration on eligible post-1989 land is a carbon project where nature establishes the forest for free. Converting marginal farmland to natural regeneration and registering this free gift from nature in the New Zealand Emissions Trading Scheme (NZETS) would be an ideal way to finance carbon sequestration. This could deliver on our Paris Agreement target alongside considerable biodiversity and sustainable land management co-benefits. Similarly, managing natural regeneration on existing pre-1990 indigenous scrub and forest land induces additional carbon sequestration that (in theory) could also be traded in a voluntary carbon market and contribute to our national climate change mitigation goals.

This paper presents a practitioner perspective on these two aspects of natural regeneration for carbon management, with a particular emphasis on operating at a scale that has a meaningful impact on national carbon sequestration goals.

A discounted cash flow (DCF) analysis was undertaken for four approaches to forest carbon sequestration projects commencing in 2024, at a scale of 100,000 ha:

Scenario 1: Natural regeneration on eligible post-1989 land (a 'shut the gate' approach).

Scenario 2: Indigenous afforestation planted at 2,000 stems/ha.

Scenario 3: Exotic afforestation transitioned to indigenous forest over a 60-year period.

Scenario 4: A combination of exotic afforestation transitioning to indigenous forest (70,000 ha) plus indigenous afforestation at 2,000 stems/ha (30,000 ha).

Results showed that (under Scenario 1) natural regeneration starting in 2024 would contribute zero carbon sequestration towards the 2030 Paris Agreement target, cost $650 million in investment (assuming no land purchase costs) and not be financially viable (i.e. unlikely to gain access to investment capital and not be financially self-sustaining). Indigenous afforestation planting 2,000 stems/ha (Scenario 2) would deliver approximately 800,000 carbon credits towards the Paris Agreement target, require $1.5 billion in investment and also not be financially viable. In contrast, a project that used exotic afforestation (Scenarios 3 and 4) would deliver between 2.77 million and 3.5 million tCO_2e by 2030 (respectively), is financially viable, and could therefore be delivered at no cost to the taxpayer.

Pre-1990 indigenous forest regeneration was also examined using an additionality lens consistent with international forest carbon standards. 'Additionality' is a measure of whether a project is delivering carbon benefits to the atmosphere that resulted from human intervention that is additional to: (a) what nature would do anyway; and b) what humans would do anyway. Pre-1990 natural regeneration is not additional unless there is a change in forest management (project scenario) that causes a measurable change in carbon benefits compared with business-as-usual (baseline scenario). This can be delivered through avoided logging of commercially viable timber volumes (via land-use change from productive to permanently protected forest) and/or enhancing carbon sequestration through (for example) enrichment planting.

Introduction

National and global climate change mitigation requires a change from the current situation where greenhouse gas (GHG) emissions from sources are running at a higher rate than GHG removals by sinks. The shift of this dynamic ratio to avoid dangerous climate change requires a significant reduction of emissions from sources (beyond what is currently occurring) combined with a significant increase of emission removals by sinks.

Forests are one form of carbon sink and the lowest hanging fruit in the carbon sink world. Forest carbon stock change is relatively easy to measure, and interventions that cause this change are relatively easy to attribute to a causal agent (e.g. someone planted the forest on non-forest land).

For this reason, the first phase of global carbon sink management has been dominated by forest carbon sequestration. Subsequent phases of global and domestic carbon sink management will likely have a greater emphasis on non-forest systems, including soils, wetlands, saltmarsh and grasslands. But forests are also likely to remain a key component in climate change mitigation due to the technical and logistical

suitability of forests to function as carbon sinks and reservoirs.

The Climate Change Commission (CCC) has made recommendations for carbon emissions reduction and carbon sequestration targets to enable Aotearoa New Zealand to meet its Paris Agreement obligations. The emission reductions and removals required between 2021 and 2035 are listed in Table 1.

Table 1: Climate Change Commission emissions reductions and removals targets for the period 2021-2035. Source: 2021 Draft Advice Scenarios Dataset (CCC, 2021)

Emissions sector	GHG reductions 2021–2035
Transport	–43%
Buildings	–33%
Heat, industry & power	–49%
Agriculture	–14%
Waste & hydrofluorocarbons	–26%
Forestry	+135%

These sector targets include the assumption of the Government purchasing ~100 million tCO_2e of climate change mitigation from offshore. If the nation fails on any of these targets, we will need to either buy additional offshore mitigation, or plant more forests (or both).

As such, GHG removals by forests plays a central role in meeting national emissions targets. Since 2022, there has been considerable controversy over the policy settings for carbon sequestration in the forest sector. Of particular interest to the public debate is the relative roles of exotic and indigenous forestry, with special reference to the permanent forest category of the New Zealand Emissions Trading Scheme (NZETS).

The Government asserted a desire for a much greater role for indigenous forests in its public announcements during 2022. This included a proposal to exclude exotic forests from the NZETS permanent forest category (MPI, 2022). The Government backtracked on this proposal (Radio NZ, 29 July 2022), but then set in motion consultation with relevant stakeholder groups to establish rules for the use of exotic species in the permanent forest category.

At the core of this policy debate are the economic realities of indigenous carbon forestry and the impact this reality will have on the effectiveness of policy settings. Practitioners in the NZETS have asserted that the high cost of indigenous forest establishment, the slow-carbon sequestration rates of indigenous forest and price sensitivity among carbon buyers means that carbon-financed afforestation using solely indigenous species is often not financially viable (Weaver, 2021, 2022; Weaver et al., 2022). Situations where indigenous afforestation can be financially viable include:

- Natural regeneration (where nature planted the forest without charge)
- Transitioning exotic forests to indigenous forests (through active management)
- When indigenous afforestation projects are financed jointly with exotic afforestation projects as part of an indigenous and exotic investment portfolio (Weaver, 2022, op. cit.).

Because natural regeneration has very low forest establishment costs, it is plausible to consider that this approach to afforestation could play an important role in meeting national sequestration targets while: (a) reducing reliance on exotic forests; and (b) substantially contributing to biodiversity conservation. This includes project activity types undertaken inside the carbon accounting boundary of the NZETS (post-1989 forestry) and outside the NZETS (pre-1990 forestry).

This study has two parts:

1. Financial viability analysis for post-1989 natural regeneration at scale.
2. Additionality analysis for pre-1990 natural regeneration.

Post-1989 Natural Regeneration at Scale

A discounted cash flow (DCF) analysis of carbon-financed natural regeneration at scale has been undertaken to test the ability of this approach to contribute to national climate change mitigation targets. It does so by comparing four project scenarios undertaken at the scale of 100,000 ha.

Scenario 1: Natural regeneration on eligible post-1989 land (a 'shut the gate' approach).

Scenario 2: Indigenous afforestation planted at 2,000 stems/ha.

Scenario 3: Exotic afforestation transitioned to an indigenous forest over a 60-year period through strip/patch harvest and replanting. This scenario delivers 100% indigenous forest by year 60 with harvest and replanting interventions starting in year 15.

Scenario 4: A combination of exotic afforestation transitioning to an indigenous forest in the manner of Scenario 3 (70,000 ha) plus indigenous afforestation at 2,000 stems/ha (30,000 ha). A 70:30 ratio of exotic forest to indigenous forest was the highest ratio of indigenous afforestation possible while delivering a financially viable project venture at the carbon prices modelled.

This analysis uses 100,000 ha as a benchmark to provide an indication of the extent to which natural regeneration can be used to meet the potential identified by the CCC (e.g. 740,000 ha of marginal land that could revert to native forest) (CCC, 2022).

The regeneration scenario modelled the termination of grazing at the initiation of the project intervention and then letting natural regeneration take place thereafter. This scenario assumed that it would take 12 years for the pasture to be populated. It also assumed sufficient native tree species to meet the forest definition in the NZETS, and during those 12 years the landowner would need to receive a land rental payment (modelled at $150/ha/yr being the same rate used in financial scenario modelling by local government entities that the author works with) to compensate for the loss of pastoral revenue from the land in question.

It is assumed that such land rental payment is not required for years when the project is issuing carbon credits and receiving carbon revenue. In reality, the time it would take for closed pasture to eventually meet the forest definition of the NZETS would vary, depending on factors such as rainfall, aspect and proximity to seed sources.

Another approach that could be tested is natural regeneration where the regeneration started in the past where the native forest is already present now having established (e.g. 12 years ago). The problem with this approach is that although it is undertaken routinely in the NZETS now, it does not occur at the scale under consideration. To come close to achieving the scale envisioned by the CCC (i.e. hundreds of thousands of hectares), new natural regeneration on land that is currently non-forest land will be required.

Methodology

A DCF analysis was employed to generate key financial indicators, including investment required, internal rate of return (IRR) and net present value (NPV). The analysis is designed to shed light on the scale of investment required, risk and expected return. These are key financial attributes to consider when attempting to secure investment funding and before considering the non-financial costs and benefits accruing to the investor or society.

Key assumptions and inputs used:

1. Cashflows are unleveraged (no debt), before-tax and real (no inflation)
2. Project is undertaken by a landowner on their own land
3. Project development starting year (e.g. recruiting land) – 2023
4. Project intervention start year (e.g. shut the gate and/or plant forest) – 2024
5. Starting carbon price in 2024 – $90 – aligned to the mid-range of the Treasury shadow carbon prices (The Treasury, 2021)
6. Annual average real carbon price increment (three scenarios) = CP1 $1.50; CP2 $4.75; CP3 $8
7. Fencing/tracking costs = $0
8. Average native seedling price = $2 each
9. Average exotic seedling price = $0.50 each
10. Indigenous forest carbon sequestration rate = 80% of the Ministry for Primary Industries (MPI) Lookup Tables, to realistically align with field measurement results from forest carbon projects. Some have argued that carbon sequestration rates in natural forest are higher than the MPI Lookup Tables. This is not supported by the experience of forest carbon projects in practice, which typically deliver carbon sequestration rates considerably lower than the MPI Lookup Tables. The latter experience aligns with the national average carbon sequestration rate for indigenous forest of 3.5-3.7 tCO_2e/ha/yr (Payton, 2007)
11. Exotic forest carbon sequestration = 100% of MPI Lookup Tables for 'other softwoods' (to be conservative)
12. Exotic planting density = 1,000 stems/ha
13. Native planting density = 2,000 stems/ha
14. Cashflow period = 25 years
15. No terminal value
16. Discount rate = 6% (the assumed required rate of return for the investor)
17. Carbon accounting method = stock change
18. Exotic management regime = continuous cover forest management transitioning to native forest through harvest and replacement with harvest strips or patches never exceeding NZETS forest definition for any given hectare
19. Forests established over two years when planted (2024 and 2025).

Results

The DCF results are shown numerically in Table 2, and graphically in Figures 1-5 below.

As shown in Table 2, the different carbon price scenarios are material to the financial viability, with increasing returns as the carbon price increases from CP1 to CP3.

Internal rate of return (IRR)

The IRR is an indicator of the financial viability of a project. Different investors will require different rates of return, depending on their investment preferences and the amount of real or perceived financial risk in the project venture. The IRR reflects a discount rate where the NPV of a cashflow equals zero.

Table 2: Discounted cash flow results (red numbers indicate negative numbers)

	IRR CP1	IRR CP2	IRR CP3	Capex	Investment	Investment/ha
Regeneration	−2.3%	0.1%	1.7%	$5,750,000	$650,000,000	$6,500
Native	−1.9%	0.7%	2.5%	$1,262,815,230	$1,500,000,000	$15,000
Exotic transition	8.9%	12.3%	14.8%	$357,880,000	$550,000,000	$5,500
Exotic & native	4.6%	7.7%	9.9%	$628,670,615	$800,000,000	$8,000

	NPV CP1	NPV CP2	NPV CP3		Total credits	Credits by 2030
Regeneration	($512,783,022)	($437,851,757)	($362,289,805)		23,600,000	0
Native	($1,052,439,632)	($837,749,049)	($622,639,680)		25,736,000	796,000
Exotic transition	$208,346,868	$563,742,446	$919,138,024		42,858,300	3,550,000
Exotic & native	($127,534,095)	$187,744,269	$503,022,633		37,848,010	2,775,400

Note: IRR = internal rate of return of the project; NPV = net present value to the investor; Capex = capital expenditure; Total credits = carbon credits delivered across the 50-year cashflow period; Credits by 2030 = carbon credits delivered by 2030; CP1, CP2, CP3 = three different carbon price change scenarios listed in the methodology bullet points

The respective IRR results for the different afforestation scenarios are shown in Figure 1.

Negative and marginally positive IRRs tend to fail to gain access to investment capital due to the low projected returns when considered alongside the financial risk involved (i.e. losses arising from unforeseen events). Higher returns (e.g. those towards the right-hand side of Figure 1) increase the probability of gaining access to investment capital.

Net present value (NPV)

NPV is a more reliable measure of the financial viability of a project as it provides a measure of a project's level of profitability, including 'not-for-profit' ventures that need to break even to be financially viable. It is calculated as the sum of all discounted costs and revenues for a project over the investment period where the discount rate applied is consistent with the investor's required rate of return. In this analysis, the discount rate applied is 6%. Results of the NPV for each afforestation scenario are shown in Figure 2.

The NPVs for natural regeneration and native afforestation (Scenarios 1 and 2) are negative at all carbon price scenarios. In contrast, the exotic transition to indigenous forest (Scenario 3) and the 70% exotic afforestation transitioning to indigenous forest and 30% indigenous afforestation (Scenario 4) both show predominantly positive NPVs, with the exception of Scenario 4 under the lower CP1 carbon price projection. In each scenario the carbon project NPVs can be compared with the NPV of same land receiving a land rental of $150/ha/yr instead of a carbon project.

Investment required

The investment required is the amount of capital needed to fund project establishment and any negative operational cashflows in early years when the project is running at a loss. This is presented in Figure 3 for each scenario.

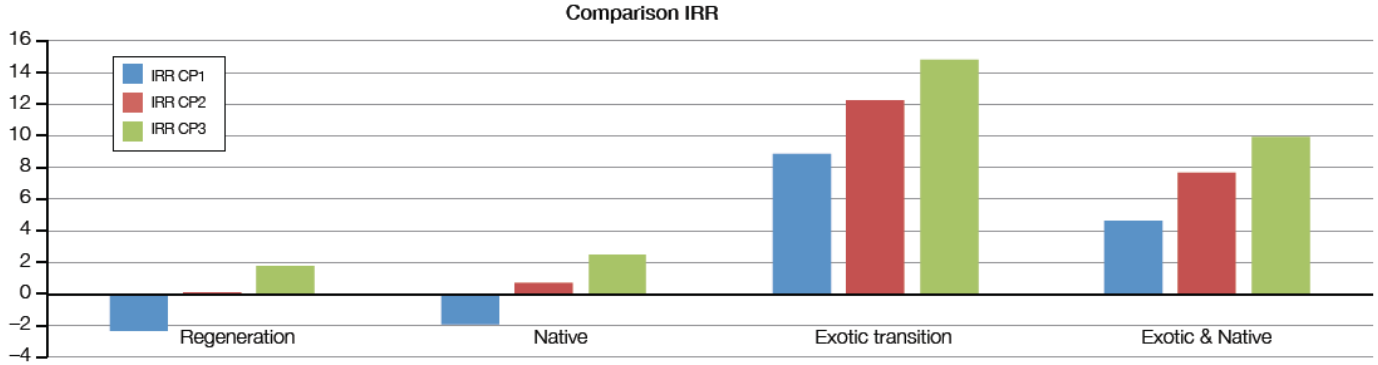

Figure 1: IRR for the four forest establishment scenarios showing the three different carbon price change scenarios (CP1, CP2 and CP3) for a 25-year investment period

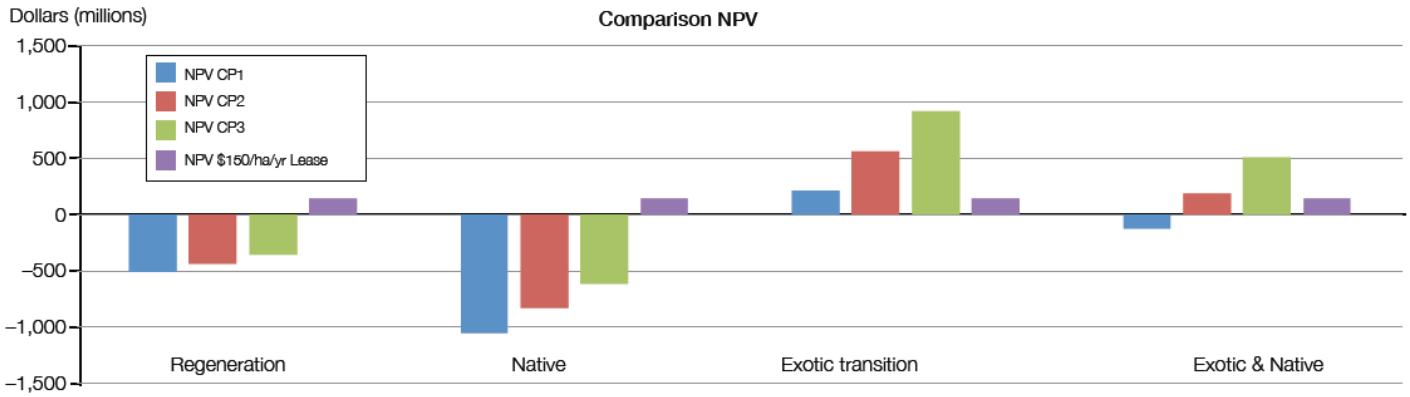

Figure 2: NPV for the four forest establishment scenarios showing the three different carbon price change scenarios (CP1, CP2 and CP3) and for leasing out the same land at $150/ha/yr for the investment period (i.e. instead of a carbon project)

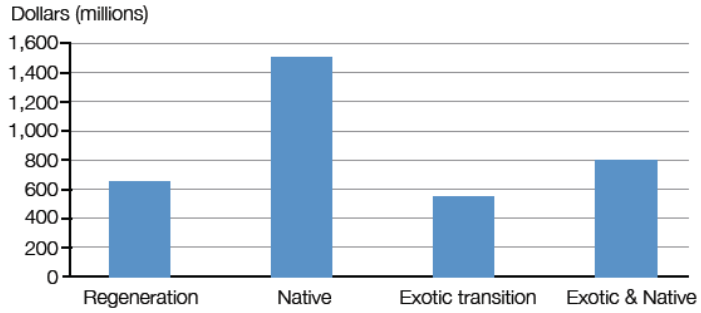

Figure 3: Investment required for the four forest establishment scenarios for a 25-year investment period

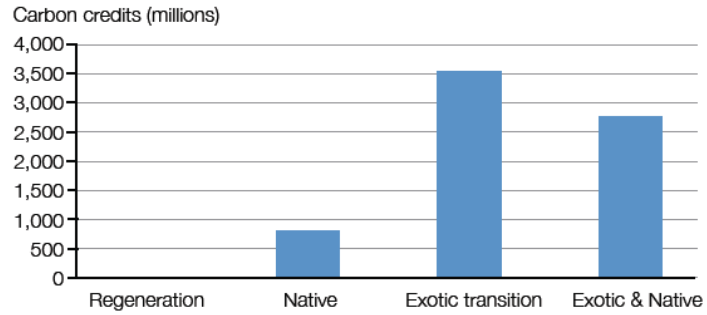

Figure 4: Carbon credits delivered by the four forest establishment scenarios by 2030

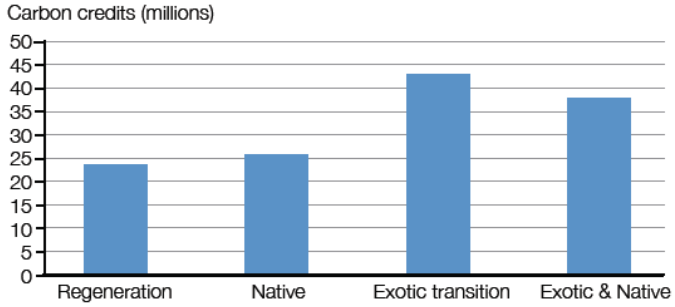

Figure 5: Carbon credits delivered by the four forest establishment scenarios by 2050

Figure 3 shows that Scenario 2 (indigenous afforestation) requires the greatest capital investment at $1.5 billion ($15,000/ha). Scenario 4 (70% exotics/30% indigenous) requires $800 million ($8,000/ha). The lowest capital investment required is for Scenario 3 (exotic afforestation transitioning to indigenous forest) at $550 million ($5,500/ha).

Notable also is the relatively high amount of investment required for Scenario 1 (natural regeneration) ($650 million), which may seem an anomaly because nature did the planting for free. While this is true, this project type also needs to fund the land rental costs of $150/ha/yr for the 12 years when no carbon credits (and no carbon revenue) can be delivered to the landowner (i.e. the period of natural forest establishment). While there may be some landowners willing to forego a land rental payment when no carbon revenue is being received, most rural landowners need to make a living from their land and cannot afford to forgo revenue from such land for 12 or more years while nature gets the forest established.

Also, because of the relatively low volume of carbon credits delivered in the first 25 years, it is difficult for this project type to support debt funding and/or deliver the necessary dividends to the investor in a manner that enhances liquidity (the ability for an investor to exit the project at any time during the project investment period).

Limited initial cashflow revenue is a common attribute of all four scenarios. This extends the period of investment and has the effect of increasing the perceived project risk for both investors and debt funders.

Carbon credits delivered

A key purpose of forest carbon sequestration at scale is to help the nation deliver its Paris Agreement obligations by 2030. Figure 4 shows the volume of carbon credits delivered by each project type by 2030.

As can be seen in Figure 4, Scenario 1 (natural regeneration) delivers zero carbon credits as a contribution to the Paris Agreement by 2030. As such, this option can at best be seen as a component of a long-term carbon management strategy. To this

end, carbon credits delivered by 2050 have also been modelled, with results shown in Figure 5.

As shown in Figure 5, indigenous forests can make a significant contribution to carbon credit supply over a longer timeframe, but still deliver less than an exotic forest that transitions to indigenous forest, and a forest including 70% of exotic forest transitioning to native forest and 30% indigenous afforestation.

Analysis and discussion

Trade-offs

Financial analysis provides an opportunity to weigh the merits of different project types in relation to what they also do not allow (trade-offs). Trade-offs come into play when considering the purpose of carbon forestry in the context of a national obligation to the Paris Agreement, an aspiration to be a net-zero carbon nation by 2050 and a climate emergency response. When viewed through a climate change mitigation lens, indigenous forests perform slowly and take opportunities away from other more cost-effective options. This is because those other options cannot be resourced with land or capital that has been used by indigenous afforestation and/or natural regeneration.

Because the volume of carbon credits delivered by natural regeneration is zero by 2030, this afforestation approach cannot help Aotearoa New Zealand deliver on the Paris Agreement target. This means that the $650 million in investment required for 100,000 ha of natural regeneration will deliver a zero return to the 2030 Paris target. If, on the other hand, the same investment was allocated to an exotic forest transitioning to indigenous forest the return to the Paris target will be in the order of 43 million tCO_2e.

Another problem is that natural regeneration at scale is not financially viable. The NPV for this activity type is negative for all three carbon price scenarios, meaning that this project type is unlikely to gain mainstream investment funding. One could remedy this by means of a taxpayer subsidy to lift the returns to private investors. The subsidy required to deliver a positive NPV at carbon price change scenario CP2 (starting at $90 and rising annually on average at $4.75) is $450 million for every 100,000 ha reforested. In contrast, project scenarios (3 and 4) incorporating exotic afforestation would deliver 3.5 million tCO_2e and 2.77 million tCO_2e by 2030, respectively, at no cost to the taxpayer.

With the challenges facing society (COVID-19 recovery, high inflation, a cost-of-living crisis, a supply chain crisis, a human resources crisis in health, education, policing and across the private sector, and a climate change emergency), society needs a cost-effective climate change solution. New Zealand requires an affordable approach that can be delivered at least cost to the taxpayer now and into the future. Least cost now means avoiding taxpayer subsidies for forest establishment. Least cost in the future means reducing the need to buy more offshore carbon credits due to failure to deliver emission reduction and carbon sequestration targets under the Paris Agreement.

Taxpayer and philanthropic funds are not limitless, and if we are to succeed as a nation at avoiding dangerous climate change, we need these finite financial resources to be allocated to an urgent set of 'must-haves' in the form of investment in low-carbon transportation, agriculture, buildings and clean energy. In the meantime, the private sector can fund the carbon sequestration element of the national climate change emergency response using a combination of exotic and indigenous afforestation without the need for taxpayer or philanthropic funding. If well designed, this private sector afforestation contribution will also comprise much-needed climate resilience and adaptation through permanently reforesting erosion-prone landscapes.

Sitting in the background are farmers who do not want the forest sector to multiply its land area needs by a factor of three or four, as required for indigenous regeneration in comparison with blended approaches that employ exotic and indigenous afforestation.

Pre-1990 Natural Regeneration Additionality Analysis

Methodology

This analysis examines the definition of 'additionality' in international carbon standards and as applied by the New Zealand Ministry for the Environment (MfE) in the context of natural regeneration in pre-1990 indigenous forests. It then uses these definitions to identify legitimate ways to pass an additionality test in a pre-1990 indigenous forest setting. This analysis is designed to inform public policy in preparation for potential future changes to the Climate Change Response Act 2002 (and NZETS) to include pre-1990 indigenous forests. It also provides a context for evaluating the validity of voluntary carbon market activities in pre-1990 forests.

Additionality analysis

The CCC has indicated that recognition of carbon stock change in pre-1990 forest has the potential to assist in meeting New Zealand's 2030 Paris targets. According to the CCC, accounting for carbon stock change in pre-1990 forests involves estimating additional emissions and removals in pre-1990 forests above or below 'business-as-usual' due to changes in forest management (CCC, 2022, p. 202). This echoes the United Nations Framework Convention on Climate Change (UNFCCC) definition of climate change mitigation, which 'involves human interventions to reduce the emissions of greenhouse gases by sources or enhance their removal from the atmosphere by sinks' (UNFCCC, 2009).

A key principle (MfE, 2022; Verified Carbon Standard, 2022; Gold Standard, 2020) in international

carbon markets relating to carbon sequestration is that sequestration eligible to be used to offset GHG emissions must be derived from:

1. A human intervention, and
2. Be additional to what nature would do anyway (e.g. additional to sequestration by natural forests and the oceans), and
3. Be additional to what humans would do anyway (e.g. additional to activities already required by law, regulation or common practice).

In carbon projects there are two main components of additionality:

- Project additionality – the carbon credits issued may only be those arising from the project as a result of human intervention
- Financial additionality – the human intervention in the project would not occur in the absence of revenue derived from the sale of carbon credits. In this way, the purpose of carbon credit sales revenue is to fund an activity that could not happen without that revenue.

Without 'financial additionality' the so-called 'carbon credits' would be a fiction and potentially fraudulent, as they would have happened naturally or did not need carbon revenue to occur. Their use to offset real and additional GHG emissions may give the impression (to a third party) that something beneficial to the atmosphere is occurring when in fact no additional carbon sequestration or removal has been delivered. This would potentially breach the Environmental Claims Guidelines of the Commerce Commission (Commerce Commission, 2020 p. 11):

> *Carbon-offsets are credits for emission reductions gained by projects such as tree planting or energy efficiency. The offsets can be used to cancel out the negative environmental impact of carbon emissions, by achieving lower emissions elsewhere. Businesses might use carbon-offset claims to promote themselves and/or their good or service, or they might allow customers to participate in carbon-offsetting (i.e., by purchasing carbon credits as part of the sales process).*
>
> *Carbon-offset claims should clearly inform consumers about what is being offset and how it is being offset.*

In some indigenous forest management activity types such as habitat enhancement, biodiversity benefits are being delivered that are additional (i.e. the benefits would not occur without money spent on biodiversity conservation activities such as pest and weed control). But for such activity to be traded in a carbon market, as opposed to a biodiversity market or philanthropy, the project must pass the minimum requirements for carbon benefit delivery (i.e. comprise additional carbon benefits). This coalescence of carbon and biodiversity benefits delivered through the same project actions has been recognised by international carbon standards such as the Plan Vivo Standard, the Gold Standard and the Verified Carbon Standard. The biodiversity benefits, however, remain secondary to the carbon benefits required by these standards.

Where an activity type delivers biodiversity benefits, but not carbon benefits, the project would fall outside the ecosystem accounting boundary of the carbon market and outside the scope of a carbon market financing instrument. This by no means suggests that there is anything inferior about biodiversity conservation in comparison with carbon benefits. It simply recognises that the carbon market was designed for carbon outcomes as the core deliverable to be traded.

This potential alignment of biodiversity and community co-benefits with carbon projects has led many actors in the carbon market domestically and internationally to focus carbon project and programme development on delivering a range of non-carbon co-benefits alongside the carbon benefits. Examples include the multitude of nature-based solutions projects already certified to the Plan Vivo Standard and the combination of the Verified Carbon Standard and the Climate, Community and Biodiversity Standard.

When the non-carbon co-benefits of a forest conservation project cannot be accommodated in the carbon project (e.g. because the beneficial carbon stock change is marginal or non-existent), such a project has the opportunity to pursue other (non-carbon) market-based financing instruments and approaches. Such market-based financing instruments and approaches to biodiversity conservation internationally include the:

- Business and Biodiversity Offsets Programme (BBOP, 2016)
- Plan Vivo Biodiversity Standard (in development) (Bohannon, pers. comm)
- Ekos Sustainable Development Units programme developed by the author (World Economic Forum, 2022)
- Sustainable Development Verified Impact Standard (SD VISta) (Verra, 2019)
- Gold Standard for the Global Goals (Gold Standard, 2019)
- DHF Model (Environmental Finance, 2021)
- EcoAustralia credits
- Wallace Trust biodiversity credit methodology (World Economic Forum, op. cit.)
- Biodiversity credit initiatives of ValueNature, Terrasos, Qarlbo Natural Asset Company, the Scottish Wildlife Trust and the Biodiversity Credits Alliance (BCA) – the author is a founding committee member of the BCA.

There is also a range of sustainable financing revenue streams and modalities for biodiversity conservation (Weaver et al., 2022b), including (but not limited to):

Sustainable revenue streams, including:

- Taxes, levies fees and fines
- Results-based payments
- Payment for ecosystem services
- Voluntary surcharges
- Environmental trust funds.

Sustainable financing modalities, including:

- Impact investment
- Blended finance
- Impact bonds
- Pooled funds
- Partnerships for public purpose (PPP)
- Crowdfunding
- Catalytic capital
- Debt-for-Nature Swaps.

Non-additional 'carbon credits', even if they deliver considerable non-carbon co-benefits, make the atmosphere worse off rather than better off for the following reasons:

1. Money spent on these carbon credits could have been spent on genuinely additional carbon benefits to the atmosphere (e.g. investing in emission reductions like installing a solar photovoltaic system, or purchasing legitimate carbon offsets from planting a new permanent forest).
2. The seller and buyer of those carbon offsets has made a carbon-related claim that is fictional (i.e. claimed to have offset their fossil fuel emissions when they have not). This threatens the integrity of the carbon markets and can impede investment flows and consumer demand for carbon market solutions for a low-carbon economy.

Table 3 provides examples of different aligned definitions of additionality by different carbon market standards and integrity initiatives.

The only legitimate way for a carbon credit seller and buyer to maintain integrity in a carbon credit transaction is for the carbon credits used for carbon offsetting to be: (a) certified to an internationally recognised carbon standard (to safeguard additionality); and (b) issued and tracked by an internationally recognised carbon credit registry (to safeguard against double counting).

According to the MfE Interim Guidance for Voluntary Climate Change Mitigation (2022), for voluntary climate change mitigation to be considered credible it must take account of these principles:

- Information on the mitigation must be transparent, clearly stated and publicly available
- Mitigation must be real, measurable and verified by a third party to a reputable, and publicly disclosed, carbon standard (including the NZETS)
- Mitigation must be additional to business-as-usual activity
- Mitigation must not be double used*
- Mitigation must not result in leakage of emissions elsewhere
- Mitigation must be permanent.

In this guidance double use does not refer to mitigation claimed at the organisation and country level. Units representing voluntary climate change mitigation used towards a country's Nationally Determined Contribution should be transparently disclosed in the claim made by the organisation (see Weaver et al., 2022a).

At the time of writing MfE had not released its 2023 guidance on the voluntary carbon market.

The MfE Interim Guidance for Voluntary Climate Change Mitigation (2022) lists several types of New Zealand Units (NZUs) that cannot legitimately be used for voluntary carbon offsetting. These are units freely allocated by the Government that were not earned by undertaking specific emissions reduction or removal activities. These units include:

- Emissions-intensive, trade-exposed allocation (NZU_EITE)
- Pre-1990 forestry allocation plan (NZU_FA)
- Fishing allocation (NZU Fishing)
- NZUs sold by auction (NZU_AUC).

Voluntary carbon market

Project types not eligible to register in the NZETS can potentially deliver legitimate carbon offsets through the international voluntary carbon market. This market functions by means of international carbon standards and international carbon credit registries.

Internationally recognised carbon standards include:

- Verified Carbon Standard
- Gold Standard
- Clean Development Mechanism
- Plan Vivo Standard
- Climate Action Reserve
- Joint Implementation
- American Carbon Registry
- Emissions Reduction Fund (ERF) of the Australian Government.

* In this guidance 'double use' refers to: multiple organisations using the same units representing voluntary climate change mitigation to meet their own organisational targets; or an organisation using the same units representing voluntary climate change mitigation for their mandatory compliance obligations and making a claim of voluntary action.

Table 3: Additionality definitions by different carbon standards and programmes

Carbon standard	Additionality definitions/guidance
Verified Carbon Standard Methodology Requirements (2022)	A project activity is additional if it can be demonstrated that the activity results in emission reductions or removals that are in excess of what would be achieved under a 'business-as-usual' scenario and the activity would not have occurred in the absence of the incentive provided by the carbon markets. Additionality is an important characteristic of GHG credits, including VCUs, because it indicates that they represent a net environmental benefit and a real reduction of GHG emissions, and can therefore be used to offset emissions. Methodologies shall set out a procedure for demonstrating additionality using a project method or a standardized method (i.e. performance method or activity method). Source: Verified Carbon Standard, 2022
Plan Vivo	The benefits from a Project Intervention are considered to be additional if they would not be achieved in the absence of the Project. Source: Plan Vivo Standard, 2022
Gold Standard	Additionality is a defining concept of carbon-offset projects. To qualify as a genuine carbon offset, the reductions achieved by a project need to be 'additional' to what would have happened if the project had not been carried out (e.g. continued as business as usual). The concept of additionality is important as only carbon credits from projects that are 'additional to' the business-as-usual scenario represent a net environmental benefit. Without the 'additionality' requirement, there is no guarantee that the emissions reduction activities will lead to a reduction of GHGs into the atmosphere. Therefore, in simple terms, if carbon credits are awarded to activities that would have happened anyway, emissions are allowed to rise without a corresponding cut elsewhere, making the process meaningless. Any business or individual considering purchasing carbon credits to ask questions to ensure that the standard or system backing the credits require proof of additionality. Source: Gold Standard, 2020
CDM	Project additionality The first requirement is that the project activity is not a 'null' activity (i.e. it achieves real 'net anthropogenic GHG removals by sinks' relative to the 'business-as-usual' scenario – called the 'baseline scenario'). Financial additionality The second requirement is that the project activity must be in need of additional resources and it should be possible to cover this resource gap with the expected Clean Development Mechanism (CDM) revenue (i.e. the financial incentives expected from carbon credits under the CDM must be demonstrated to be both necessary and sufficient for the project activity to be implemented). The difference made by the financial incentives expected from carbon credits must therefore be shown to be a decisive factor in enabling the project activity. Source: UNFCCC, 2013
Integrity Council for the VCM	The GHG emission reductions or removals from the mitigation activity shall be additional (i.e. they would not have occurred in the absence of the incentive created by carbon credit revenues). Source: Integrity Council for the Voluntary Carbon Market, 2022
ICROA	Project-based emission reductions and removals shall be additional to what would have occurred if the project had not been carried out. International Carbon Reduction and Offset Alliance (ICROA) members shall demonstrate the project would not have occurred without the availability of carbon finance. Source: ICROA, 2019
Ministry for the Environment	The GHG emissions reductions or removals are due to a specific intervention and would not have occurred under business-as-usual. This means the voluntary climate change mitigation cannot be an action or activity that was going to happen anyway, something that is already required under existing regulation, or incentivised by other policy measures. Business-as-usual management of a pre-1990 forest is likely to sequester carbon. Only measurable carbon benefits in a pre-1990 forest that result directly from a specific new action could be considered additional. Source: MfE, 2022

Each of these carbon standards is listed as an eligible offset type by the International Carbon Reduction and Offset Alliance (ICROA). Note that the ICROA endorsement of the Plan Vivo Standard occurred after publication of its 2019 Code of Best Practice.

Natural regeneration in the international voluntary carbon market

To date, there is only one forest carbon project registered in the international voluntary carbon market in Aotearoa New Zealand – the Rarakau Forest Carbon Project on Māori land in western Southland. This project is certified to the Plan Vivo Standard (Weaver, 2018a, 2018b) and applies an improved forest management methodology. It has passed two additionality tests through two international validation and verification audits (2013 and 2018), issues carbon credits in Markit Environmental Registry (New York) and has traded carbon credits since 2014.

The carbon accounting methodology for the Rarakau project involves avoided conventional logging of tall indigenous forest. The baseline (business-as-usual) situation was low impact logging under the Forests Act 1949 and the Resource Management Act 1991 (RMA). The landowners had been logging the forests until the 1990s and during a pause in the logging cycle in the mid-2000s agreed to permanently give up the property right to log their forests and instead transition to a forest carbon project to earn revenue from carbon credit sales instead of indigenous timber.

The carbon benefits from the project are delivered through a combination of avoided emissions from logging (one-off small carbon benefit), plus enhanced carbon sequestration caused by the change in land use from production forestry to long-term protection and the ability of the measured natural regeneration to continue uninterrupted by periodic logging for a limited period. The total carbon benefits to the atmosphere are modest, averaging 3.3 tCO_2e/ha/yr (i.e. approximately half of the 50-year average indigenous carbon sequestration rate in the MPI Lookup Tables (MPI, 2017)).

Avoided emission carbon project activities in the forest sector has provoked controversy internationally in recent times (Verra, 2023). Avoided emissions in the energy and forest sectors are conceptually challenging because they are preventing harm from happening rather than causing something new and desirable to happen. 'Harm avoidance' involves effort and cost to ensure that nothing (bad) happens. Similar public policy challenges are common, such as preventing disease from tobacco, preventing road accidents and preventing fires, through to preventing dangerous climate change.

Projects that prevent or reduce harm face the problem of not knowing exactly when the harm would have happened without the intervention. Yet carbon markets have successfully supported renewable energy and energy efficiency projects for many years, despite no-one knowing for certain the extent to which such projects slowed down the rate of fossil fuel extraction and burning globally.

As such, 'avoided harm' project types need to be treated slightly differently to 'causing good' project types. Additionality tests in avoided harm projects need to examine the plausible level of emissions that would occur without the intervention, based on a detailed examination of local drivers across time. The alternative is to not do the climate change equivalent of fencing swimming pools until we can prove that this fence will save the life of this child. The trouble with climate change and child drownings is the permanence of the harm that results from a failure to prevent or reduce the risk of that harm.

The other main activity type eligible in principle for carbon project development in pre-1990 indigenous forest land is enhanced carbon sequestration from improved forest management of land that does not have any commercially viable timber and cannot be otherwise cleared for farming (i.e. is protected under the RMA). Enhancing the carbon sequestration rate in such forest could conceivably be delivered through one or more of the following interventions:

- Herbivore control at such a level that a significant increase in carbon sequestration is demonstrated through measurement in comparison with a reference (control) area
- Enrichment planting of tree species that will lift the carbon sequestration rate from the baseline rate (baseline: 'business-as-usual' or 'without intervention')
- Invasive herbaceous weed control (e.g. eliminating *Clematis vitalba*) to enhance woody vegetation growth rates.

While each of these interventions could conceivably deliver carbon benefits in comparison with a baseline, in practice the annual volume of carbon benefits will need to generate sufficient carbon credits to cover project costs, including the cost of capital/borrowing.

Simply declaring that natural regeneration is occurring in pre-1990 indigenous forest land is not sufficient for issuing and trading carbon credits for the purpose of carbon offsetting. This is because natural regeneration is a baseline (business-as-usual) activity (i.e. it is happening anyway), in the same way that natural carbon sequestration into the oceans is a natural occurrence (taking place in the baseline) and is therefore not additional (i.e. not a human intervention that needs to be funded through the sale of carbon credits).

For carbon projects to pass an additionality test, the project activity (i.e. the human intervention) needs to deliver carbon benefits that are not delivered in the baseline. The volume of carbon benefits that

can legitimately be turned into carbon credits is equal to the sum project carbon benefits minus the baseline carbon benefits.

To illustrate this concept in a natural regeneration setting on pre-1990 forest land one can imagine the following contrasting carbon scenarios:

1. Baseline = natural regeneration without human interventions to speed it up.
2. Project = enhanced natural regeneration with human interventions that speed up the rate and amount of carbon sequestration.

Subtracting the baseline carbon benefits from the project carbon benefits delivers the net carbon benefits delivered by the project. This concept is illustrated in Figure 6.

The annual difference between the carbon benefits delivered by the natural regeneration (green line) and the enrichment planting (blue line) amounts to the annual additional carbon benefits delivered by the project intervention and that can be legitimately issued as carbon credits.

Note also that the total carbon benefits delivered by the project is not equal to the carbon credits that can be traded from a project in the voluntary carbon market. This is because such projects are required by international carbon standards to self-insure by means of allocating a percentage of 'buffer credits' that are issued but which cannot be sold. Such buffer credits are used to 'make good' on any carbon credits damaged in the case of a reversal (e.g. fire). The buffer credits are typically held and owned by the carbon standard in a pooled buffer. The volume of buffer credits required for a project is calculated by means of a detailed risk assessment – the higher the risk the larger the buffer.

Conclusion

Despite my own preferences for indigenous forests as a climate change solution, including a career in indigenous forest conservation that runs back to the late 1980s, my experience working with indigenous forest carbon projects at scale has revealed a set of economic realities and public policy trade-offs.

Naturally regenerating indigenous forest carbon projects can and do work well at a small scale and/or where landowners are wealthy enough to not need to replace pastoral revenues on reforested lands. But at a scale sufficient to have a material impact on national carbon sequestration targets, economic and public policy realities come into play that cannot be ignored. These realities include: (a) the need to cover forgone income (e.g. replacing pastoral revenues and/or covering land rental costs); (b) the slow delivery of carbon credits (missing the Paris Agreement deadline); and (c) the much larger land area required to deliver the same volume of carbon sequestration that could be delivered in a much smaller area when exotic forests are included in the carbon sequestration portfolio. This is at a time when there is considerable political pressure from the agricultural sector to avoid turning good farmland into forests amid high inflationary pressures on the economy.

If the taxpayer were asked to fund the forgone income mentioned in (a) above, trade-offs to consider include: (i) deciding what domestic public spending budgets to cut; and/or (ii) the impact of reallocating public funds earmarked for the acquisition of international carbon credits to domestic forest carbon through natural regeneration. During a cost-of-living crisis in the wake of a global pandemic the public will rightfully demand a cost-effective solution to climate change. Any public spending on carbon sequestration internationally or domestically will need to deliver a cost-effective outcome – otherwise climate change policy will fail politically.

The inconvenient truth elaborated in this paper shows that indigenous regeneration at scale is a far less cost-effective option compared with other regenerative options at scale, including continuous cover exotic forestry (e.g. the kind that gets sustainable forest management certification), continuous cover exotic forestry transitioning to indigenous forest

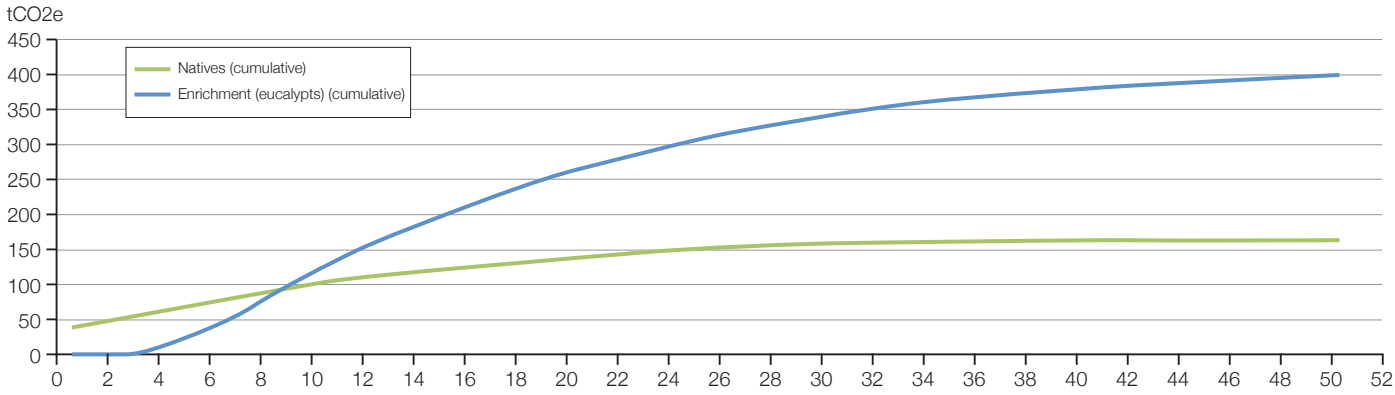

Figure 6: Cumulative baseline (green line) and project (blue line) carbon benefits in natural regeneration that has been enrichment planted with widely-spaced eucalypt

(through careful management including harvest and replacement), combined with indigenous afforestation plantings. The latter combination can deliver a high-carbon sequestration outcome, in time for the Paris Agreement deadline, at no cost to the taxpayer. This approach can also include indigenous regeneration wherever possible, but as part of a climate change strategy that does not rely on this practice as the core solution.

Indigenous regeneration will deliver high biodiversity benefits. But so too will indigenous afforestation that has been funded by exotic continuous cover forestry, and such forestry that transitions through to indigenous forest across several decades. Moreover, biodiversity conservation costs money in the short and long term (pest and weed control in perpetuity).

A forest carbon project focused on biodiversity conservation needs to fund that biodiversity conservation effort. If the financial viability of that forest carbon project is negative or highly marginal, there will be little or no funds available for pest and weed control now and into the future. This is for the hundreds of thousands of hectares that need reforesting to meet our Paris Agreement obligations, our biodiversity conservation goals, our net-zero carbon nation aspirations, and to get our landscapes ready for the intense ex-tropical cyclones that will become the norm in a warmer climate.

Improved forest management of pre-1990 indigenous forest is worthy of inclusion in a national forest carbon strategy. But this activity will need to demonstrate additionality through either being included in the Climate Change Response Act 2002, with appropriate additionality safeguards, or being certified to the additionality requirements of internationally recognised forest carbon standards. To do less would create a flawed carbon market and leave the door open to fraudulent carbon trading activities that are both not benefiting the atmosphere and are degrading the integrity of the carbon market itself.

If project proponents want to pursue biodiversity conservation in situations that are not delivering additional carbon benefits to the atmosphere, they have the option to pursue biodiversity conservation financing pathways including (but not limited to) philanthropy and biodiversity markets. Such philanthropy could include the funds no longer needed for native afforestation because the carbon markets are delivering this at scale in a blended exotic and indigenous approach.

If an activity cannot be funded, it will not happen. We are in a climate emergency and this demands open-minded innovation, extraordinary responses to an extraordinary situation and an acceptance that, according to the Italian proverb La Bégueule 'le meglio è l'inimico del bene' – the perfect is the enemy of the good.

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Ministerial Inquiry into Land Use Submission

This Moment

1. This Ministerial Inquiry can be a catalyst for healing and hope for our region.
2. We want to take this opportunity to acknowledge all the various layers of leadership that have led to the Ministerial Inquiry. Incremental change will not be enough to deal with the challenges that lie ahead. It takes courage and conviction to ensure all stakeholders in the community are represented at this time.
3. The East Coast has a unique opportunity to demonstrate cooperation and innovation in a new market-led approach that could inspire positive change across Aotearoa.
4. If we all work together, a range of solutions are possible.
5. Toha network entities are ready to serve the aspirations of all in the community and to support in delivering the recommendations that will come from this Inquiry.

Impacts & Experiences

6. Severe weather events increasingly impact East Coast communities. For those living in high-risk areas, their unheard concerns have been a source of growing frustration.
7. All sectors of our communities are affected in some way. As a result, there is growing awareness of the ongoing impacts climate change will have.
8. The post-cyclone responses across Tairāwhiti, Tūranganui-a-Kiwa, and Te Wairoa have shown that collective action is possible. The willingness of frontline communities to act must be coupled with the incentivisation of well-considered solutions for short, medium and long-term land use change.
9. The day after the Cyclone, Toha launched the first frontline interface to the Toha platform, the East Coast Exchange (ECX). The service is designed to measure, account for, and value community contributions in a way that can stimulate funding innovation. The ECX is an open public record of the

activities taken in response and recovery, resilience building and in the regeneration of the East Coast. The ECX also provides a mechanism for funding to be distributed directly to these frontline activities, enabling resources to flow based on the activities and aspirations of East Coast communities.

10. It is our goal that the ECX, as well as Toha's wider digital infrastructure, can play a role in the transition to a nature-based recovery for the region. We encourage the Ministerial Inquiry into Land Use to take this opportunity to learn from the past and lay the foundations for a more resilient future.

Context

11. In the aftermath of Cyclone Gabrielle, there is an opportunity for land-use change to positively contribute to a variety of community and government objectives, including climate adaptation, biodiversity improvement, catchment resilience, and long-term carbon storage.

12. Ultimately, land-use decisions should reflect the specific risks and opportunities of particular sites, as well as the aspirations of landowners, land managers, tangata whenua and the wider community. Consequently, there is no single, optimal spatial solution. However, to enhance resilience and biodiversity throughout the East Coast, there is a substantial body of evidence[1] [2] [3] to support the view that several trends in land use change should, in combination, take precedence immediately:

    - A shift from pastoral agriculture on highly erodible soils to vegetation and forest, especially in upper catchments.

    - A shift from clear-fell harvesting of plantation forests to less intensive forest management systems, such as continuous cover forestry, or unharvested forests for long-lived carbon storage.

    - A shift from the use of exotic even-aged monocultures for carbon farming to the use of biodiverse, uneven-aged forests – with a strong preference for native species dominance over time.

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- A greater integration of small forests, wetlands, floodplains, riparian margins and estuarine ecosystems throughout catchments to manage flood risk and flood-related impacts.

Policy framework, including Legislation, Market settings, and Regulations

13. Current policy settings are not well-aligned to supporting these trends. On the contrary, the compliance carbon market of the Emissions Trading Scheme, combined with timber markets, creates incentives that benefit *Pinus radiata*, either for clear-fell harvest and carbon farming. This is a function of this exotic species' rapid growth rates, low establishment costs, and industrial-scale seedling supply. In particular:

    - Averaging accounting in the Standard Forest Category creates a one-off incentive to convert pastoral land to *Pinus radiata* plantation forestry for clear-fell harvest.

    - Stock change accounting in the Permanent Forest Category creates an ongoing incentive to convert pastoral land into unharvested *Pinus radiata* for carbon farming.

    - A combination of high carbon prices, increased regulatory stringency on clear-fell harvesting, and higher operation costs is likely to incentivise the transition of existing even-aged *Pinus radiata* plantation forests into the Permanent Forest Category for carbon farming.

14. These incentives have the combined effect of crowding out investment into other tree species, including natives species and other exotic species. The opportunity cost of slower growing species is too large for decision-makers who need to generate financial returns on land assets. Also, investments into alternative species and silvicultural systems are perceived as risky because of the comparative lack of knowledge, as well as uncertainties around supply, wood processing capability, and market alignment.

15. Consequently, current incentives are likely to produce an expansion of even-aged forests dominated by a single species, *Pinus radiata*, either for clear-fell harvest or carbon farming. From a climate adaptation perspective, this implies a number of risks, some of which Cyclone Gabrielle has brought to the fore:

    - Clear-fell harvesting produces significant quantities of on-site forestry debris or slash, which become hazardous if poorly managed, either by being mobilised during flood events, or contributing to fire risk.

- Clear-fell harvesting on steep and erodible soils is increasingly risky in a heating world where storm and rain events are expected to increase in frequency and intensity. During the 'window of vulnerability' that lasts about seven years after harvest, forest land is highly susceptible to erosion and sedimentation.

- As a general rule, even-aged monospecific forests are likely to be less resilient to climate-related impacts than biodiverse forests with an uneven-aged structure.[4] [5] [6] Thus, the use of such forests for carbon farming is inherently risky, especially if not appropriately managed into the future. In the event of major forest loss from windthrow or wildfire, there is significant uncertainty over how such sites will be managed subsequently, and whom the liabilities will fall upon.

16. In addition to these climate adaptation risks, there are significant lost opportunities to address other policy objectives by transitioning land into even-aged monospecific forests, rather than a more diversified forest estate that uses native tree species, or even more diverse exotic species. In particular, thi native forests create more appropriate habitat for native flora and fauna, which contributes to biodiversity objectives.

Solutions

17. To facilitate change toward better land use in the East Coast, coordinated reform is needed across multiple policy instruments, especially the Emissions Trading Scheme (ETS) and National Environmental Standards for Plantation Forestry (NES PF). Additionally, the policy mix will benefit from the creation of new economic or policy instruments that enable and incentivise nature-positive activities.

Emissions Trading Scheme

18. The role of forestry in the ETS is already the focus of a recently announced review by the Ministry for the Environment. Among other issues, the review intends to investigate 'what balance of gross and net emissions reductions

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[5] Hahn, T., Eggers, J., Subramanian, N., Caicoya, A.T., et.al. (2021). Specified resilience value of alternative forest management adaptations to storms. *Scandinavian Journal of Forest Research* https://doi.org/10.1080/02827581.2021.1988140

[6] Larsen, J.B., Angelstam, P., Bauhus, J., Carvalho, J.F., Diaci, J., Dobrowolska, D., Gazda, A., Gustafsson, L., Krumm, F., Knoke, T., Konczal, A., Kuuluvainen, T., Mason, B., Motta, R., Pötzelsberger, E., Rigling, A., Schuck, A., (2022). *Closer-to-Nature Forest Management: From Science to Policy* 12. European Forest Institute. https://efi.int/publications-bank/closer-nature-forest-management

should the NZ ETS incentivise in the future?' and 'what levels of net emissions reductions should be from exotic forests and indigenous forests, and how to improve NZ ETS incentives for indigenous afforestation?' These are vital questions to ask – and while these need to be answered in the context of emissions reductions strategy at the national level, it should be recognised that these questions have disproportionate implications for regions like the East Coast where consequent land-use change is likely to occur.

19. Given the growing recognition that New Zealand needs to reduce gross emissions, not merely net emissions,[7] it is possible that the ETS Review will recommend a restriction of volume of units from forestry, rather than a continuation of current settings which permit an unrestricted volume of NZUs to be allocated to ETS-registered foresters. If this is the direction of travel, the recommendations will need to chart a course between the risks and opportunities of the ETS. On the one hand, policy makers should recognise the urgent need to manage the perverse outcomes that carbon incentives are currently producing, especially the risks of maladaptation in land use. On the other hand, policy makers should recognise that the ETS can facilitate beneficial land use changes (e.g. assisted regeneration, management of unharvested or continuous cover forest) that are otherwise limited in revenue opportunities. Striking a balance between these competing imperatives will not be easy.

20. The discussion of carbon dioxide removal (CDR) by Working Group Three in the IPCC's Sixth Assessment Report is suggestive. The IPCC identifies three roles that CDR can play: '(i) further reduce net CO2 or GHG emission levels in the near-term; (ii) counterbalance residual emissions from hard-to-transition sectors, such as CO2 from industrial activities and long-distance transport (e.g., aviation, shipping), or methane and nitrous oxide from agriculture, in order to help reach net zero CO2 or GHG emissions in the mid-term; (iii) achieve and sustain net-negative CO2 or GHG emissions in the long-term, by deploying CDR at levels exceeding annual residual gross CO2 or GHG emissions'.[8]

21. This suggests a pathway where New Zealand transitions to a more discerning use of forestry removals for hard-to-abate emissions only, as well as a successive decoupling of forestry sequestration from offsetting so that an increased share of forestry removals contribute to the drawdown of excess carbon dioxide from the atmosphere. This positions New Zealand to eventually

[7] Climate Change Commission (2022). *Advice on NZ ETS unit limits and price control settings for 2023-2027*. https://www.climatecommission.govt.nz/public/ETS-advice-July-22/PDFs/NZ-ETS-settings-2023-2027-final-report-web-27-July-2022.pdf

[8] IPCC (2022). *Climate Change 2022: Mitigation of Climate Change*. Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://www.ipcc.ch/report/ar6/wg3/

achieve a net-negative position where sinks outweigh sources. The return of temperate rainforest to vulnerable catchments of East Coast could play a significant role over the long run, which would reverse some of New Zealand's historical contribution to climate change by deforestation, and also address the historical injustice of land use change that occurred without the consent of tangata whenua.

22. The details of ETS policy design are beyond the scope of this submission. However, to align with the pathway discussed, ETS settings could be adjusted to increase restrictions on both the demand for, and supply of, NZUs sourced from forestry. On the demand side, the use of forestry removals could be increasingly restricted to genuinely hard-to-abate emissions. On the supply side, allocation of NZUs could prioritise those natural forests which are most likely to sustain long-lived carbon stocks – i.e. forests that are biodiverse, uneven-aged, managed for continuous canopy cover through selective harvesting or no harvesting at all, and protected from browsing pests. These restrictions would improve the ETS's alignment with the objective of resilient, biodiverse landscapes in the East Coast, while also increasing the stringency of its capacity to reduce gross emissions.

National Environmental Standards for Plantation Forestry (NES PF)

23. There are limits to the extent to which ETS settings can deliver specific forest management systems, or certain compositions of tree species. The ETS is fundamentally designed to discover least-cost emissions reductions. To improve alignment with other policy objectives, such as biodiversity and climate adaptation, it is necessary to consider additional policy instruments and their likely interactions with the ETS.

24. One such instrument is the National Environmental Standards for Plantation Forestry (NES PF), which is also currently under review. This includes potentially widening the scope of its regulations to include permanent exotic afforestation (exotic carbon forests). This presents an opportunity to steer the ETS's carbon incentive toward afforestation that better aligns with other objectives, including biodiversity and climate adaptation.

25. As discussed above, averaging accounting has created a strong incentive for conversion to exotic plantation forest for clear-fell harvest, because participants stand to receive a substantial one-off allocation of NZUs in the first rotation. However, the transition of pastoral land in the East Coast to clear-fell harvest is at risk of exacerbating the problems that recent extreme weather events, including Cyclone Gabrielle, have exposed.

26. Consequently, **we recommend a region-specific moratorium on all new forestry conversions into clear-fell harvesting of any tree species.** This can be implemented through the consenting regime and by district (e.g. Gisborne District), by erosion susceptibility classification (e.g. all land classified as 'moderate' to 'very high'), or a combination of the two (e.g. all moderately to very highly erosion-prone land in the Gisborne district). We recommend that this moratorium be applied to all tree species, and not only pine species, because the negative impacts of clear-fell harvesting are not species-specific, and because a ban of any particular species could easily be circumvented by switching to another.

Biodiversity Payment

27. A biodiversity payment is potentially a major lever to improve land use outcomes in the East Coast. This is because a payment for biodiversity improvement and/or a penalty for biodiversity degradation can correct existing market failures where the value of biodiversity is being effectively externalised. By creating liquid cashflow for biodiversity improvement, a biodiversity payment facilitates the creation or reconfiguration of markets to match the demand for biodiversity improvements with supply of aligned projects and activities.[9]

28. A biodiversity payment would affect land use by reducing or neutralising the opportunity cost between land uses that are dominated by native rather than exotic species. Payment schemes might track one or several possible indicators including protection of existing natural habitat, conversion to natural habitat, improved species abundance and richness of flora and fauna, and evidence of pest and predator control.

    - Toha is currently developing a suite of claims templates which can support impact verification for biodiversity improvements.

29. A biodiversity payment might also improve upon previous payment schemes, specifically the East Coast Forestry Project (subsequently the Erosion Control Funding Programme), which focused on erosion control. Although the ECFP has contributed positively to avoided erosion[10], it was a lost opportunity for native biodiversity by subsidising exotic tree species, and also subsidising exotic plantations for clear-fell harvest which produced forestry debris and post-harvest erosion. By centering native biodiversity in future schemes, the subsidy will be directed to tree species that benefit most.

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[9] David Hall & Sam Lindsay (2021). *Scaling Climate Finance: Biodiversity Instruments*. Concept Paper. Auckland: Mōhio Research. https://dx.doi.org/10.34721/yc1w-me20

[10] Marden, M., & Seymour, A. (2022). *Op. cit*.

30. The aftermath of Cyclone Gabrielle creates an opportunity to pilot a biodiversity payment as part of disaster recovery funding. This would deliver on two critical objectives: (1) enhancing regional resilience to future climate-related disasters and (2) creating regional economic opportunities to address the long-run economic effects of Cyclone Gabrielle. Lessons learned from a regional biodiversity payment might eventually be applied elsewhere in Aotearoa New Zealand to drive better land-use outcomes.

31. A biodiversity payment could be delivered by a number of different instruments. The instruments discussed below are biodiversity credits, direct payments and resilience bonds.

Biodiversity credits

32. A biodiversity credit is a tradeable unit which represents a standardised improvement to biodiversity. Through the issuance of biodiversity credits, there is an opportunity to create biodiversity markets that serve to complement and counterbalance existing markets for carbon credits.

33. Currently, two major constraints for biodiversity credits are (1) a lack of appropriate methodologies for the issuance of biodiversity credits in Aotearoa and (2) uncertainty around the scale of voluntary demand for biodiversity credits:

    - Internationally and domestically, there is already progress underway to develop appropriate methodologies for biodiversity credits. A critical platform is the Biodiversity Credit Alliance, led by the UNDP and UNEP, which counts at least three New Zealand-based organisations among its members. Australia has now introduced the Nature Repair Market Bill into parliament to establish a legislative framework for a biodiversity market; and the UK is implementing requirements upon land managers and developers for biodiversity net gain from November 2023. Consequently, there is considerable progress in the development of appropriate methodologies.

    - Achieving scale in voluntary demand is likely the greater challenge, because of the significant market education involved. This is beginning to occur, especially through the adoption of reporting and disclosure frameworks for climate and nature-related risks – such as the Taskforces for Climate- and Nature-related Financial Disclosures, which should motivate companies to invest in biodiversity and ecosystem-based adaptation to reduce the risks identified. Similarly, impact frameworks like Science Based Targets for Nature encourage companies to address biodiversity impacts throughout their value chain. Nevertheless,

voluntary demand is only likely to build momentum over time, in the same way that carbon-neutral and net-zero commitments have gathered momentum in recent years.

34. To overcome uncertainties around voluntary demand, governments might implement compliance markets for biodiversity, analogous to what the Emissions Trading Scheme enables for greenhouse gas emissions. One way to achieve this is biodiversity offsetting requirements, which are currently being developed for the Natural and Built Environment Act. Internationally, however, there is an emerging consensus that biodiversity credits should not be used for offsetting, and instead only as proof that the credit holder has contributed positively to biodiversity goals or objectives.[11] Accordingly, an alternative structure for a compliance market would instead require participants to meet annual quotas in biodiversity improvement or landscape resilience. As such, participants would be required to surrender a certain volume of biodiversity credits each year to achieve a pre-agreed quota, with credits being purchased directly from suppliers or via secondary markets.[12]

35. Implementing biodiversity credits as a near-term response to Cyclone Gabrielle would be challenging. However, over the long-term, biodiversity credits could complement carbon credits as a means of incentivising and enabling land use change that improves biodiversity. Eventually, biodiversity credits could even displace carbon credits as a way to finance forest and other land-based sinks, so that carbon removals could be claimed as negative emissions to meet emissions reductions targets, rather than claimed as compensation for emissions which perpetuate the problem of climate change.

Direct payments for biodiversity

36. Direct payments are simply a financial transfer in exchange for the production of biodiversity value. Direct payments can be output- or action-based where recipients are paid to undertake specific activities; or results- or outcomes-based payments where recipients are paid *ex post* upon verification of the achievement of pre-agreed outcomes. Payments could originate from public or private sources, and could be undertaken voluntarily or as a mandatory requirement (e.g. by regulation).

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[11] Anne Ducros and Paul Steele (2021). *Biocredits to finance nature and people: emerging lessons.* UNDP & IIED. https://www.iied.org/21216iied

[12] See the adaptation markets proposal in David Hall (2022). *Adaptation finance: Risks and opportunities for Aotearoa New Zealand*. Concept paper prepared for the Ministry for the Environment. Auckland: Mōhio Research and AUT, pp.63-69.

37. A direct payment for biodiversity and landscape resilience is one way that disaster recovery funding could be deployed by government to stimulate the regional economy, while also contributing to policy objectives for climate adaptation and biodiversity. In the current context of the East Coast, the payment could be earmarked for the creation and management of nature-based solutions, such as native forests on erosion prone slopes or wetlands in flood prone catchments, which produce resilience through biodiversity.

    - One recent example of an output-based payment for biodiversity is the $1.219 billion Jobs for Nature programme which funded pest control, ecosystem restoration, freshwater improvement and capability-building on a project basis. The programme was effective in generating regional employment as well as biodiversity gains, including in the East Coast.[13]

38. Overseas examples show how biodiversity payment schemes are being used to drive different land-use changes. A useful case study is Ireland which, like New Zealand, has a large primary sector so faces similar challenges and trade-offs in its net-zero strategy. To address these, Ireland has implemented schemes which are worth considering in the New Zealand context.

    - The Burren Programme provides a results-based biodiversity payment to farmers to reward them for the environmental health of pastoral landscapes. On-farm biodiversity is graded by auditors on a score sheet and farmers receive a payment that corresponds to the score that they receive. Farmers also have access to output-based funding to fund nature-positive activities, accompanied with support from expert farm advisors.[14]

    - The Woodland Improvement Scheme provides financial support to encourage conversion into continuous cover forestry systems. The Scheme provides €750 grants for interventions (to a maximum of three) which include developing forest transition plans, pre-thinning tree marking, thinning or re-spacing, deer management, enrichment planting, forest protection, clearance of invasive species, support for

[13] RDC Group (2021). *Final report: Jobs for Nature Programme Review*. https://environment.govt.nz/publications/jobs-for-nature-programme-review/

[14] Eileen O'Rourke and John A. Finn (2020). *Farming for Nature: The Role of Results-Based Payments*. NPWS and Teagasc | National Parks & Wildlife Service. https://www.npws.ie/news/farming-for-nature-book

non-conventional harvesting, woodland edge management, and more.[15]

39. Direct payments are vulnerable to fiscal unsustainability and changes in government priorities. However, this risk is reduced by the creation of a regionally specific payment in response to Cyclone Gabrielle which has a specific purpose of repairing the damage done by historical land uses and addressing the specific resilience challenges of the East Coast with its unique geomorphology. If successful, moreover, such a scheme might improve public acceptability by demonstrating the positive impact of biodiversity payments on land use outcomes. As such, a direct payment scheme in the East Coast could serve as a pilot which might inform future schemes.

40. Over the longer term, a revenue-neutral scheme could be developed that uses a levy to fund the protection, restoration and creation of native biodiverse ecosystems. In accordance with the polluter-pays principle, the levy might be imposed on activities that threaten or degrade biodiversity. This corresponds with the Tax Working Group recommendations to explore a natural capital enhancement tax, complemented by biodiversity tax credits, over the next 10–30 years. The intent is to expand the tax base and to improve market functioning by ensuring that people and companies better understand and account for the impact of their actions on natural ecosystems.

41. A natural capital enhancement tax could be implemented by a national land-use intensity (LUI) indicator, which involves a measure of human activity concentrated per unit area and time.[16] This might be measured as inputs (e.g. amount of fertiliser), outputs (e.g. yields), emissions (e.g. nitrogen, phosphorus, E. coli, air emissions), efficiencies, frequencies (e.g. cultivation), or densities (e.g. housing density). Basically, this would involve a transfer of capital from areas with the most intensive land uses (i.e. urban areas, followed by intensive agriculture and forestry) to land areas with less intensive or more regenerative land uses. In turn, this might improve the acceptability of the levy by increasing the social solidarity between urban and rural communities.

Resilience bonds

42. Bonds are certificates of debt issued by a government or corporation that promise payment of the borrowed amount, plus interest, by a specified future

[15] Department of Agriculture, Food and the Marine (2020). *Woodland Improvement Scheme including Continuous Forestry Cover*. https://www.gov.ie/en/service/d54212-woodland-improvement-scheme/

[16] Andrew Manderson. 2020. *Scoping a national land-use intensity indicator*. Report prepared for MfE, LC3688, Manaaki Whenua – Landcare Research: https://environment.govt.nz/assets/Publications/Files/scoping-a-national-land-use-intensity-indicator.pdf

date. Green, social and sustainability (GSS) bonds have emerged in recent years as a family of bonds which require that bond proceeds are used only to achieve positive environmental and social outcomes across various sectors, including energy, transport, built environment, waste, water, land use, agriculture, adaptation and resilience. Resilience bonds are simply a species of GSS bond that focus on the latter themes of adaptation and resilience.[17]

43. Sovereign bonds or council-issued bonds create the capacity to spread the costs of investment across multiple generations. This is appropriate when future generations are beneficiaries of that investment, such as long-lasting infrastructure which contributes to future wellbeing and economic productivity. The same economic logic applies to investments into natural infrastructure of nature-based solutions, such as native forests or wetlands. In the context of global heating, these land-use changes can reduce risks and vulnerabilities, and therefore result in avoided losses and damages. Consequently, nature-based solutions also reduce the forward liabilities to government which would otherwise carry the costs of repairing or replacing infrastructure, as well as assisting communities in the event of disasters. From the perspective of the Crown's balance sheet, nature-based solutions will often be a highly cost-effective way to manage those forward liabilities. Also, in the context of high inflation, debt is potentially more politically acceptable than new levies or taxes that generate revenue in the present.

44. The purpose of a use-of-proceeds bond, such as a resilience bond, is to ensure that bond proceeds are directed toward pre-specified outcomes and activities.[18] [19] Biodiversity payments, supported by impact verification, is one way to ensure that bond proceeds are being used to achieve social and environmental objectives. For instance, bond proceeds could be used to fund a region-wide pest and predator control programme, which facilitates natural and assisted regeneration in upper catchments that most need forest canopy cover. Other uses of proceeds might include the creation of nature-based solutions to mitigate flood risk, improved water management, investments into grid resilience and decentralised energy systems, reduction of fire risk, agricultural resilience, and so on.

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[17] David Hall (2022). *Adaptation finance: Risks and opportunities for Aotearoa New Zealand*. Concept paper prepared for the Ministry for the Environment. Auckland: Mōhio Research and AUT.

[18] Climate Bonds Initiative (2019). *Climate Resilience Principles.* https://www.climatebonds.net/climate-resilience-principles

[19] International Capital Markets Assocation (2020). Green Bonds: Working Towards a Harmonised Framework for Impact Reporting for Climate Change Adaptation Projects. https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Suggested-metrics-for-Climate-Adaptation-projects-with-Reporting-Templates-December-2020-151220.pdf

45. The potential for impact can be further enhanced by designing a sustainability-linked bond, which reduces interest rates if pre-agreed sustainability performance targets, or KPIs, are achieved. For instance, Uruguay has issued a sovereign sustainability-linked bond which tracks KPIs on emissions reductions and also the maintenance of native forest area. If both KPIs are exceeded, then interest rate is reduced, thereby reducing the costs of servicing the debt.[20]

General

46. Toha is a local Tairāwhiti organisation creating an incentive system for climate and nature work. The Toha points system has been incubating on the East Coast for the last four years, and was effectively launched the day after Cyclone Gabrielle. Our R&D effort together has been focused on finding a new system-level solution to:

    - Get scale finance to the frontline
    - Create incentives for climate action
    - Recognise the value of regenerative action
    - Lower the cost of verification and trusted data within a network
    - Create incentives for data sharing across New Zealand

47. The East Coast Exchange is a shop-front for the Toha Platform and has been set up to be cooperatively owned and collectively governed by leadership layers within the region. The current capabilities on the ECX include:

    - a Contribution Points scheme that recognises early movers who take action to deliver grassroots value
    - profiles that celebrate contributions and exchanges based on relationships
    - transparent record keeping to incentivise/ inspire action
    - untagged and tagged funding pools that reward Points earners
    - a map with increasingly sophisticated spatial analytics
    - funder/ organisational profiles and leaderboards showcasing the contributions made to a strong community.

48. Toha is developing impact verification and data sharing products that can be used to implement a biodiversity payment, especially to give confidence to funders that outcomes are being achieved through financial contributions. Toha is a member of the international Biodiversity Credits Alliance, with an eye to future domestic issuance of biodiversity credits. Toha's claims and pledges

[20] Uruguay's Sovereign Sustainability-linked Bond. http://sslburuguay.mef.gub.uy/

templates are purpose-built as high-integrity, high-trust payment mechanisms by which public or private organisations can deploy funding to diverse environmental impacts. Finally, Toha's digital infrastructure can also be used to verify use-of-proceeds for resilience bonds, which improves the integrity of labeled debt for bondholders.

49. The solutions raised in the Ministerial Inquiry to Land Use will be considered in our ongoing design and implementation of the ECX.

50. We welcome ongoing discussions with all stakeholders.

Regards,

Renee Raroa

Tairāwhiti Lead

David Hall

Climate Policy Director

Nathalie Whitaker

Chief Executive

Forest Stewardship Council®

The FSC Forest Stewardship Standard for New Zealand

FSC-STD-NZL-02-2023 Plantations EN

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Standard

Photo Credit

From Left to Right:

Photo 1. Two people walking in forest (Craig Kenney, FSC New Zealand).

Photo 2. Pine sapling (Craig Kenney, FSC New Zealand).

Photo 3. Lake beach surrounded by forest (Craig Kenney, FSC New Zealand).

NOTE ON THIS ENGLISH VERSION:

This is the official version of the FSC Forest Stewardship Standard that is approved by FSC International Center, and it is available at ic.fsc.org. Any translation of this version is not an official translation approved by FSC International Center. If there is any conflict or inconsistency between the approved English version and any translated version, the English version shall prevail.

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Title	The FSC Forest Stewardship Standard for New Zealand
Document reference code	FSC-STD-NZL-02-2023 Plantations EN
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Local contact	FSC New Zealand c.kenney@nz.fsc.org
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[1] The transition period is the timeline in which there is a parallel phase-in of the new version and phase-out of the old version of the standard. Six (6) months after the end of the transition period, certificates issued against the old version are considered invalid.

Table of Contents

A Preface

(Informative section)

A.1 Descriptive statement of the Forest Stewardship Council (FSC)

The Forest Stewardship Council A.C. (FSC) was established in 1993, as a follow-up to the United Nations Conference on Environment and Development (the Earth Summit at Rio de Janeiro, 1992) with the mission to promote environmentally appropriate, socially beneficial, and economically viable management of the world's forests.

Environmentally appropriate Forest management ensures that the production of timber, non-timber products and ecosystem services maintains the forest's biodiversity, productivity, and ecological processes. Socially beneficial forest management helps both local people and society at large to enjoy long term benefits and also provides strong incentives to local people to sustain the forest resources and adhere to long-term management plans. Economically viable forest management means that forest operations are structured and managed so as to be sufficiently profitable, without generating financial profit at the expense of the forest resource, the ecosystem, or affected communities. The tension between the need to generate adequate financial returns and the principles of responsible forest operations can be reduced through efforts to market the full range of forest products and services for their best value (FSC A.C. By-Laws, ratified, September 1994; last revision in June 2011).

FSC is an international organization that provides a system for voluntary accreditation and independent third-party certification. This system allows certificate holders to market their products and services as the result of environmentally appropriate, socially beneficial, and economically viable forest management. FSC also sets standards for the development and approval of FSC Stewardship Standards which are based on the FSC Principles and Criteria. In addition, FSC sets standards for the accreditation of Conformity Assessment Bodies (also known as Certification Bodies) that certify compliance with FSC's standards. Based on these standards, FSC provides a system for certification for organizations seeking to market their products as FSC certified.

A.2 Descriptive statement of the National Office and Standard Development Group

The FSC National Office consists of a single team member. This team member's role is to oversee the growth, development and advocacy of the FSC brand in New Zealand.

The New Zealand Standard Development Group (SDG) is typical of an FSC SDG except that it represents 4 chambers (instead of the standard 3 chambers). These chambers include an Economic Chamber, an Environmental Chamber, a Social Chamber, and a Māori Chamber. The Māori Chamber exists to represent the significant role Māori (the indigenous peoples of New Zealand) play in the stewardship of New Zealand forests, water ways, lakes and other natural and cultural values.Three chambers of the SDG are comprised of 2 representatives each (Economic, Environmental and Māori), and the Social Chamber, due to its diversity, has 3 representatives (with the voting rights of 2).

To ensure a balanced approach, an independent facilitator was engaged. The SDG has made its decisions by consensus, defined as general agreement in favour of a proposal, plus the absence of a sustained objection to the proposal.

A.3 The New Zealand Standard Development Group

Chair: Craig Kenney (FSC New Zealand)

Chamber	Representative
Economic	Colin Maunder (Coordinator) [General Manager - Sustainability at Timberlands Ltd]
	Brett Gilmore [Environmental and Technical Advisor at Pan Pac Forest Products Ltd 2007 - 2017, Director at Brett Gilmore Consulting Ltd
	-Present]
	Sally Strang (Alternate) [Environmental Manager at Manulife Investment Management Forest Management (NZ) Ltd]
Environmental	Bill Gilbertson Campaigner- Environmental Conservation Organisations of Aotearoa New Zealand Convenor Environment Chamber
	Meg Graeme [Principal Ecologist at Natural Solution]
	Kevin Hackwell (Alternate) [Chief Conservation Advisor (previously: Group Manager Campaigns and Advocacy) at Royal Forest & Bird Protection Society]
Maori	George Asher [CEO at Lake Taupo Forest Trust]
Social	Hugh Barr [Secretary at Council of Outdoor Recreation Associations]
	Rhys Millar [Managing Director at Ahika Consulting]
	Ed Miller, replaced by Robert Reid [President at First Union]
	Louisa Jones (Alternates) [NZ First Union]

Table 1: Technical Experts

Name	Expertise	List of documents (ToR, work plan, documents produced)
Geoff Cameron	Former auditor	Draft Standard version 1.9
Katie Rhodes	Editing reviewer	Draft Standard version 2.4

A.4 Background information on the standard development

The development process involved the adaptation of FSC International Generic

Indicators (IGI's) to the FSC Forest Stewardship Standard (FSC-STD-NZL-02-2023). The National Standard for Certification of Plantation Forest Management in New Zealand, Approved Version 5.7 FSC Code: FSC-STD-NZL-01-2012 New Zealand plantations EN (effective date: 27th September 2013) was also used as a basis for this process.

The SDG initially used a matrix where each of the IGI's was used as the starting point and then compared with relevant indicators from the current NZ standard. The SDG followed the approach in FSC-PRO-60-006 V2-0 EN Development and Transfer of National Forest Stewardship Standards to the FSC Principles and Criteria Version 5-1. Where the IGI was not suitable for New Zealand, the SDG either adapted, replaced, or deleted the indicator (in order of preference). In some cases where the IGI's were not considered adequate or appropriate, New Zealand-specific indicators were added.

The key phases/components of development were:

- Eighteen face-to-face meetings of the SDG
- Two SDG sub-group meetings on high-risk erosion areas.
- Three SDG sub-group meetings on riparian management including two field visits.
- In between meetings the SDG members used e-mail and telephone to further refine the draft standard.
- A review by a former FSC auditor.
- Two reviews by a professional editor.

A.5 Draft versions of the standard

The initial versions were created in a matrix that compared each of FSC's IGI's to the current NZ standard (National Standard for Certification of Plantation Forest Management in New Zealand, Approved Version 5.7 FSC Code: FSC-STD-NZL-01-2012 New Zealand plantations EN). A final version of the matrix is available with the consultation documentation and also provides a brief rationale where the SDG has proposed different wording from the FSC IGI. After three matrix versions, the SDG developed word versions.

Due to the breadth and nature of submissions and the amendments that followed, the SDG decided a second consultation was necessary.

B Preamble

B.1 Purpose of the standard

(Informative section)

This standard sets out the required elements against which FSC accredited Certification Bodies shall evaluate forest plantation management practices in New Zealand within the scope (see 2.2. below) of the standard.

The FSC Principles and Criteria (P&C) for Forest Stewardship provides an internationally recognised standard for responsible forest management. However, any international standard for forest management needs adapting at the regional or national level to reflect the diverse legal, social and geographical conditions of forests in different parts of the world. The FSC P&C, therefore, requires the addition of indicators adapted to regional or national conditions implemented at the management unit (MU) level.

With the approval of FSC-STD-60-004 V1-0 EN the FSC International Generic Indicators (IGI) by the FSC Board of Directors in March 2015, the adaptation of the P&C to regional or national conditions is done using the IGI Standard and the FSC-STD-NZL-01-2012 New Zealand plantations EN as the starting point. This has the advantage to:

- Ensure the consistent implementation of the P&C across the globe;
- Improve and strengthen the credibility of the FSC System;
- Improve the consistency and quality of Forest Stewardship Standards;
- Support a faster and more efficient approval process of Forest Stewardship Standards.

The FSC Principles and Criteria together with a set of indicators approved by FSC Policy and Standards Committee (PSC) constitute an FSC Forest Stewardship Standard (FSS).

The development of FSS follows the requirements set out in the following FSC normative documents:

- FSC-PRO-60-006 V2-0 EN *Development and Transfer of National Forest Stewardship Standards to the FSC Principles and Criteria Version 5-1*;
- FSC-STD-60-002 (V1-0) EN *Structure and Content of National Forest Stewardship Standards*;
- FSC-STD-60-006 (V1-2) EN *Process requirements for the development and maintenance of National Forest Stewardship Standards.*

The above documents have been developed by the FSC Performance and Standards Unit (PSU) to improve consistency and transparency in certification decisions between various Certification Bodies in a region/nation and different parts of the world, and thereby to enhance the credibility of the FSC certification scheme.

B.2 Scope of the standard

(Normative section)

Geographic region	New Zealand
Forest types	Plantations
Ownership types	All types of ownerships, including public, private and community
Scale and intensity categories (according to Section 6 of FSC-STD-60-002)	All categories of management units, including provisions for small MUs *(see section E of the standard for further details)*
Forest products (according to FSC-STD-40-004a)	Rough wood (including logs), bark, chip, sawdust and other plantation tree products. NTFP *(see the list below in this section)*

FSC certification of NTFP requires that the rest of this standard has also to be complied with, proportional to the scale and intensity of management activities. In case of intention to certify NTFP not included in this list, these products have to be included into the standard and relevant additional indicators developed, if necessary. The following is the list of NTFP that can be certified within the framework of this standard:

1. **Animal products:** Fur, meat, and other products from non-pest species. Note: Products from pest species are subject to requirements of pest control indicators which focuses on ecological sustainability, not sustainability of the pest species.
2. **Leaves:** Oils and extracts from manuka, radiata pine, or other plantation species.
3. **Bee Products:** Honey and other extracts produced by bees.

Where "NTFP" is designated, the indicators are mandatory when NTFP are harvested for commercial purpose (whether FSC-certified or not).

B.3 Responsibility for conformity

(Normative section)

The requirements in this standard cover all of The Organization's management activities that are related to the Management Unit, whether within the Management Unit or outside; whether directly undertaken or contracted out.

In terms of geographical space, the requirements in this standard apply generally to the entire geographic space inside the boundary of the Management Unit which is being submitted for (re)certification. However, some of the Criteria and indicators apply beyond the boundary of the Management Unit. This would include those infrastructural facilities that are part of the Management Unit, as defined by the FSC Principles and Criteria.

This standard is to be used in conjunction with international, national and local laws and regulations.

Where there might be situations of conflict between the requirements in this standard and laws, specific FSC procedures will apply.

Responsibility for ensuring conformity with the requirements in this standard lies with the person(s) or entities that is/are the certificate applicant or holder. For the purpose of FSC certification, this person(s) or entities are referred to as 'The Organization'.

The Organization is responsible for decisions, policies and management activities related to the Management Unit.

The Organization is also responsible for demonstrating that other persons or entities that are permitted or contracted by The Organization to operate in, or for the benefit of the Management Unit, conform with the requirements in this standard.

The Organization is required to take corrective actions in the event of such persons or entities not being in conformity with the requirements in this standard.

C Context

(Informative section)

New Zealand's forests cover 38% of the country's total land area. According to recent satellite imagery and reported in New Zealand's Third Country Report to the Montreal Process (MPI, 2015), the total forest area in NZ is about 10.1 million ha. This figure is broken into 8 million hectares of indigenous forests (6.833 million ha of "tall indigenous forest"; 1.234 million ha of "regenerating indigenous forest") and 2.1 million ha of exotic or plantation forest of which 1.7 million ha are considered productive. The remaining 400 thousand hectares consists of reserves or unplanted areas near water bodies and infrastructure. Thus, indigenous forests cover about 30% of the country's total land area, and exotic plantation forests cover 7.8%.

C.1 Exotic forest plantations

There are 22 FSC certified exotic plantations in New Zealand, consisting of a total of roughly 1.22 million hectares (72% of the total productive plantation forest area). 29% of total plantations are small grower forestry plantations (including farm forestry plantations) (under 10,000 hectares), with a total area of approximately 490,000 hectares. Apart from a small number of owners in the PF Olsen Group Scheme, small growers are not FSC certified. Limited harvesting of specialty species occurs, Specialty end uses require sustainability, natural durability, or decorative appearance. Both large- and small-scale plantation forests are subject to the regulations present in the national regulation; National Environmental Standard – Plantation Forestry (NES-PF).

C.2 Indigenous forests and indigenous plantations

There exists in New Zealand, one FSC certified indigenous forest. It consists of 11,916 hectares of privately-owned indigenous forest. 2,0195.2 million hectares (76%) of indigenous forest is in public conservation land managed by the State through the Department of Conservation (DOC), no production-based forest management activities are undertaken in these forests. A further 206,000 hectares of indigenous forest is privately, or Māori owned but covenanted for conservation purposes. Of the remaining area, 1.734 million hectares is privately owned indigenous forest (including Māori land). "Estimates of the area of indigenous plantations range from 100 to 2500 hectares. Most are small, and many may not have been established for the sole purpose of producing timber". The harvesting, milling, and exporting of indigenous

timber is managed under the Forests Act 1949. Under the Act, native timber can only be taken from natural forests in a way that maintains forest cover and ecological balance.

Part 3A of the Act discourages unsustainable harvesting and clearance of private indigenous forests and provides for their sustainable management. It gives owners options for managing their forests to harvest and mill timber. It also places controls on the milling and exporting of indigenous timber. Ministry of Primary Industries (MPI) takes responsibility for effectively monitoring and enforcing the Forests Act. Their roles include but are not limited to:

- monitoring and auditing milling and export activities
- maintaining indigenous forestry statistics
- ensuring compliance with export and sawmilling controls
- ensuring compliance with sustainable forest management provisions.
- The Forests Act only allows indigenous timber to be milled at registered sawmills. Milled timber must come from a source approved under the Forests Act.

C.3 The Māori, Indigenous Peoples of New Zealand

The Māori are the indigenous Polynesian people of mainland New Zealand. Māori originated with settlers from eastern Polynesia, who arrived in New Zealand in several waves of waka (canoe) voyages between roughly 1320 and 1350.[7] Over several centuries in isolation, these settlers developed their own distinctive culture, whose language, mythology, crafts and performing arts evolved independently from those of other eastern Polynesian cultures.

Māori connections to forestry and forest land in NZ are strongly cultural and spiritual, as well as commercial. Māori own over 400 000 ha of indigenous forests (6% of total indigenous forest) and some 238 000 ha of planted exotic forests (13% of total exotic forests). These forests contribute significantly to Māori socio- economic development. Māori involvement in commercial forestry commenced over 40 years ago with the planting of pine forests under forestry leases involving the Crown, companies, and Māori landowners. These forests are now maturing and Māori participation is moving to a stronger commercial involvement.

Currently, forestry comprises 10% of Māori's total asset base. This will grow as Māori take increasing ownership and control of their land and forests. The use of former State-owned forest land to fund Māori claims under the Treaty of Waitangi could see Māori owning up to 41% of the planted forests in the future. The sustainable management of indigenous forests represents a relatively undeveloped opportunity for Māori, both for timber and non timber benefits. Māori owners are a very significant group within the forestry sector.

(Source:
https://www.researchgate.net/publication/237230851_MAORI_CONNECTIONS_TO_FORESTRY_IN_NEW_ZEALAND)

C.4 New Zealand's terrain and its influence on forestry

Much of New Zealand is a geographically young mountainous or steep hill country. The geology is also highly varied with hard, brittle rocks in mountain areas. These shatter easily, forming screes. In North Island hill country soft rocks and soils can erode with heavy rain. Added to this are many fault lines which cause weakness in rocks and

can trigger landslides in an earthquake. The maritime climate also means high rainfall. All these factors contribute to a high potential for landslides in many hilly parts of the country.

(Source: https://teara.govt.nz/en/zoomify/8780/new-zealands-terrain#:~:text=Much%20of%20New%20Zealand%20is,These%20shatter%20easily%2C%20forming%20screes.)

These hilly and mountainous landscapes can make forestry challenging as erosion poses a real threat to NZ forest management, both in harvesting and planting. Special considerations, included in this standard, must be taken to minimize and mitigate the risk of landslides that could lead to the harm of forest *workers*, waterways, communities, flora, and fauna.

D References

(Informative section)

The following referenced documents are relevant for the development and application of this standard. For references without a version number, the latest edition of the referenced document (including any amendments) applies.

FSC

FSC-POL-20-003	*The Excision of Areas from the Scope of Certification*
FSC-POL-30-001	*FSC Pesticides Policy*
FSC-POL-30-401	*FSC Certification and the ILO Conventions*
FSC-POL-30-602	*FSC Interpretation on GMOs (Genetically Modified Organisms)*
FSC-STD-01-001	*FSC Principles and Criteria for Forest Stewardship*
FSC-STD-01-002	*Glossary of Terms*
FSC-STD-01-003	*SLIMF Eligibility Criteria*
FSC-STD-20-007	*Forest Management Evaluations*
FSC-STD-30-005	*FSC Standard for Group Entities in Forest Management Groups*
FSC-STD-60-002	*Structure and Content of National Forest Stewardship Standards*
FSC-STD-60-004	*International Generic Indicators, version 2.1, effective date 1 July 2018*
FSC-STD-60-006	*Development of National Forest Stewardship Standards*
FSC-PRO-01-001	*The Development and Revision of FSC Normative Documents*
FSC-PRO-01-005	*Processing Appeals*
FSC-PRO-01-008	*Processing Complaints in the FSC Certification Scheme*
FSC-PRO-01-009	*Processing Policy for Association Complaints in the FSC Certification Scheme*
FSC-PRO-30-006	*Ecosystem Services Procedure: Impact Demonstration and Market Tools*
FSC-DIR-20-007	*FSC Directive on Forest Management Evaluations*

FSC-GUI-60-005	*Promoting Gender Equity in National Forest Stewardship Standards*
FSC-GUI-30-003	*FSC Guidelines for the implementation of the right to Free, Prior and Informed Consent (FPIC)*
FSC-GUI-60-009	*Guidance for Standard Development Groups: Developing National High Conservation Value Frameworks*
FSC-GUI-60-009a	*Template for National High Conservation Value Frameworks*
FSC-PRO-60-006	*Development and Transfer of National Forest Stewardship Standards to the FSC Principles and Criteria Version 5-1*
FSC-STD-60-004	*International Generic Indicators*
FSC-GUI-60-002	*Scale, Intensity and Risk (SIR) Guideline for Standard Developers*

Other

- New Zealand Forest Accord 1991
- NZS8409:2004 Code of Practice for the Management of Agrichemicals
- Approved Code of Practice for Safety and Health in Forestry Operations
- Competenz Best Practice Guidelines
- United Nations Conference on Environment and Development 1992
- Ecological Regions and Districts of NZ (W.M McEwen)
- The New Zealand Protected Natural Areas Programme, Kelly and Park, 1986
- Principles for Commercial Plantation Forest Management in New Zealand, 1995
- NZ Environmental Code of Practice for Plantation Forestry
- IUCN Red List of Threatened Species
- N.Z. Threat Classification system and most recent species list
- ICOMOS New Zealand Charter, 1993
- DSS 1. Calculating Wilding Spread Risk from New Plantings. Ledgard and Langer, Scion
- Erosion Susceptibility Classification and Analysis of Erosion Risks for Plantation Forestry. Bloomfield, et al., School of Forestry, University of Canterbury, 2011
- The National Environmental Standard for Plantation Forestry's Erosion Susceptibility Classification (ESC)
- Approaches to the Selection of a Network of Freshwater Ecosystems within New Zealand for Conservation. West, et al, Department of Conservation – Biodiversity Group, 2019.

E Note on the use of indicators

(Normative section)

The standard follows the FSC Principles and Criteria and for each criterion there are indicators, and in many cases, verifiers and notes. These are described below.

The following elements of this standard are normative: scope, effective date, validity period, glossary of terms, principles, criteria and indicators, tables and annexes, unless indicated otherwise.

The verifiers as well as guidance notes (in Annex J), applicability notes and explanatory notes in this standard are not normative.

Considering the current size pattern of management units (MUs) in New Zealand (see Section 3.1 above), the specifically designated working group recommended three respective size classes: large, medium and small MUs. Specific indicators and other related requirements were developed for these size classes. The SDG also agreed that as the scope of standard covers plantations (and not natural forests), much of SIR is already inherent in the standard. This was kept mind when the SDG considered each indicator.

The NZ SDG has determined SIR in two ways (that also affects the way the indicators are used):

1. Primarily the standard is developed for medium to large plantation operations, so SIR is already inherent in the proposed indicators. For example, it has been incorporated into standard practice for higher risk operations such as clear-felling, chemical use, and species mix found in NZ.
2. SIR has additionally been addressed by attributing, where necessary, either a small, medium or large qualifier either as an Indicator, a verifier or as guidance. For example:
    a. For each criterion where indicators are numbered with no additional letter (like Indicator 1.1.1) then the indicator is intended to be applicable to all sizes and types of plantation forests.
    b. Where an Indicator, a verifier or guidance note is followed by a large, medium or small, then it is only applicable to that particular size(s) of forest. For example, medium and small would only apply to small and medium MUs.

For this standard, the SDG, in consultation with other stakeholders, have established the following size thresholds for the respective categories listed above:

1. Management Units with area of less than 100 ha are classified as small.
2. Management Units with an area between 100 hectares and 1000 hectares are classified as medium.
3. Management Units greater than 1000 hectares are classified as large.

F Essential elements of the FSS

(Normative section)

FSC Principles and Criteria

The Standard includes the FSC Principles and Criteria. Principles are an essential rule or element in FSC's position on Forest stewardship. These are the main numbered items e.g. 1 – 10. Criteria are a means of judging whether Principles have been fulfilled and these are the second-tier numbers e.g. 1.1, 1.2.

Indicator

An Indicator is a quantitative or qualitative variable which can be measured or described, and which provides a means of judging whether a management unit complies with the requirements of an FSC Criterion. Indicators and the associated thresholds thereby define the requirements for responsible forest management at the level of the management unit and are the primary basis of forest evaluation. Indicators are the third-tier numbers e.g. 2.3.5.

Verifier

A potential source of information that allows an auditor to evaluate compliance with an indicator. A certification body may justifiably use alternative means of verification to those listed in this FSS.

Guidance

Similar to a verifier but written to primarily guide the auditor on the intent of an indicator or verifier.

G Conflicts Between the Principles and Criteria and Laws

(Normative section)

The SDG recognises that there may be situations where it is not possible to comply with the Principles and Criteria and law at the same time. Where known, these have been addressed in developing the standard and were included in the Transfer Matrix as an explanation. It is the role of the Certification Body (auditor) to identify these conflicts with The Organisation during audits and to address with FSC in the prescribed manner.

G.1 Interpretations and disputes

(Normative section)

Interpretation requests regarding the FSC Forest Stewardship Standards are submitted directly to FSC for processing and approval. Approved interpretations are published in the international FSC website (see: INT-STD-60-006_01).

Disputes between stakeholders concerning certification requirements are managed by FSC dispute resolution procedure (see: FSC-PRO-01-008).

H Principles, criteria and indicators

(Normative section)

*PRINCIPLE** 1: COMPLIANCE WITH LAWS

***The Organisation** shall comply with all *applicable laws**, regulations and nationally-*ratified** international treaties, conventions and agreements.**

1.1 *The Organisation shall be a *legally** defined entity with clear, documented, and unchallenged *legal registration**, with written authorization from the *legally competent** authority for specific activities.**

1.1.1 Legal registration to carry out all activities within the scope of the certificate is documented and unchallenged.

Verifiers: Relevant land titles, leases, licences, *forestry** rights, Crown *Forestry** Rights, rights, easements, *resource consents**, authorities to modify, knowledge of permitted activity status (under legislation such as the RMA) and other legal mechanisms for land or property under the management units.

1.1.2 Legal registration is granted in accordance with New Zealand law.

1.2 *The Organisation shall demonstrate that the *legal** status of the *management unit**, including *tenure** and use *rights**, and its boundaries, are clearly defined.**

1.2.1 Legal tenure to manage and use resources within the scope of the certificate is documented.

Verifiers: Relevant land titles, leases, licences, *forestry** rights, Crown *Forestry** Rights, rights, easements and other legal mechanisms for land or property under the management units.

1.2.2 Legal tenure is granted by a legally competent authority according to legally prescribed processes.

1.2.3 The boundaries of all management units within the scope of the certificate are clearly marked or documented and clearly shown on maps.

Verifiers: Legal boundaries for the management units in a GIS system, on physical maps, or a map showing property ownership including formal public access routes, public access easements and formed and unformed legal roads on these maps.

Guidance: Guidance can be found in Annex: J.

1.3 *The Organisation shall have *legal** rights to operate in the *management unit**, which fit the *legal** status of *The Organisation** and of the *management unit** and shall comply with the associated *legal** obligations in applicable national and *local laws** and regulations and administrative requirements. The *legal** rights shall provide for harvest of products and/or supply of *ecosystem services** from within the *management unit**. *The Organisation** shall pay the *legally** prescribed charges associated with such rights and obligations.**

1.3.1 Activities covered by the management plan are designed to comply with all applicable laws.

1.3.2 All activities undertaken in the management unit are carried out in compliance with:

1) Applicable laws and regulations and administrative requirements
2) Legal and customary rights; and
3) Obligatory codes of practice.

NTFP 1.3.3 When non-timber forest products are aimed to human or animal consumption, all applicable legal and administrative requirements for hygiene and food safety are complied with.

1.3.4 Payment is made in a timely manner of all applicable legally prescribed charges connected with forest management.

1.4 *The Organisation shall develop and implement measures, and/or shall engage with regulatory agencies, to systematically protect the *management unit** from unauthorized or *illegal** resource use, settlement and other *illegal** activities.**

1.4.1 Measures are implemented to provide protection from unauthorized or *illegal** harvesting, hunting, fishing, trapping, collecting, settlement, and other unauthorized activities.

Guidance: Guidance can be found in Annex: J.

1.4.2 Where protection is the legal responsibility of regulatory bodies, a system is implemented to work with these regulatory bodies to identify, report, control, and discourage unauthorised or *illegal** activities.

1.4.3 If *illegal** or unauthorised activities are detected, measures are undertaken to address them.

1.5 *The Organisation shall comply with the *applicable laws**, local *laws**, *ratified** international conventions and *obligatory* codes of practice*, relating to the transportation and trade of *forest** products within and from the *management unit**, and/or up to the point of first sale.**

1.5.1 Compliance with applicable laws, local laws, ratified international conventions and *obligatory* codes of practice relating to the transportation and trade of forest products up to the point of first sale is demonstrated.

Guidance: Guidance can be found in Annex: J.

1.5.2 Compliance with CITES provisions is demonstrated, including through possession of certificates for harvest and trade in any CITES species.

Applicability note: This indicator is only applicable when The Organisation or other entity is taking, using and trading in CITES-listed species from the management unit.

1.6 *The Organisation shall identify, prevent, and resolve *disputes** over issues of statutory or *customary law**, which can be settled out of court in a *timely manner**, through *engagement** with *affected stakeholders**.**

1.6.1 A publicly available *dispute resolution process** is in place and

modified where necessary in *Culturally appropriate engagement** with affected stakeholders.

1.6.2 Disputes related to issues of applicable laws or customary law that can be settled out of court are responded to in a timely manner and are either resolved or are in the *dispute resolution process**.

1.6.3 Up-to-date records of disputes related to issues of applicable laws or customary law, are held including:

1) Steps were taken to resolve disputes;
2) Outcomes of all *Dispute resolution processes*;* and
3) Unresolved disputes and the reasons why they are not resolved and how they will be resolved.

1.6.4 Operations cease in areas while disputes exist:

1) Of *substantial magnitude**; or
2) Of *substantial duration**; or
3) Involving a significant number of interests.

1.7 *The Organisation shall publicize a commitment not to offer or receive bribes in money or any other form of corruption and shall comply with anti-corruption legislation where this exists. In the absence of anti-corruption legislation, *The Organisation** shall implement other anti-corruption measures proportionate to the *scale** and *intensity** of management activities and the *risk** of corruption.**

1.7.1 A policy is implemented that includes a commitment not to offer or receive bribes of any description.

Guidance: Guidance can be found in Annex: J.

1.7.2 The policy is publicly available at no charge.

1.7.3 Bribery, coercion and other acts of corruption do not occur, and there is compliance with:

- Crimes Act 1961
- Tax Administration Act 1994
- Goods and Services Tax Act 1985
- Sale of Goods Act 1908
- Income Tax Act 2007
- Commerce Act 1986
- Companies Act 1993
- Consumer Guarantees Act 1993
- Contracts (Privity) Act 1982
- Electoral Act 1993
- New Zealand Institute of Chartered Accountants Code of Ethics.

1.7.4 Corrective measures are implemented if corruption does occur.

***1.8 The Organisation** shall demonstrate a *long-term** commitment to adhere to the *FSC Principles** and *Criteria** in the *management unit**, and to**

related FSC Policies and Standards. A statement of this commitment shall be contained in a *publicly available document made freely available.**

1.8.1 A written policy, endorsed by an individual with authority to implement the policy, includes a long-term commitment to forest management practices consistent with FSC Principles and Criteria and related policies and standards.

1.8.2 The policy is publicly available at no cost.

*PRINCIPLE** 2: *WORKERS** RIGHTS AND EMPLOYMENT CONDITIONS

The Organisation* shall maintain or enhance the social and economic wellbeing of workers*.

***2.1 The Organisation* shall *uphold* the *principles* and rights at work as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998) based on the eight ILO Core Labour Conventions.**

2.1.1 Employment practices and conditions for workers demonstrate conformity with or uphold the principles and rights of work addressed in the eight ILO Core Labour Conventions as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998).

Guidance: Guidance can be found in Annex: J.

2.1.2 Workers are able to establish or join labour organisations of their choosing subject only to the rules of the labour organisation concerned.

2.1.3 The forest manager has documentation indicating the existence of any Treaty of Waitangi Claims over the land.

Guidance: Guidance can be found in Annex: J.

2.1.4 The Organisation respects the full freedom of workers' organisations to draw up their constitutions and rules.

Explanatory note: Forestry Workers Network is a free network provided by First Union which is the official union representing forestry workers.

2.1.5 Agreements resulting from collective bargaining with representatives from trade unions or informal organisations are implemented.

2.1.6 The Organisation facilitates union access to workers including the employees of contractors and sub-contractors in accordance with section 20 of the Employment Relations Act 2000.

2.2 *The Organisation shall promote *gender equality** in employment practices, training opportunities, awarding of contracts, processes of *engagement** and management activities.**

2.2.1 Systems promote gender equality and prevent gender discrimination in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities, in accordance with the Human Rights Act 1993 and Equal Pay Act 1972.

2.2.2 Job opportunities are open to all persons under the same conditions, and women are encouraged to actively participate in all levels of employment, in accordance with the Human Rights Act 1993 and Equal Pay Act 1972.

2.2.3 Work such as silviculture, non-timber forest product harvesting, weighing, packing, nursery service, etc. is included in training and health & safety programs to the same extent as any other type of work.

2.2.4 Parental leave and partner's/paternity leave (where the spouse/partner is an employee) complies with the Parental Leave

and Employment Protection Act 1987.

2.2.5 All persons receive the same rate of remuneration when they do the same or substantially similar work in accordance with the Equal Pay Act 1972.

Guidance: Refer to New Zealand law and guidance. There continue to be proposed changes to this legislation so that the specifics may change.

2.2.6 Meetings, management committees and decision-making forums are organized to include women and men, and to facilitate the active participation of both.

2.2.7 Confidential and effective mechanisms exist for reporting and eliminating cases of sexual harassment and discrimination based on gender, marital status, parenthood, sexual orientation or any other ground.

2.3 *The Organisation shall implement health and safety practices to *protect* workers** from occupational safety and health hazards. These practices shall, proportionate to *scale, intensity, and risk** of management activities, meet, or exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work.**

2.3.1 The Organisation complies with the Health and Safety at Work Act and has systems in place to ensure compliance with the Approved Code of Practice for Safety and Health in Forest Operations.

Guidance: Guidance can be found in Annex: J.

2.3.2 Workers are given the opportunity to participate in health and safety initiatives.

2.3.3 Workers have personal protective equipment appropriate to their assigned tasks and provided by their employer, compliant with the Health and Safety at Work Act and the Approved Code of Practice for Safety and Health in Forest Operations.

2.3.4 Use of personal protective equipment is enforced.

2.3.5 The Organisation operates a health and safety management system that is consistent with the Health and Safety at Work Act.

2.3.6 There is a system for reporting and investigating health and safety incidents, which includes:

1) Notifiable incidents (previously serious harm incidents) are reported to WorkSafe and fully investigated; and
2) relevant findings of investigations are communicated to workers; and
3) the Health and Safety practices are reviewed and revised as required after major incidents or accidents; and
4) records are kept on health and safety practices, including accident rates and lost time to accidents.

NTFP 2.3.7 (applicable for commercial hunting only) Safety measures are implemented in areas with ongoing hunting activities to protect the public from casualties.

2.4 *The Organisation shall pay wages that meet or exceed minimum *forest** industry standards or other recognized *forest** industry wage agreements or *living wages**, where these are higher than the *legal** minimum wages. When none of these exist, *The Organisation** shall through *engagement** with *workers** develop mechanisms for determining *living wages**.**

2.4.1 Wages paid by The Organisation meet or exceed the requirements of the Minimum Wage Act 1983.

2.4.2 For employees on piece rates, the amount earned can't be less than the minimum hourly wage equivalent.

2.4.3 Wages paid meet or exceed:

1) Minimum forest industry standards; or
2) Other recognized forest industry wage agreements; or
3) Living wages that are higher than legal minimum wages.

Guidance: Guidance can be found in Annex: J.

2.4.4 Where contractors are engaged in the management unit the living wage is calculated into the contract for workers.

2.4.5 The Organisation has a method to determine that the workers receive the living wage.

2.4.6 Wages, salaries and contracts are paid on time.

2.4.7 Workers are paid directly and using mutually agreed methods to ensure they safely receive and retain their wages, e.g. direct bank transfer.

2.5 *The Organisation shall demonstrate that *workers** have job-specific training and supervision to safely and effectively implement the *management plan** and all management activities.**

2.5.1 Workers are trained, or in training, for the task(s) they are performing, with supervision to safely and effectively contribute to the implementation of the management plan and all management activities.

Verifiers: Approved Code of Practice for Safety and Health in forest Operations requirement that "every person undertaking *forestry** work should be either under documented training and close supervision, or deemed competent"; and/or industry certification requirements or similar schemes relevant to their role of workers.

Guidance: Guidance can be found in Annex: J.

2.5.2 Up-to-date training records are kept for all relevant workers.

Guidance: Guidance can be found in Annex: J.

2.6 *The Organisation through *engagement** with *workers** shall have mechanisms for resolving grievances and for providing *fair compensation** to *workers** for loss or damage to property, *occupational diseases**, or *occupational injuries** sustained while working for *The Organisation**.**

2.6.1 The Organisation complies with the dispute resolution requirements of the Employment Relations Act 2000, including provisions in the worker's individual/collective employment agreement.

Guidance: Guidance can be found in Annex: J.

2.6.2 Workers grievances are identified and responded to and are either resolved or are in the *dispute resolution process**.

2.6.3 Up-to-date records of workers grievances related to workers loss or damage of property, occupational diseases or injuries are maintained including:

1) Steps taken to resolve grievances; and
2) outcomes of all *Dispute resolution processes** including fair compensation; and
3) unresolved grievances and the reasons why they were not resolved.

2.6.4 The Organisation complies with the provisions of New Zealand law to ensure work-related occupational disease or injuries are covered by ACC.

Guidance: The relevant legislation which The Organisation must comply with, includes the Employment Relations Act 2000, the Wage Protection Act 1983, the Accident Compensation Act, and the Health and Safety at Work Act.

2.6.5 The Organisation complies with the provisions of New Zealand law (see the guidance to 2.6.4) to offer remedial action or fair compensation in the case of work-related loss or damage of property.

PRINCIPLE* 3: INDIGENOUS PEOPLES'* RIGHTS

The Organisation* **shall identify and *uphold** *Indigenous Peoples'** *legal** and *customary rights** of ownership, use and management of land, territories* and resources affected by management activities.**

3.1 ***The Organisation**** **shall identify the *Indigenous Peoples** that exist within the *management unit** or those that are affected by management activities. *The Organisation** shall then, through *engagement** with these *Indigenous Peoples**, identify their rights of *tenure**, their rights of access to and use of *forest** resources and *ecosystem services**, their *customary rights** and *legal** rights and obligations, that apply within the *management unit**. *The Organisation** shall also identify areas where these rights are contested.

3.1.1 *Tangata whenua** and their representative bodies within the management unit and those outside the management unit that may be affected by management activities are identified and, up to date records are kept by management.

3.1.2 Through *Culturally appropriate engagement** the following *Tangata whenua** rights relating to the management unit are identified and documented by management:

1) Tenure rights and agreements;
2) customary rights and obligations;
3) agreements relating to *mana whenua**, access and the use of natural resources;
4) agreements, arrangements and requests for the protection and safeguarding of cultural *taonga** including *wahi tapu** and *wahi tupuna**.

3.1.3 Through *Culturally appropriate engagement**:

1) Identify and document the customary obligations of *Tangata whenua** relating to *tino rangati ratanga** and kaitiakitanga* and any other customary values and practices that *Tangata whenua** may deem important in the management of their customary lands and *taonga** within the management unit; and
2) Identify and document disputes or disagreements with *Tangata whenua** relating to legal and/or customary rights and the application of customary obligations within the Management unit.

3.1.4 Through *Culturally appropriate engagement** identify and document the aspirations and goals that *Tangata whenua** may have to their ancestral land and *taonga** within the management unit.

3.2 ***The Organisation**** **shall recognize and *uphold** the *legal** and *customary rights** of *Indigenous Peoples** to maintain control over management activities within or related to the *management unit** to the extent necessary to *protect** their rights, resources and *lands and territories**. Delegation by *Indigenous Peoples** of control over management activities to third parties requires *Free, Prior, and Informed Consent**.

3.2.1 Through *Culturally appropriate engagement** *Tangata whenua** are informed of when, where, and how they can comment on, and request modification to, management activities to the extent necessary to *protect** their rights and maintain their obligations.

3.2.2 The legal and customary rights of *Tangata whenua** are not violated by The Organisation.

3.2.3 Where evidence exists that legal and customary rights of *Tangata whenua** related to management activities have been violated, the situation is recorded and corrected, if necessary, through *Culturally appropriate engagement** and/or through the *dispute resolution process** required in Criteria 1.6 or 4.6.

3.2.4 Free, Prior and Informed Consent is granted by *Tangata whenua** before management activities that affect their identified legal and customary rights through a mutually agreed proc that includes the provisions listed in 3.2.4c.

Guidance: Guidance can be found in Annex: J.

3.2.5 Mandated representatives of *Tangata whenua** organisations are engaged by mutually agreed communication protocols.

3.2.6 Formal meeting minutes have been recorded and agreed.

3.2.7 *Tangata whenua** have been informed of:

1) The economic, social, and environmental value (by the delegation of control of their re-sources) to The Organisation;
2) Their right to withhold consent to the proposed management activities to the extent necessary to protect rights, customary obligations and resources and *taonga**.

3.2.8 The Organisation provides reasonable opportunities for employment, training and other services to *Tangata whenua** contractors and suppliers proportionate to intensity of its management activities.

Guidance: Guidance can be found in Annex: J

3.2.9 The Organisation implements additional activities, through engagement with *Tangata whenua**, that contribute to their natural environment and social and economic development, proportionate to the scale and socio-economic impact of its management activities.

Guidance: Refer to 4.4 as guidance and as a means to incorporate 3.2.9 in a whole of community approach

3.2.10 The Organisation, through engagement with *Tangata whenua**, takes action to identify, avoid, remedy and mitigate significant negative social, environmental and economic impacts of its management activities on *Tangata whenua**. The action taken is proportionate to the scale, and risk of those activities and negative impacts.

Guidance: Refer to 4.5 as guidance and as a means to incorporate 3.2.10 in a whole of community approach.

3.2.11 Where there has been proven evidence of negative or adverse impacts that cannot be remedied or mitigated upon *Tangata whenua** as a result of management activities, The Organisation through engagement with *Tangata whenua** has mechanisms to recognise negative impacts, resolving grievances, and providing fair compensation.

Guidance: Refer to 4.6 as guidance and as a means to incorporate

3.2.11 in a whole of community approach.

3.3 In the event of delegation of control over management activities, a binding agreement* between *The Organisation and the *Indigenous Peoples** shall be concluded through *Free, Prior, and Informed Consent**. The agreement shall define its duration, provisions for renegotiation, renewal, termination, economic conditions, and other terms and conditions. The agreement shall make provision for *monitoring** by *Indigenous Peoples** of *The Organisation's** compliance with its terms and conditions.**

3.3.1 Where control over management activities has been granted the binding agreement contains the duration, provisions for renegotiation, renewal, termination, economic conditions and other terms and conditions. The binding agreement was established through Free Prior and Informed Consent based on *Culturally appropriate engagement**.

3.3.2 Records of binding *a*greement*s* are maintained.

3.3.3 The binding *a*greement contains the provision for monitoring by *Tangata whenua** of The Organisation's compliance with its terms and conditions.

3.4 *The Organisation shall recognize and *uphold** the rights, customs and culture of *Indigenous Peoples** as defined in the United Nations Declaration on the Rights of Indigenous Peoples 2007 (UNDRIP) and ILO Convention 169 (1989).**

3.4.1 The rights, customs, and culture of *Tangata whenua** as defined in UNDRIP and ILO Convention 169 are not violated by The Organisation.

3.4.2 Where evidence that rights, customs and culture of *Tangata whenua**, as defined in UNDRIP and ILO Convention 169, have been violated by The Organisation, the situation is documented including steps to restore these rights, customs and culture of *Tangata whenua**, to the satisfaction of the rights holders.

3.5 *The Organisation, through *engagement** with *Indigenous Peoples**, shall identify sites which are of special cultural, ecological, economic, religious or spiritual significance and for which these *Indigenous Peoples** hold *legal** or *customary rights**. These sites shall be recognized by *The Organisation** and their management, and/or *protection** shall be agreed through *engagement** with these *Indigenous Peoples**.**

3.5.1 Sites and natural features of special cultural, ecological, economic, religious or spiritual significance for which *Tangata whenua** hold legal or customary rights are identified through *Culturally appropriate engagement**.

Guidance: Refer to 4.7 as guidance and as a means to incorporate 3.5.1 in a whole of community approach.

3.5.2 Measures to protect such sites and natural features are agreed, documented, and implemented through *Culturally appropriate engagement** with *Tangata whenua**. If *Tangata whenua** determine that physical identification of sites in documentation or on maps would threaten the value or protection of the sites, then other means will be

applied to ensure their protection.

Guidance: Guidance can be found in Annex: J.

3.5.3 Wherever sites and natural features of special cultural, ecological, economic, religious or spiritual significance are newly observed or discovered, management activities that could affect these sites cease immediately in the vicinity until protective measures have been agreed to with *Tangata whenua**, in accordance with any existing local laws.

3.6 *The Organisation shall *uphold** the right of *Indigenous Peoples** to *protect** and utilize their *traditional knowledge** and shall compensate *local communities** for the utilization of such knowledge and their *intellectual property**. A *binding agreement** as per *Criterion** 3.3 shall be concluded between *The Organisation** and the *Indigenous Peoples** for such utilization through *Free, Prior, and Informed Consent** before utilization takes place, and shall be consistent with the *protection** of *intellectual property** rights.**

3.6.1 Traditional knowledge and intellectual property are protected and are only used when the acknowledged owners of that traditional knowledge and intellectual property have provided their Free, Prior, and Informed Consent formalized through a binding *a*greement.

3.6.2 *Tangata whenua** are compensated according to the binding *a*greement* reached through Free, Prior and Informed Consent for the use of traditional knowledge and intellectual property.

*PRINCIPLE** 4: COMMUNITY RELATIONS

***The Organisation** shall contribute to maintaining or enhancing the social and economic wellbeing of *local communities**.*

4.1 ***The Organisation** shall identify the *local communities** that exist within the *management unit** and those that are affected by management activities. ***The Organisation** shall then, through *engagement** with these *local communities**, identify their rights of *tenure**, their rights of access to and use of *forest** resources and *ecosystem services**, their *customary rights** and *legal** rights and obligations, that apply within the *management unit**.*

4.1.1 Local communities that exist in the management unit and those that may be affected by management activities are identified.

Guidance: Guidance can be found in Annex: J.

4.1.2 Through *Culturally appropriate engagement** with the local communities, identified in 4.1.1 the following are documented and/or mapped:

1) Their legal and customary rights of tenure;
2) their legal and customary access to, and use rights, of the forest resources and ecosystem services;
3) their legal and customary rights and obligations that apply;
4) the evidence supporting these rights and obligations;
5) areas where rights are contested between local communities, governments and/or others;
6) summary of how the legal and customary rights, and contested rights are addressed by The Organisation; and
7) the aspirations and goals of local communities related to management activities and the effects of these.

4.2 ***The Organisation** shall recognize and *uphold** the *legal** and *customary rights** of *local communities** to maintain control over management activities within or related to the *management unit** to the extent necessary to protect their rights, resources and *lands and territories**. Delegation by *local communities** of control over management activities to third parties requires *Free, Prior, and Informed Consent**.*

4.2.1 Through *Culturally appropriate engagement** local communities are informed of when, where, and how they can comment on and request modification to management activities to the extent necessary to protect their rights.

4.2.2 The legal and customary rights of local communities are not violated by The Organisation.

4.2.3 Where evidence exists that legal and customary rights of local communities related to management activities have been violated the situation is corrected, if necessary, through *Culturally appropriate engagement** and/or through the *dispute resolution process** in Criteria 1.6 or 4.6.

4.2.4 Free, Prior, and Informed Consent is granted by local communities prior to management activities that affect their identified rights through a process that includes:

1) Ensuring local communities know their rights and obligations

regarding the resource and its qualities and the impacts of and risks posed by the management activities
2) Informing the local communities of the value and risks, in economic, social and environmental terms, of the resource and environment over which they are considering delegation of control
3) Informing the local communities of their right to withhold or modify consent to the proposed management activities to the extent necessary to protect rights and resources; and
4) Informing the local communities of the current and future planned forest management activities.

4.3 *The Organisation shall provide *reasonable** opportunities for employment, training and other services to *local communities**, contractors and suppliers proportionate to *scale** and *intensity** of its management activities.**

4.3.1 Reasonable opportunities are, communicated and provided to local communities, local contractors and local suppliers for:

1) Employment;
2) training; and
3) other services.

Guidance: Guidance can be found in Annex: J.

4.4 *The Organisation shall implement additional activities, through *engagement** with *local communities**, that contribute to their social and economic development, proportionate to the *scale**, *intensity** and socio-economic impact of its management activities.**

4.4.1 Opportunities for local social and economic development are identified through *Culturally appropriate engagement** with local communities and other relevant organisations.

Guidance: Guidance can be found in Annex: J.

4.4.2 Projects and activities are implemented and/or supported that contribute to local social and economic benefit and are proportionate to the socio-economic impact of management activities.

Guidance: Guidance can be found in Annex: J.

4.4.3 The Organisation seeks to enable different types of recreational access and use by the community, and taking account of any constraints of legal, safety, environmental protection, economic protection and landowner requirements. The Organisation has a process to address requests for recreational access.

Verifier: A process to address requests for recreational access.

4.4.4 Large A public-access policy and/or plan has been developed and is periodically reviewed in *consultation** with recreational and community representative groups and affected stakeholders.

Guidance: Guidance can be found in Annex: J.

4.4.5 Access, including recreational access through *forestry** areas to adjacent land, is provided in *consultation** with the affected landowners.

4.5 *The Organisation, through *engagement** with *local communities**, shall**

take action to identify, avoid and mitigate *significant negative social, environmental, and economic impacts of its management activities on affected communities. The action taken shall be proportionate to the *scale, intensity, and risk** of those activities and negative impacts.**

4.5.1 Through *Culturally appropriate engagement** with local communities, measures are implemented to identify, avoid and mitigate negative social, environmental and economic impacts of management activities.

4.6.1 A publicly available *dispute resolution process** is in place, modified where necessary with *Culturally appropriate engagement** with affected local communities.

4.6.2 Grievances related to the impacts of management activities are responded to in a timely manner and are either resolved or are in the *dispute resolution process**.

4.6.3 An up-to-date record of grievances related to the impacts of management activities is held including:

1) The nature of the grievance and parties involved;
2) steps taken to resolve grievances;
3) outcomes of all *Dispute resolution processes** including fair compensation consistent with New Zealand law; and
4) Unresolved grievances and the reasons why they are not resolved and how they will be resolved.

Guidance: Guidance can be found in Annex: J.

4.6.4 Operations cease in areas while disputes exist:

1) Of *substantial magnitude**; or
2) of *substantial duration**; or
3) involving a significant number of interests.

Guidance: Guidance can be found in Annex: J.

4.7 *The Organisation, through *engagement** with *local communities**, shall identify sites which are of special cultural, ecological, economic, religious or spiritual significance, and for which these *local communities** hold *legal** or *customary rights**. These sites shall be recognized by *The Organisation**, and their management and/or *protection** shall be agreed through *engagement** with these *local communities**.**

4.7.1 Sites of special cultural, ecological, economic, religious or spiritual significance for which local communities hold legal or customary rights are identified through *Culturally appropriate engagement** and are recognized by The Organisation.

4.7.2 Measures to protect such sites are agreed, documented and implemented through *Culturally appropriate engagement** with local communities. If local communities determine that physical identification of sites in documentation or on maps would threaten the value or protection of the sites, then other means will be used.

4.7.3 Whenever sites of special cultural, ecological, economic, religious or spiritual significance are newly observed or discovered, management activities cease immediately in the vicinity until protective measures have been agreed.

Guidance: Guidance can be found in Annex: J.

4.8 *The Organisation shall *uphold** the right of *local communities** to *protect** and utilize their *traditional knowledge** and shall compensate *local communities** for the utilization of such knowledge and their *intellectual property**. A *binding agreement** as per *Criterion** 3.3 shall be concluded between *The Organisation** and the *local communities** for such utilization through *Free, Prior and Informed Consent** before utilization takes place, and shall be consistent with the *protection** of *intellectual property** rights.**

4.8.1 Traditional knowledge and intellectual property are protected and are only used when the owners of that traditional knowledge and intellectual property have provided their Free, Prior and Informed Consent formalized through a binding agreement.

Guidance: Guidance can be found in Annex: J.

4.8.2 Local communities are compensated according to the binding agreement reached through Free, Prior and Informed Consent for the use of traditional knowledge and intellectual property.

PRINCIPLE* 5: BENEFITS FROM THE *FOREST**

The Organisation* **shall efficiently manage the range of multiple products and services of the *management unit** to maintain or enhance *long-term* economic viability** and the range of social and environmental benefits.**

5.1 ***The Organisation**** **shall identify, produce, or enable the production of, diversified benefits and/or products, based on the range of resources and *ecosystem services** existing in the *management unit** in order to strengthen and diversify the *local** economy proportionate to the *scale** and *intensity** of management activities.**

5.1.1 The range of resources and ecosystem services that could strengthen and diversify the local economy and environment are identified.

5.1.2 Consistent with management objectives and the scale of The Organisation, The Organisation produces and makes available opportunities to produce benefits and products to strengthen and diversify the local economy and environment.

5.1.3 When The Organization uses FSC *Ecosystem services** Claims, The Organization complies with applicable requirements in FSC-PRO-30-006.

5.2 ***The Organisation**** **shall normally harvest products and services from the *management unit** at or below a level which can be permanently sustained.**

5.2.1 Timber harvesting volumes are based on an analysis of current *Best Available Information** on growth and yield; inventory of the forest; mortality rates; and *maintenance** of *ecosystem functions**.

5.2.2 Large and medium Based on the *timber harvesting level** analysis, a maximum allowable annual cut for timber is determined that does not exceed the harvest level that can be permanently sustained including by ensuring that harvest rates do not exceed inter-rotational growth.

Guidance: Guidance can be found in Annex: J.

5.2.3 Small Harvesting of the entire forest can occur in one stage, so long as *ecosystem services** are maintained. Actual harvest rates are recorded.

5.2.4 Actual annual harvest volumes for timber are recorded and the harvest over a defined period does not exceed the allowable cut determined in 5.2.2 or 5.2.3 for the same defined period.

Guidance: Guidance can be found in Annex: J.

NTFP 5.2.5 For extraction of commercially harvested services and non-timber forest products under The Organisation's control a sustainable harvest level is calculated and adhered to, except for removal/elimination of *pest** species. Sustainable harvest levels are based on *Best Available Information**.

NTFP 5.2.6 A record is kept of the annual harvest rate for each NTFP harvested.

NTFP 5.2.7 (applicable for honey and other bee products) Feeding of

bees only takes place in cases of lack of natural food sources, due to climatic conditions or alike, e.g. during winter periods. When bee families are fed, a log book is kept for each bee family/beehive, including:

1) Food product fed, e.g. sugar;
2) Amount fed; and
3) date/period fed.

5.3 *The Organisation shall demonstrate that the positive and negative *externalities** of operations are included in the *management plan**.**

5.3.1 Large Costs related to preventing, mitigating, or compensating for negative social and environmental impacts of management activities are included in the management plan.

5.3.2 Large Benefits related to positive social and environmental impacts of management activities are identified and included in the management plan.

5.4 *The Organisation shall use *local** processing, *local** services, and *local** value adding to meet the requirements of *The Organisation** where these are available, proportionate to *scale, intensity, and risk**. If these are not *locally** available, *The Organisation** shall make *reasonable** attempts to help establish these services.**

5.4.1 Where cost, quality and capacity are at least equivalent to non-local options, local goods, services, processing and value-added facilities are used.

Guidance: Guidance can be found in Annex: J.

5.4.2 Reasonable attempts are made to establish and encourage capacity where local goods, services, processing and value-added facilities are not available.

5.5 *The Organisation shall demonstrate through its planning and expenditures proportionate to *scale, intensity, and risk**, its commitment to *long-term** economic viability**.**

5.5.1 Sufficient funds are allocated to implement the management plan to meet this standard and to ensure long-term economic viability.

Guidance: Guidance can be found in Annex: J.

5.5.2 Expenditures and investments are made to implement the *management plan* in order to meet this standard and to ensure long-term economic viability.

PRINCIPLE* 6: *ENVIRONMENTAL VALUES** AND IMPACTS

The Organisation* **shall maintain, *conserve**** **and/or *restore**** ***ecosystem services**** **and *environmental values**** **of the *management unit**, and shall avoid, repair or mitigate negative environmental impacts.**

6.1 *The Organisation** **shall assess *environmental values**** **in the *management unit**** **and those values outside the *management unit**** **potentially affected by management activities. This assessment shall be undertaken with a level of detail, *scale**** **and frequency that is proportionate to the *scale, intensity, and risk**** **of management activities, and is sufficient for the purpose of deciding the necessary *conservation**** **measures, and for detecting and *monitoring**** **possible negative impacts of those activities.**

6.1.1 *Best Available Information** is used to identify environmental values within, and, where potentially affected by management activities, outside of the management unit.

6.1.2 Assessments of environmental values are conducted with a level of detail and frequency so that:

4) Impacts of management activities on the identified environmental values can be assessed as per Criterion 6.2;
5) risks to environmental values can be identified as per Criterion 6.2;
6) necessary conservation measures to protect values can be identified as per Criterion 6.3; and,
7) monitoring of impacts or environmental changes can be conducted as per Principle 8.

Guidance: Guidance can be found in Annex: J.

6.1.3 Large *Fine level evaluation** of conservation zones and protection areas is progressively undertaken appropriate to scale to determine viability and establish specific management requirements of poorly represented areas.

Guidance: Guidance can be found in Annex: J.

6.1.4 All assessments of ecological value and actions are recorded and identified on maps and used to inform future implementation at harvest time, where applicable.

6.2 Prior to the start of site-disturbing activities, *The Organisation** **shall identify and assess the *scale, intensity, and risk**** **of potential impacts of management activities on the identified *environmental values**.**

Guidance Small: To assist in the requirements of Criterion 6.2, The Organisation should use the assessment sheet in Annex F "Identifying Biodiversity Requirements for Small Plantations" or a similar alternative.

6.2.1 A documented *environmental impact assessment** identifies potential present and future impacts of management activities on environmental values, from the stand level to the landscape level.

6.2.2 This assessment process occurs before the start of site-disturbing activities taking into account the interaction with adjoining land, nearby habitats and downstream impacts.

Guidance: Guidance can be found in Annex: J.

6.3 ***The Organisation**** **shall identify and implement effective actions to prevent negative impacts of management activities on the *environmental values**, and to mitigate and repair those that occur, proportionate to the *scale, intensity, and risk**** **of these impacts.**

Guidance Small: To assist in the requirements of Criterion 6.3, The Organisation should use the assessment sheet in Annex F "Identifying Biodiversity Requirements for Small Plantations" or a similar alternative.

6.3.1 Measures seeking to prevent negative impacts are planned, documented, and implemented to protect environmental values prior to the commencement of works.

6.3.2 The Organisation has safeguards in place to minimise adverse effects on environmental values.

6.3.3 The Organisation has written guidelines to:

1) Control accelerated erosion that may occur because of the removal of vegetation;
2) avoid or minimise riparian area damage during harvesting, road construction, or other mechanical disturbances; and
3) enable protection of water resources within and downstream of the management unit including specifying *wetlands**, water body and streamside *protection zones* in which harvesting and other disturbance are prohibited or minimised.

6.3.4 Large The Organisation operates and documents a *decision support system** to manage operations in high-risk areas.

6.3.5 Road and track construction is prohibited in conservation zones and protection areas, except where:

1) It can be demonstrated that this is the best environmental solution to an access issue;
2) it is part of a habitat restoration plan designed to meet the objectives of the protection zone; and
3) a track is part of a recreation or nature interpretation activity and does not adversely affect the objectives of the protection zone.

Verifiers: Roads and tracks within conservation zones and protection areas documented in management plans with their purpose and justification and associated mitigation activities.

6.3.6 A record is kept of any adverse impacts that occur to identified environmental values.

6.3.7 Where negative impacts to environmental values occur, measures are adopted that seek to prevent further damage, and negative impacts are mitigated and/or repaired.

Guidance: Guidance can be found in Annex: J.

6.3.8 A record is kept identifying corrective actions where non-compliance with prescriptions occurs and records:

1) Change in future activities that will prevent similar impacts occurring; and

2) Actions were taken to mitigate the negative impact.

6.4. ***The Organisation**** **shall** ***protect**** ***rare species**** **and** ***threatened species**** **and their** ***habitats**** **in the** ***management unit**** **through** ***conservation zones****, ***protection areas****, ***connectivity**** **and/or (where necessary) other direct measures for their survival and viability. These measures shall be proportionate to the** ***scale, intensity, and risk**** **of management activities and to the** ***conservation**** **status and ecological requirements of the rare and** ***threatened species****. ***The Organisation**** **shall take into account the geographic range and ecological requirements of rare and** ***threatened species**** **beyond the boundary of the** ***management unit****, when determining the measures to be taken inside the** ***management unit****.**

Guidance Small: To assist in the requirements of Criterion 6.4, The Organisation should use the assessment sheet in Annex F "Identifying Biodiversity Requirements for Small Plantations" or a similar alternative.

6.4.1 *Best Available Information** is used to identify rare and threatened species, and their habitats, including CITES species (where applicable) and those listed on national, regional and local lists of rare and threatened species that are present or likely to be present within and adjacent to the management unit.

6.4.2 Generic policy and plans for the maintenance of populations of rare or threatened species within the management unit are prepared and progressively updated in consultation with competent experts.

Guidance: Guidance can be found in Annex: J.

6.4.3 Indigenous habitat within, adjacent to and/or downstream of the management unit that supports or is likely to support rare or threatened species and may be affected by The Organisation's activities is identified in management planning.

Guidance: Refer to 6.1.1.

6.4.4 Potential impacts of management activities on rare and threatened species and their habitats are identified, and management activities are modified to avoid negative impacts on the viability of the populations.

Guidance: Refer to 6.2.1.

6.4.5 Rare and threatened species and their habitats within the management unit are protected, including through the provision of habitat maintenance, conservation zones, protection areas, connectivity, and other direct means for their survival and viability, such as species' recovery programs.

6.4.6 Hunting, fishing, trapping and collection of rare or threatened species is prevented.

Guidance: Guidance can be found in Annex: J.

6.4.7 The need for wildlife corridors for rare and threatened species is assessed within the *ecological landscape** and existing and established corridors (based on the outcomes of the assessment) are managed to promote the viability of these species).

6.4.8 Wildlife corridors for rare and threatened species are:

1) identified on management maps and
2) wildlife corridors for rare and threatened species identified within production areas are detailed in harvest plans with appropriate management actions considered

Guidance: Guidance can be found in Annex: J.

6.5 *The Organisation shall identify and *protect** *Representative Sample Areas** of *native ecosystems** and/or *restore** them to more *natural conditions**. Where *Representative Sample Areas** do not exist or are insufficient, *The Organisation** shall *restore** a proportion of the *management unit** to more *natural conditions**. The size of the areas and the measures taken for their *protection** or *restoration**, including within *plantations**, shall be proportionate to the *conservation** status and value of the *ecosystems** at the *landscape** level, and the *scale, intensity, and risk** of management activities.**

6.5.1 *Best Available Information** is used to identify native ecosystems that exist or would exist under natural condition*s* within the management unit.

Guidance: Guidance can be found in Annex: J

6.5.2 Representative Sample Areas of native ecosystems are protected, where they exist.

6.5.3 Where Representative Sample Areas do not exist, or where existing sample areas inadequately represent native ecosystems, or are otherwise insufficient, a proportion of the management unit is restored progressively to more natural conditions.

Guidance: Guidance can be found in Annex: J

6.5.4 Large and medium The size of the Representative Sample Areas and/or restoration areas is proportionate to the conservation status and value of the ecosystems at the landscape level, the size of the management unit, and the viability of the Representative Sample Area.

Guidance: Guidance can be found in Annex: J

6.5.5 Where modified *threatened significant environments** 1 or 2, *wetland** or *duneland** areas occur within the management unit they are documented together with efforts to restore them progressively.

6.5.6 An area equivalent to or exceeding 10% of the area of the management unit is identified, mapped, and managed as *conservation areas network**.

6.5.7 The Organisation has developed a detailed plan to achieve the requirements of 6.5.6.

6.5.8 At least 10% of the area of the management unit in each *ecological district** (overlapping with the management unit), and if not possible, each *ecological region**, is identified, mapped and managed as a *conservation areas network**; any shortfall (at the *ecological district** or *ecological region** level) is made up through *equivalent ecological effort** (without compromising the requirements of 6.5.6).

Guidance: Annex C provides instructions for calculating

conservation *area network** areas.

6.5.9 Where equivalent *ecological effort** is required to meet the 10% CAN requirement at the *ecological district**, or *ecological region** level (as outlined in 6.5.7) within the management unit, The Organisation has documented the process used, demonstrating that consideration was given to all practical options of *equivalent ecological effort**, and in the stated order of priority.

Guidance: Annex C provides instructions for calculating *conservation area network** areas.

6.5.10 The Organisation records *conservation areas network** management actions.

6.6 *The Organisation shall effectively maintain the continued existence of naturally occurring *native species** and *genotypes**, and prevent losses of *biological diversity**, especially through *habitat** management in the *management unit**. *The Organisation** shall demonstrate that effective measures are in place to manage and control hunting, fishing, trapping and collecting.**

6.6.1 Management activities ensure maintenance of the plant communities and habitats found within native ecosystems in which the management unit is located.

6.6.1a Management activities designed to ensure the maintenance of plant and animal communities and habitats found within native ecosystems within the management unit are detailed in planning documents and implemented.

6.6.2 *Active restoration** or activities in excess of maintenance are detailed in planning documents and implemented.

6.6.3 Maintenance actions and *active restoration** are progressively undertaken to support the maintenance and enhancement of ecological functions including ecosystem regeneration and species diversity.

Guidance: Guidance can be found in Annex: J.

6.6.4 Management maintains, enhances, or restores *habitat features** associated with native ecosystems, to support the diversity of naturally occurring species and their genetic diversity.

6.6.5 Before harvest, adjacent areas of existing habitat for rare and threatened species or representative sample ecosystems are assessed, and where appropriate, *active restoration** undertaken following harvest.

Guidance: Guidance can be found in Annex: J.

6.6.6 The Organisation records *conservation area network** management actions for individual or ecologically related reserves.

6.6.7 Effective measures are taken to manage and control hunting, fishing, trapping, and collecting activities and other recreational activities to ensure that naturally occurring native species, their diversity within species and their natural distribution are maintained and not compromised.

6.7 *The Organisation shall *protect** or *restore** natural water courses*, *water bodies**, *riparian zones** and their *connectivity**. *The Organisation** shall avoid negative impacts on water quality and quantity and mitigate and remedy those that occur.**

6.7.1 Riparian zones of a minimum of 10m each side of the water body are identified and documented on all water bodies that have permanent water when forested.

Guidance: Guidance can be found in Annex: J.

6.7.2 No commercial afforestation is undertaken in riparian zones, with the exceptions described in 6.7.4.

6.7.3 At replanting The Organisation assesses whether any additional *setback** is possible beyond the existing stump-line without creating an area or areas of deforestation under the Climate Change Response Act and Climate Change Regulations.

Guidance: Guidance can be found in Annex: J.

6.7.4 [Large/Medium] Where it is possible to setback without creating deforestation under 6.7.3, no commercial replanting is undertaken in riparian zones except where catchment planning has been undertaken and one of two exemption options to manage replanting setbacks is implemented:

Option 1 exemption:

The Organisation has a Riparian Decision Support System* specified within the Management Plan that:

a) addresses in-stream environmental conditions to maintain long term aquatic values and;

b) allows commercial replanting within the riparian zone of any 3rd order stream catchment where it reaches more than 100m into the MU, and does not exceed 20% of the length of streams in that catchment.

Option 2 exemption:

A minimum 25m continuous setback (each side) is applied on any 3rd order stream (where it reaches more than 100m into the MU) to the top of its sub-catchment that includes at least one significant headwater, and all other tributaries on that stream must have a minimum 5m setback and be replanted no closer than the previous planted stump line.

Verifiers: Mapped 3rd order stream catchments.

Guidance: Guidance can be found in Annex: J.

6.7.5 Small Where a continuous cover regime is used in a riparian zone and adjoining forest, species suitable for indigenous habitat and protection of riparian values may be planted and harvested in that riparian zone only when in-stream values are not compromised by this activity.

6.7.6 Where plantation planting has been undertaken within a riparian

zone, evidence of the assessments carried out in the riparian *decision support system** are recorded along with resulting effects on aquatic values.

6.7.7 Any vegetation felled within the riparian zone is felled away from the water body, except where safety practices require it.

6.7.8 All practicable steps are taken to avoid dragging logs or trees through the bed of a flowing river, lake or *wetland** or the sea. Where this is planned to occur, documentation of the decision-making process is recorded.

6.7.9 The decision-making process includes examination of alternative harvesting methods away from the waterway or use of haul corridors to minimise the stream reach affected.

6.7.10 Where vegetation is cleared within a designated riparian zone, regeneration of suitable riparian vegetation is promoted.

Guidance: Guidance can be found in Annex: J.

6.7.11 Where riparian clearance has been as a result of harvest activities then a re-planting plan details actions that seek to avoid riparian clearance or minimise damage in the next harvest cycle.

Guidance: Guidance can be found in Annex: J.

6.7.12 No earthworks are undertaken within riparian zones, except:

1) In association with designated stream crossings;
2) Where it is maintenance of an existing road;
3) Where a topographical constraint leaves no alternative for the formation of a road;
4) In emergencies such as firefighting.

6.7.13 Steps are taken to ensure disturbed vegetation, soil or debris are deposited or contained to prevent, with the exception of major storm events, the:

1) Diversion, damming or blockage of any river or stream;
2) passage of fish being impeded;
3) destruction of any habitat in a water body or coastal water;
4) flooding or erosion; and
5) downstream property damage.

Guidance: Guidance can be found in Annex: J.

6.7.14 The Organisation complies with any conditions established in *resource consents** and relevant codes of practice including conditions required by permitted activities under the NES – PF.

Guidance: Guidance can be found in Annex: J.

6.7.15 Where continued degradation exists to water bodies, and water quality caused solely or partially by *forestry** activities, measures are implemented that prevent or mitigate this degradation.

Guidance: Guidance can be found in Annex: J.

6.7.16 In *pre-harvest** planning a risk assessment of erosion susceptibility and potential effected values is undertaken to determine where

potential erosion risk is very high.

Guidance: Guidance can be found in Annex: J.

6.7.17 In areas identified as very high risk in 6.7.16 a *pre-harvest** evaluation is undertaken to establish the most appropriate method to transition to *forestry** practices that support soil stability on this land. This evaluation is documented and include consideration of:

1) Post-harvest retirement to suitable permanent vegetation;
2) transition to a continuous cover forest;
3) alternative species, silvicultural practices and regimes; and
4) retirement without harvest and encouragement of suitable long-term soil stability vegetation.

6.7.18 Large and medium If areas identified in 6.7.16 are clear-felled then:

1) For replanting of plantation species that require clear fell harvesting a programme of erosion monitoring is undertaken covering the full rotation of the crop to determine effects, including identifying where sediment has reached water bodies; and
2) areas left to revert to an indigenous vegetation cover are monitored to ensure natural regeneration is occurring.

Verifiers: Documented erosion monitoring following rainfall events (including 10% AEP or more intense storm events) over the course of the rotation, management practices and their relationship to erosion, particularly during the first six years following harvest.

Guidance: Guidance can be found in Annex: J.

6.7.19 Small If plantation species that require clear fell harvesting are replanted within areas identified in 6.7.16 then a photographic record or similar form of monitoring is undertaken to determine soil erosion effects; or if the area is clear-felled and left to revert to indigenous vegetation it is monitored to ensure natural regeneration is occurring.

Verifiers*:* Documentation of erosion monitoring following high rainfall events, and during the first six years following harvest, including:

a. erosion sites (e.g. slips, stream bank erosion) and/or;

b. water quality and/or;

c. related weather events and/or;

d. *forestry** activity data.

Guidance: Guidance can be found in Annex: J.

6.7.20 Afforestation in very high-risk *erosion** areas is not conducted with species that requires clear felling.

Guidance: Guidance can be found in Annex: J.

6.7.21 No storage or mixing of fuels, oils, chemicals, or similar substances is undertaken in areas where a deliberate or inadvertent discharge could enter any water body.

6.8 *The Organisation shall manage the *landscape** in the *management unit****

to maintain and/or *restore a varying mosaic of species, sizes, ages, spatial *scales** and regeneration cycles appropriate for the *landscape values** in that region, and for enhancing environmental and economic *resilience**.**

6.8.1 A varying mosaic of species, sizes, ages, spatial scales, and regeneration cycles is maintained appropriately to the landscape.

Guidance: Guidance can be found in Annex: J.

6.8.2 The mosaic of species, sizes, ages, spatial scales, and regeneration cycles is maintained and/or restored where it has not been maintained appropriate to the landscape.

6.9 *The Organisation shall not convert *natural forest** to *plantations**, nor *natural forests** or *plantations** on sites directly converted from *natural forest** to *non-forest** land use, except when the conversion:**

a) Affects a *very limited portion of the area of the *management unit**, and**
b) Will produce clear, substantial, additional, secure *long-term* conservation benefits in the *management unit**, and**
c) Does not damage or *threaten *high conservation values**, nor any sites or resources necessary to maintain or enhance those *high conservation values**.**

6.9.1 There is no conversion of natural forest to plantations, nor conversion of natural forests to non-forest land use, nor conversion of plantations on sites directly converted from natural forest to non-forest land use, except when the conversion:

1) Affects a very limited portion of the management unit; and
2) the conversion will produce clear, substantial, additional, secure, long-term conservation benefits in the management unit; and
3) does not damage or threaten high conservation values, nor any sites or resources necessary to maintain or enhance those high conservation values.

6.9.2 Conversion of the areas of naturally occurring indigenous vegetation with the following characteristics to plantation is not conducted even within the limits established by 6.9.1:

1) Any area of 5 hectares or greater which has an actual or emerging predominance of naturally occurring indigenous tree species of any height. For this clause an indigenous tree species is defined as any woody plant which ultimately forms part of the canopy of a naturally occurring forest or any indigenous tree species that attains a diameter at breast height of 30cm or greater;
2) any natural indigenous forest vegetation, including riparian of between 1 and 5 hectares in area with an average canopy height of at least 6 m which is practical to protect. This recognises that in some instances some small pockets of native vegetation within a plantation forest management area cannot practically be protected from disturbance. However, viable stands will be excluded from clearance and reasonable effort made to ensure such areas are not damaged in subsequent *forestry** operations;
3) any vegetation recommended for protection in a survey report in the Protected Natural Areas Programme or classified as a Site of

Special Wildlife Interest (SSWI) in a published report of the former Wildlife Service;
4) significant Natural Areas (Areas recognised as significant indigenous vegetation or significant habitats of indigenous fauna) as defined in an operative District and Regional Plan under the Resource Management Act 1991;
5) indigenous habitat of rare, threatened or endangered species;
6) *geopreservation** Sites as listed in The *Geopreservation** Inventory;
7) *wetlands** as defined in the Resource Management Act 1991;
8) *dunelands** where the primary vegetation is indigenous;
9) geothermal areas where there are indigenous plant communities adapted to geothermal conditions.

6.9.3 The following lands are not considered for conversion to plantation unless *consultation** is undertaken with affected and interested *stakeholders** and the respective measures do not violate the requirements of 6.9.1 or 6.9.2:

1) High-country tussock scrublands or herb fields as defined in MfE's *LENZ** publication;
2) Coastal scrub and coastal herb fields with an indigenous plant content of greater than 30 per cent within the area being considered;
3) Any indigenous vegetation that is mapped as *LENZ** Threatened Environment 1–3*;
4) Areas of indigenous vegetation within Outstanding Natural Features and Landscapes identified in Regional and District Plans.

Guidance: Guidance can be found in Annex: J.

6.9.4 Where conversion has taken place (within the allowed limits defined in 6.9.1), this is documented along with the relevant justifications.

6.10. *management units containing *plantations** that were established on areas converted from *natural forest** after November 1994 shall not qualify for certification, except where:**

a) clear and sufficient evidence is provided that *The Organisation was not directly or indirectly responsible for the conversion, or**
b) the conversion affected a *very limited portion of the area of the *management unit** and is producing clear, substantial, additional, secure *long-term** *conservation** benefits in the *management unit**.**

6.10.1 Based on *Best Available Information**, accurate data is compiled on all conversions since 1994.

6.10.2 Areas converted from natural forest to plantation since November 1994 are not certified, except where:

1) The Organisation provides clear and sufficient evidence that it was not directly or indirectly responsible for the conversion; or
2) The conversion is producing clear, substantial, additional, secure, long-term conservation benefits in the management unit; and
3) The total area of plantation on sites converted from natural forest since November 1994 is less than 5% of the total area of the management unit.

*PRINCIPLE** 7: MANAGEMENT PLANNING

***The Organisation** shall have a **management plan** consistent with its policies and **objectives** and proportionate to **scale, intensity, and risks** of its management activities. The **management plan** shall be implemented and kept up to date based on **monitoring** information in order to promote **Adaptive management**. The associated planning and procedural documentation shall be sufficient to guide staff, inform **affected stakeholders** and **interested stakeholders** and to justify management decisions.*

7.1 ***The Organisation** shall, proportionate to **scale*, intensity and risk** of its management activities, set policies (visions and values) and **objectives** for management, which are environmentally sound, socially beneficial and economically viable. Summaries of these policies and **objectives** shall be incorporated into the **management plan**, and publicized.*

7.1.1 Policies (vision and values) that contribute to meeting the requirements of this standard are defined.

7.1.2 Specific, operational management objectives that address the requirements of this standard are defined.

Guidance: Elements to be included in the management plan are listed in Annex D.

7.1.3 Summaries of the defined policies and management objectives are included in the management plan and publicized.

7.2. ***The Organisation** shall have and implement a **management plan** for the **management unit** which is fully consistent with the policies and **management objectives** as established according to **Criterion** 7.1. The **management plan** shall describe the natural resources that exist in the **management unit** and explain how the plan will meet the FSC certification requirements. The **management plan** shall cover **forest** **management planning** and social **management planning** proportionate to **scale, intensity, and risk** of the planned activities.*

7.2.1 The management plan includes management actions, procedures, strategies and measures to achieve the management objectives.

7.2.2 The management plan addresses the elements listed in Annex D and is implemented.

NTFP 7.2.3 (applicable for hunting only) The management plan includes the following elements:

1) Policies and procedures for game managers.
2) Hygiene and food safety regulations in cases that the game is used for food.
3) Maps of all hunting areas.
4) Procedures for monitoring of the impacts of hunting.
5) A general evaluation of the ecological impact of hunting.
6) Procedures for processing, packing and sales (if applicable).

7.3 ***The management plan** shall include **Verifiable targets** by which progress towards each of the prescribed **management objectives** can be assessed.*

7.3.1 Verifiable targets and the frequency that they are assessed, are established for monitoring the progress towards each management

objective.

7.4 *The Organisation shall update and revise periodically the *management planning** and procedural documentation to incorporate the results of *monitoring** and evaluation, *stakeholder* engagement** or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances.**

7.4.1 The management plan is revised and updated periodically, consistent with Annex D to incorporate:

1) Monitoring results, including results of certification audits;
2) Evaluation results;
3) Stakeholder engagement results;
4) New scientific and technical information; and
5) Changing environmental, social, or economic circumstances.

Guidance: Guidance can be found in Annex: J.

7.5 *The Organisation shall make *publicly available** a summary of the *management plan** free of charge. Excluding *Confidential information**, other relevant components of the *management plan** shall be made available to *affected stakeholders** on request, and at cost of reproduction and handling.**

7.5.1 A summary of the management plan in a format understandable to stakeholders including maps and excluding Confidential information, is made publicly available at no cost.

7.5.2 Relevant components of the management plan, excluding Confidential information, are available to affected stakeholders on request at the actual costs of reproduction and handling.

7.6 *The Organisation shall, proportionate to *scale, intensity, and risk** of management activities, proactively and transparently engage *affected stakeholders** in its *management planning** and *monitoring** processes, and shall engage *interested stakeholders** on request.**

7.6.1 *Culturally appropriate engagement** is used to ensure that affected stakeholders are proactively and transparently engaged in the following processes:

1) *Dispute resolution processes** (Criterion 1.6, Criterion 2.6, Criterion 4.6);
2) Identification of rights (Criterion 3.1, Criterion 4.1), sites (Criterion 3.5, Criterion 4.7) and impacts (Criterion 4.5);
3) Local communities' socio-economic development activities (Criterion 4.4); and
4) High conservation value assessment, management and monitoring (Criterion 9.1, Criterion 9.2, Criterion 9.4).

7.6.2 *Culturally appropriate engagement** is used to:

1) Determine appropriate mandated representatives and contact points (including where
2) appropriate, local institutions, organizations and authorities);
3) Determine mutually agreed communication channels allowing for information to flow in both
4) directions;
5) Ensure all actors (women, youth, elderly, minorities) are

represented and engaged equitably;
6) Ensure all meetings, all points discussed and all agreements reached are recorded;
7) Ensure the content of meeting records is approved; and
8) Ensure the results of all *culturally appropriate engagement** activities are shared with those involved.

7.6.3 Affected stakeholders are provided with an opportunity for *culturally appropriate engagement** in monitoring and planning processes of management activities that affect their interests.

7.6.4 On request, interested stakeholders are provided with an opportunity for engagement in monitoring and planning processes of management activities that affect their interests.

*PRINCIPLE** 8: MONITORING AND ASSESSMENT

The Organisation* **shall demonstrate that, progress towards achieving the *management objectives**, the impacts of management activities and the condition of the *management unit**, are *monitored** and evaluated proportionate to the *scale, intensity, and risk** of management activities, in order to implement *Adaptive management**.**

8.1 ***The Organisation**** **shall *monitor**** **the implementation of its *management plan**, including its policies and *management objectives**, its progress with the activities planned, and the achievement of its *verifiable targets**.**

8.1.1 Procedures are documented and executed for monitoring the implementation of the management plan including its policies and management objectives and achievement of verifiable targets.

8.1.2 Persons responsible for implementing and maintaining monitoring programmes are identified.

8.2 ***The Organisation**** **shall *monitor**** **and evaluate the environmental and social impacts of the activities carried out in the *management unit**, and changes in its environmental condition.**

8.2.1 The social and environmental impacts of management activities are monitored consistent with Annex E.

8.2.2 Changes in environmental conditions are monitored consistent with Annex E.

NTFP 8.2.3 (applicable for hunting only) Areas where reintroduction, restocking programs or other animal releases take place are monitored to identify and mitigate potential adverse impacts.

8.3 ***The Organisation**** **shall analyze the results of *monitoring**** **and evaluation and feed the outcomes of this analysis back into the planning process.**

8.3.1 Adaptive management procedures are implemented so that monitoring results feed into periodic updates to the management plan.

Guidance: Guidance can be found in Annex: J

8.3.2 If monitoring results show non-conformities with the FSC Standard then management objectives, Verifiable targets and/or management activities are revised.

8.4 ***The Organisation**** **shall make *publicly available**** **a summary of the results of *monitoring**** **free of charge, excluding *Confidential information**.**

8.4.1 A summary of the monitoring results consistent with Annex E, in a format understandable to stakeholders including maps and excluding Confidential information is made publicly available at no cost.

8.4.2 When requested, additional information in sufficient detail is provided for the stakeholder to understand the nature and results of the monitoring.

8.5 ***The Organisation**** **shall have and implement a tracking and tracing system proportionate to *scale, intensity, and risk**** **of its management activities, for demonstrating the source and volume in proportion to projected output for each year, of all products from the *management unit**

that are marketed as FSC certified.

8.5.1 A system is implemented to track and trace all products that are marketed as FSC certified.

8.5.2 Information about all products sold is compiled and documented, including:

1) The common and scientific species name
2) Product name or description
3) Volume (or quantity) of product
4) Information to trace the material to the source of origin logging block
5) Logging date
6) If basic processing activities take place in the forest, the date and volume produced; and
7) Whether or not the material was sold as FSC certified.

8.5.3 Sales invoices or similar documentation are kept for a minimum of five years for all products sold with an FSC claim, which identify at a minimum, the following information:

1) Name and address of the purchaser
2) The date of sale
3) The common and scientific species name
4) Product description
5) The volume (or quantity) sold
6) Certificate code; and
7) The FSC Claim “FSC 100%” identifying products sold as FSC certified.

NTFP 8.5.4 (applicable for honey and other bee products) It is demonstrated based on *Best Available Information** or pollen analysis that at least 50% of the collected pollen originates from within the FSC certified MU before the honey can be sold with FSC claim: FSC 100%.

NTFP 8.5.5 (applicable for animal products, except bee products) It is demonstrated based on *Best Available Information** or other means (e.g. telemetric data) that the target species spent at least 50% of its lifespan within the FSC certified MU before the products can be sold with FSC claim: FSC 100%.

PRINCIPLE* 9: HIGH CONSERVATION VALUES*

The Organisation* **shall maintain and/or enhance the *high conservation values**** **in the *management unit**** **through applying the *precautionary approach*.**

9.1 ***The Organisation**, through *engagement** with affected *stakeholders**, interested *stakeholders** and other means and sources, shall assess and record the presence and status of the following *high conservation values** in the management unit*, proportionate to the scale, intensity, and *risk** of impacts of management activities, and likelihood of the occurrence of the *high conservation values** (HCV):

HCV 1 – Species diversity. Concentrations of biological diversity* including endemic species, and *rare, *threatened** or endangered species, that are *significant** at global, regional or national levels.

HCV 2 – *Landscape-level *ecosystems** and mosaics. Intact Forest *landscapes** and large *landscape**-level *ecosystems** and ecosystem* mosaics that are *significant** at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

HCV 3 – *Ecosystems and *habitats**. *Rare**, *threatened**, or endangered *ecosystems**, *habitats** or *refugia**.

HCV 4 – Critical* *ecosystem services. Basic *ecosystem services** in critical* situations, including *protection** of water catchments and control of erosion of vulnerable soils and slopes.

HCV 5 – Community needs. Sites and resources fundamental for satisfying the basic necessities of local communities* or *Indigenous Peoples (for livelihoods, health, nutrition, water, etc.), identified through *engagement** with these communities or *Indigenous Peoples**.

HCV 6 – Cultural values. Sites, resources, *habitats and *landscapes** of global or national cultural, archaeological or historical significance, and/or of critical* cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities* or *Indigenous Peoples**, identified through *engagement** with these local communities* or *Indigenous Peoples**.

9.1.1 An assessment is completed using *Best Available Information** that records the location and status of High conservation value Categories 1-6, as defined in Criterion 9.1; the *high conservation value areas** they rely upon (Annex H), and their condition.

9.1.2 The assessment uses results from *Culturally appropriate engagement** (Annex H) with affected and interested stakeholders with an interest in the conservation of the high conservation values.

Guidance: Guidance can be found in Annex: J.

9.2 ***The Organisation**** **shall develop effective strategies that maintain and/or enhance the identified *high conservation values**, through *engagement** with *affected stakeholders**, *interested stakeholders** and experts.

9.2.1 *Threats** to high conservation values are identified using *Best Available Information**.

9.2.2 Management strategies and actions are developed to maintain and/or enhance the identified high conservation values and to maintain

associated *high conservation value areas** prior to implementing potentially harmful management activities.

9.2.3 Affected and interested stakeholders and experts are engaged in the development of management strategies and actions to maintain and/or enhance the identified high conservation values.

9.2.4 The strategies developed are effective to maintain and/or enhance the high conservation values.

9.3 *The Organisation shall implement strategies and actions that maintain and/or enhance the identified *high conservation values**. These strategies and actions shall implement the *precautionary approach** and be proportionate to the *scale, intensity, and risk** of management activities.**

9.3.1 The high conservation values and the *high conservation value areas** on which they depend are maintained and/or enhanced, including by implementing the strategies developed (Annex G).

9.3.2 The strategies and actions prevent damage and avoid risks to high conservation values, even when the scientific information is incomplete or inconclusive, and when the vulnerability and sensitivity of high conservation values are uncertain.

9.3.3 Activities that harm high conservation values cease immediately and actions are taken to restore and protect the high conservation values.

9.4 *The Organisation shall demonstrate that periodic *monitoring** is carried out to assess changes in the status of *high conservation values** and shall adapt its management strategies to ensure their effective *protection**. The *monitoring** shall be proportionate to the *scale, intensity, and risk** of management activities, and shall include *engagement** with *affected stakeholders**, *interested stakeholders** and experts.**

9.4.1 A programme of periodic monitoring assesses:

1) Implementation of strategies
2) The status of *high conservation values* including *high conservation value areas** on which they depend; and
3) The effectiveness of the management strategies and actions for the protection of high conservation value to fully maintain and/or enhance the high conservation values.

9.4.2 The monitoring programme includes engagement with affected and interested stakeholders and experts.

9.4.3 A public summary of monitoring results is made available, excluding Confidential information.

9.4.4 The monitoring programme has sufficient scope, scale, detail and frequency to detect changes in high conservation values, relative to the initial assessment and status identified for each high conservation value.

9.4.5 Management strategies and actions are adapted when monitoring or other new information shows that these strategies and actions are ineffective to ensure the maintenance and/or enhancement of high conservation values.

*PRINCIPLE** 10: IMPLEMENTATION OF MANAGEMENT ACTIVITIES

Management activities conducted by or for *The Organisation for the *management unit** shall be selected and implemented consistent with *The Organisation's** economic, environmental and social policies and *objectives** and in compliance with the *Principles** and *Criteria** collectively.**

10.1 After harvest or in accordance with the *management plan, *The Organisation** shall, by natural or artificial regeneration methods, regenerate vegetation cover in a timely fashion to pre-harvesting* or more *natural conditions**.**

10.1.1 Harvested sites are regenerated in a timely manner that:

1) Protects affected environmental values; and
2) Is suitable to recover overall *pre-harvest** or natural forest composition and structure.

10.1.2 *Regeneration activities** are implemented in a manner that:

1) For harvest of existing plantations, regenerate to the vegetation or similar species cover that existed prior to the harvest or to more natural conditions using ecologically well-adapted species, or any other species in line with 10.2.1, 10.2.2 and 10.3.1 of this standard;
2) For harvest of natural forests, regenerate to *pre-harvest** or to more natural conditions; or
3) For harvest of degraded natural forests, regenerate to more natural conditions.

10.2 *The Organisation shall use species for regeneration that are ecologically well adapted to the site and to the *management objectives**. *The Organisation** shall use *native species** and *local** *genotypes** for regeneration, unless there is clear and convincing justification for using others.**

10.2.1 Species chosen for regeneration are ecologically well adapted to the site, are native species and are of local provenance, unless clear and convincing justification is provided for using non-local genotypes or non-native species.

Guidance: Guidance can be found in Annex: J

10.2.2 There is a clear justification for the choice of species and genotypes chosen for the plantation, which is consistent with the objectives of the plantation, and the climate, geology, and soils at the planting sites.

10.2.3 If there is a native species, which meets the management objectives, as well as an exotic species, the native species is selected in preference to the exotic species.

10.3 *The Organisation shall only use *alien species** when knowledge and/or experience have shown that any invasive impacts can be controlled and effective mitigation measures are in place.**

10.3.1 Alien species are used only when direct experience and / or the results of scientific research demonstrate that invasive impacts can be controlled.

10.3.2 Alien species are used only when effective mitigation measures are

in place to prevent and/or control their spread outside the area in which they are established.

Guidance: Guidance can be found in Annex: J.

10.3.3 The spread of invasive plantation species introduced by The Organization is controlled in accordance with regional *pest** management plans and relevant landowners permission.

10.3.4 The Organisation complies with any applicable Regional Council *pest** management strategy including where this identifies a wilding species as a *pest**.

10.3.5 In the absence of a species being identified in the regional *pest** management strategy, The Organisation removes *wildings** in adjoining properties before seed production where:

1) The adjoining property owner agrees to wilding control on their land, and
2) *Wildings** are identified as the progeny of species planted within the plantation area; and
3) *Wilding** spread has occurred from The Organisation's trees planted after 2001.

10.3.6 Large The Organisation monitors and/or carries out research to evaluate the potential invasiveness and/or other adverse ecological impacts of the species in the local area.

10.4 *The Organisation shall not use *Genetically modified organisms** in the management unit*.**

10.4.1 Genetically modified organisms are not used.

10.5 *The Organisation shall use silvicultural practices that are ecologically appropriate for the vegetation, species, sites and *management objectives**.**

10.5.1 Silvicultural practices are implemented that are ecologically appropriate for the vegetation, species, sites and management objectives.

10.6 *The Organisation shall minimize or avoid the use of *fertilisers**. When *fertilisers** are used, *The Organisation** shall demonstrate that use is equally or more ecologically and economically beneficial than use of silvicultural systems that do not require *fertilisers**, and prevent, mitigate, and/or repair damage to *environmental values**, including soils.**

10.6.1 The use of fertilisers is minimized or avoided.

10.6.2 The decision to use fertilisers is based on forest health surveys and/or soil or foliage analyses that demonstrate a need for intervention to address tree health and/or productivity.

10.6.3 When fertilisers are used, their ecological and economic benefits are equal to or higher than those of silvicultural systems that do not require fertilisers.

10.6.4 When fertilisers are used, their types and additives; rates, methods, and frequencies; and site of application are documented.

10.6.5 When fertilisers are used, environmental values are protected, including through implementation of measures to prevent damage.

10.6.6 Damage to environmental values resulting from fertiliser use is avoided, remedied or mitigated

10.7 *The Organisation shall use integrated *pest** management and *silviculture** systems which avoid, or aim at eliminating, the use of chemical *pesticides**. *The Organisation** shall not use any chemical *pesticides** prohibited by FSC policy. When *pesticides** are used, *The Organisation** shall prevent, mitigate, and/or repair damage to *environmental values** and human health.**

10.7.1 Integrated *pest** management, including selection of silviculture systems, is used to avoid, or aims to eliminate the frequency, extent, and amount of chemical pesticide applications, and result in non-use or overall reductions in applications.

10.7.2 The use of pesticides complies with FSC Pesticide Policy FSC-POL-30-001 V3-0.

10.7.3 Records of pesticide usage are maintained, including trade name, the active ingredient, the quantity of active ingredient used, the period of use, area of use, location of use, and reason for use.

10.7.4 The use of pesticides complies with the ILO document “Safety in the use of chemicals at work” regarding requirements for the transport, storage, handling, application and emergency procedures for cleanup following accidental spillages.

10.7.5 If pesticides are used, application methods minimise quantities used, while achieving effective results, and provide effective protection to surrounding landscapes.

10.7.6 Damage to environmental values and human health from pesticide use is prevented and mitigated or repaired where damage occurs.

10.7.7 When pesticides are used:

1) The selected pesticide, additives or adjuvants, application method, timing, and pattern of use offers the least risk to humans, recreation and non-target species; and
2) Objective evidence demonstrates that the pesticide is the only effective, practical and cost-effective way to control the *pest**.

NTFP 10.7.8 (applicable for honey and other bee products) Sickness of the bees is treated physically such as with steam or fire to disinfect the beehives. For treatment of varroa mites, the following substances are used:

1) Formic acid, lactic acid, acetic acid and oxalic acid.
2) Menthol, eucalyptol and camphor.

10.8 *The Organisation shall minimize, *monitor** and strictly control the use of *biological control agents** in accordance with *internationally accepted scientific protocols**. When *biological control agents** are used, *The Organisation** shall prevent, mitigate, and/or repair damage to *environmental values**.**

10.8.1 The use of biological control agents is minimised, monitored and

controlled.

10.8.2 Use of biological control agents complies with internationally accepted scientific protocols and includes local HSNO requirements

10.8.3 The use of biological control agents is recorded including type, quantity, period, location and reason for use.

10.8.4 Damage to environmental values caused by the use of biological control agents released by The Organisation is prevented and mitigated or repaired where damage occurs.

10.9 *The Organisation shall assess *risks** and implement activities that reduce potential negative impacts from natural hazards* proportionate to scale, intensity, and *risk**.**

10.9.1 Potential negative impacts of natural hazards on *infrastructure**, forest resources and communities in the management unit are assessed.

10.9.2 Management activities mitigate these impacts.

Guidance: Guidance can be found in Annex: J.

10.9.3 The risk for management activities to increase the frequency, distribution, or severity of natural hazards is identified for those hazards that may be influenced by management.

10.9.4 Management activities are modified and/or measures are developed and implemented that reduce the identified risks.

10.9.5 The Organisation complies with fire prevention and management requirements of Fire and Emergency New Zealand.

10.10 *The Organisation shall manage infrastructural development, transport activities, and *silviculture** so that water resources and soils are protected, and disturbance of and damage to rare and *threatened species**, *habitats*, ecosystems** and *landscape values** are prevented, mitigated and/or repaired.**

10.10.1 Development, maintenance and use of *infrastructure**, as well as transport activities, are managed to protect environmental values identified in *Criterion* 6.1.

10.10.2 Silviculture activities are managed to ensure protection of the environmental values identified in Criterion 6.1.

10.10.3 Disturbance or damages to water bodies, soils, rare and threatened species, habitats, ecosystems and landscape values are prevented, mitigated and repaired in a timely manner, and management activities modified to prevent further damage.

10.11 *The Organisation shall manage activities associated with harvesting and extraction of timber and *non-timber forest products** so that *environmental values** are conserved, merchantable waste is reduced, and damage to other products and services is avoided.**

10.11.1 Harvesting and extraction practices for timber and non-timber forest products are implemented in a manner that conserves environmental values as identified in Criterion 6.1.

10.11.2 Adverse effects to environmental values identified in 6.1 are mitigated, repaired, and restored in a timely manner, and management activities modified to prevent further damage.

10.11.3 Harvesting practices optimise the use of forest products and merchantable materials.

10.11.4 Sufficient amounts of dead and decaying biomass and forest structure are retained to conserve environmental values.

Guidance: Guidance can be found in Annex: J.

10.11.5 Harvesting practices avoid damage to standing residual trees, residual woody debris on the ground and other environmental values.

10.12 *The Organisation shall dispose of *waste materials** in an environmentally appropriate manner.**

10.12.1 Collection, clean up, transportation, and disposal of all waste materials is done in an environmentally appropriate way that conserves environmental values as identified in Criterion 6.1 and is consistent with provisions of the Resource Management Act, HSNO Act, Biosecurity Act and Local Government Act.

I Annexes

(Normative section)

Annex A List of applicable laws, regulations and nationally-ratified international treaties, conventions and agreements

Please note that this list is not an exhaustive list and other normative documents pertaining to national legislation may exist elsewhere.

1. *Legal rights to harvest**	
1.1. Land *tenure and management rights**	• Forestry Encouragement Act 1962 • Forestry Rights Registration Act 1983 • Forests Act 1949 • Government Roading Powers Act 1989 • Land Act 1948 • Overseas Investment Act 2005
1.2 Concession licenses	• Land Transfer Act 1952
1.3. Management and harvesting planning	• Land Transport Act 1998 • Personal Property Securities Act 1999 • Property Law Act 2007 • NZ Forest Accord • NZ Forest Road Engineering Manual • NZ Principles for Commercial Plantation Forest Management
1.4. Harvesting permits	• Forests Act 1949 • Public Works Act 1981
2. Taxes and fees	
2.1. Payment of royalties and harvesting fees	• Commerce Act 1986 • Companies Act 1993 • Local Government (Rating) Act 2002 • Local Government Act 1974 and 2002
2.2. Value added taxes and other sales taxes	• Goods and Services Tax Act 1985
2.3. Income and profit taxes	• Income Tax Act 2007 • Tax Administration Act 1994
3. Timber harvesting activities	
3.1. Timber harvesting regulations	• Crown Forest Assets Act 1989 • Fencing Act 1978
3.2. Protected sites and	• Conservation Act 1987

species	• Native Plants Protection Act 1934 • NZFOA Guidelines for the Management of Rare and Endangered Species
3.3. Environmental requirements	• Climate Change Response Act 2002 • Crown Minerals Act 1991 • Hazardous Substances and New Organisms Act 1996 • Plant Variety Rights Act 1987 • Plants Act 1970 • Reserves Act 1977 • Resource Management Act 1991 • Wild Animal Control Act 1977 • Wildlife Act 1953 • NZ Environmental Code of Practice for Forest Operations • NZS8409:2004 Management of Agrichemicals • Soil Conservation and Rivers Control Act 1941
3.4. Health and safety	• Accident Compensation Act 2001 • Fire and Emergency NZ Act • Health and Safety at Work Act 2015 • Machinery Act 1950 • Misuse of Drugs Act 1975 • Trespass Act 1980 • Walking Access Act 2008 • The Road Code
3.5. *Legal employment**	• Contracts (Privity) Act 1982 • Crimes Act 1961 • Employment Relations Act 2000 • Equal Pay Act 1972 • Holidays Act 2003 • Human Rights Act 1993 • Immigration Act 2009 • Minimum Wage Act 1983 • Parental Leave and Employment Protection Act 1987 • Patents Act 1953 and 2013 • Privacy Act 1993 • Approved Code of Practice for Safety and Health in

	Forest Operations • COP for Operator Protective Structures – on self-Propelled Mobile Mechanical Plant • COP for Safety and Health in tree Work – Part 2 Maintenance of Trees Around Power Lines. • Competenz Best Practice Guidelines • Growsafe Agrichemical Users' Code
4. Third parties' rights	
4.1. *Customary rights**	• Te Turi Whenua Māori Act 1993/Maori Land Act 1993
4.2 *Free Prior and Informed Consent**	• Treaty of Waitangi Act 1975
4.3. *Indigenous Peoples' rights**	• Heritage New Zealand Pouhere Taonga Act 2014 • Historic Places Act 1993 • Maori Reserved Land Act 1955
5. Trade and transport **NOTE: This section covers requirements for *forest** management operations as well as processing and trade.**	
5.1. Classification of species, quantities, qualities	• Biosecurity Act 1993
5.2. Trade and transport	• Consumer Guarantees Act 1993 • Sale of Goods Act 1908 • Land Transport Safety Council Code of Practice • Log Transport Safety Council – Industry Standards
5.3. Offshore trading and transfer pricing	• New Zealand Institute of Chartered Accounts Code of Ethics
5.4. Custom regulations	• Biosecurity Act 1993
5.5. CITES	• Biosecurity Act 1993
6. Due diligence / due care	
6.1. Due diligence / due care procedures	• Copyright Act 1994 • Designs Act 1953 • Statistics Act 1975 • Trademarks Act 2002

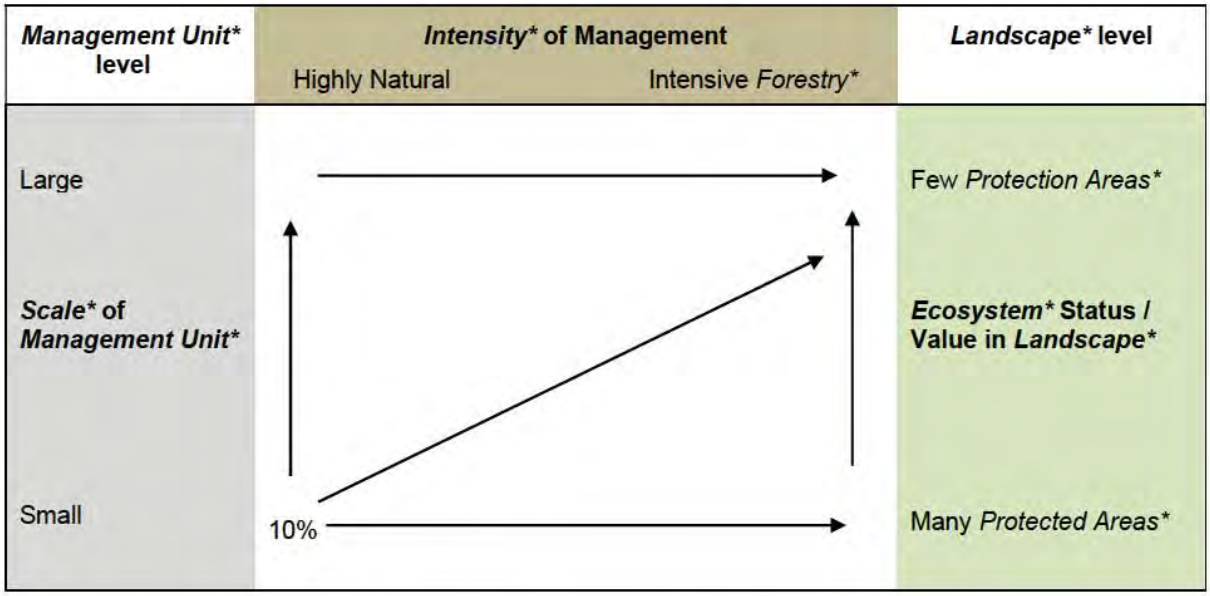
Annex B Training requirements for workers

Training for workers is primarily covered by the Health and Safety at Work Act 2015, but specifically for forestry in the Approved Code of Practice for Safety and Health in Forest Operations and Best Practice Guidelines produced by FITEC. All workers must be trained or under training and supervised.

Workers shall be able to:

1) Implement forest activities to comply with applicable legal requirements (Criterion 1.5);
2) Understand the content, meaning and applicability of the eight ILO Core Labour Conventions (Criterion 2.1);
3) Recognize and report on instances of sexual harassment and gender discrimination (Criterion 2.2);
4) Safely handle and dispose of hazardous substances to ensure that use does not pose health risks (Criterion 2.3);
5) Carry out their responsibilities for particularly dangerous jobs or jobs entailing a special responsibility (Criterion 2.5);
6) Identify where Indigenous Peoples have legal and customary rights related to management activities (Criterion 3.2);
7) Identify and implement applicable elements of UNDRIP and ILO Convention 169 (Criterion 3.4);
8) Identify sites of special cultural, ecological, economic, religious or spiritual significance to Indigenous Peoples and implement the necessary measures to protect them before the start of forest management activities to avoid negative impacts (Criterion 3.5 and Criterion 4.7);
9) Identify where local communities have legal and customary rights related to management activities (Criterion 4.2);
10) Carry out social, economic and environmental impact assessments and develop appropriate mitigation measures (Criterion 4.5);
11) Implement activities related to the maintenance and/or enhancement of declared ecosystem services (Criterion 5.1);
12) Handle, apply and store pesticides (Criterion 10.7); and
13) Implement procedures for cleaning up spills of waste materials (Criterion 10.12).

Annex C *Conservation Area Network** Conceptual Diagram.



The diagram shows how the area of the management unit included in the *Conservation Area Network** is generally expected to increase from the 10% minimum as the size, intensity of management, and/or the status and value of ecosystems at the landscape level each increase. The arrows and their direction represent these increases.

The far right column titled 'Ecosystems Status/Value in the Landscape' signifies the extent to which native ecosystems are protected at the landscape level and the relative requirements for further protection in the management unit.

The leftmost column titled 'Area of management unit shows that as the management unit area increases, the management unit will itself be at the landscape level and so will be expected to have a *Conservation Area Network** containing functional examples of all of the naturally occurring ecosystems for that landscape.

Guidance for Calculating the *Conservation Areas Network** Set Aside Requirements

Annex C has been added to help clarify the requirements around how The Organisation can establish the *conservation areas network** (CAN). Indicators 6.5.6 – 6.5.10 introduce concepts around minimum area, not only as a total percentage but by specific ecological boundaries. Also, they bring in options to have the CAN on third-party land, or by paying a certain amount for another party to do the equivalent work if the CAN was within the management unit. To complicate it further, there is a hierarchy and different requirements if the forest is small or large, and on what things can, and how much of it, constitutes CAN area.

Step 1: Deciding what can contribute to *conservation areas network area**

The areas in the following table may contribute to the CAN within the management unit:

Area description that may contribute to CAN	*Management Unit* Size (small and medium or all)	Multiplier	Maximum contribution to CAN
Conservation zones and protection areas identified and managed under 6.4, 6.5, 6.6 & 6.7.	All	1	NA
Retired areas currently under maintenance to allow transition to indigenous vegetation.	All	1	NA
Exotic species plantations managed for continuous cover, where threatened species and pest control plans are prepared and implemented.	All	0.5	Up to 3% of the total CAN requirement
Areas of plantation trees with specific threatened habitat values that have been set aside from harvest and are being managed to protect a specific threatened species e.g. bat roosts, population of threatened orchid.	All	1	NA
HCVs that meet HCV Criteria 1–4	All	1	NA

Indigenous species *plantations* managed for continuous cover. *Pest** and weed control plans must be prepared and implemented in these areas.	All	0.7	Up To 5% of the total CAN requirement
Riparian zones with permanent native, or mixed exotic/ native, (non-harvestable) suitable for protection of instream values with a minimum 10m width each side of waterway. Stock exclusion and *pest** and weed management is carried out to the extent required for maintenance. Planned *incursions** by logging disturbance or roading requirements at harvest will exclude a riparian zone from being part of the CAN.	All	1	Small up to 5% of the total CAN requirement Medium up to 3% of the total CAN requirement Large and medium up to 1% of the total CAN requirement
Permanent non-harvestable exotic or mixed exotic / indigenous (non-harvestable) areas. This may include multi-tier, double- row shelter belts, with double fencing (small only). Management plans must detail what actions are being undertaken on these areas to ensure enhancement	Small and medium	0.5	Up to 2% of the total CAN requirement

of indigenous biodiversity including *pest** control.			
Alternative forest crop species apart from Radiata pine and Douglas fir (excludes short-term coppicing for firewood). Stock excluded, understorey allowed to develop and *pest** control carried out.	Small and medium	0.3	Up to 4% of total CAN requirements

For example, 100 ha in a conservation zone counts as 100 ha towards the CAN. However, a 100 ha in alternative non- radiata or Douglas fir forest only counts towards 30 ha of CAN area.

For small forests, the above CAN areas can be outside the management unit but within the landowner's property that adjoins the management unit. For example, the management unit may be within a farming property that may have a QE11 covenant, and other riparian zone remnants. These can be included.

To take into consideration that *ecological district** boundaries were mapped at 1:250,000 using old technology and can create inconsistencies at management unit resolution level, and the Management Unit might span multiple *ecological districts** and *ecological regions**, the following adjustments may be made:

1) Where *ecological district** or *Region** boundary/ies arbitrarily bisect a management unit with similar ecological character and landforms, the areas bisected can be considered as one ecological unit.
2) Outlying areas of a management unit, where each is less than 50ha in any one ecological district/or equivalent can be combined with an adjacent area of the management unit.

There is no requirement that an existing *plantation* needs to be converted to Conservation zone or protection areas to meet the CAN Indicators. However, this is an option that may occur, particularly to buffer or extend areas, to achieve Representative Sample Areas of native ecosystems, or to restore *threatened environments** 1 and 2.

Annex D Elements of the management plan

1) Objectives, including a commitment to FSC.
2) Forest and Land Description
3) Legal Framework
4) The results of assessments, including:
    a. Natural resources and environmental values, as identified in Principle 5, 6 and 9
    b. Social, economic and cultural resources and condition, as identified in Principle 2 to 6 and Principle 9; and
    c. Major social and environmental risks in the area, as identified in Principle 2, 3, 4, 5, 6 and 9.
    d. Rationale for species selection and regime.
    e. The maintenance and/or enhancement of ecosystem services for which promotional claims are made as identified in Criterion 5.1.
5) Programs and activities regarding:
    a. Workers' rights, occupational health and safety, gender equality, as identified in Principle 2
    b. Indigenous Peoples, community relations, local economic and social development, identified, as in Principle 3, Principle 4 and Principle 5
    c. Stakeholder engagement and the resolution of disputes; and grievances, as identified in Principle 3, 4, 7 and 9
    d. Planned management activities and timelines, silvicultural systems used, typical harvesting methods and equipment, as identified in Principle 5 and 10
    e. The rationale for harvesting rates of timber and other natural resources, as identified in Principle 5
    f. Protecting the forest and management objectives, in particular from pests and natural hazards.
6) Measures to conserve and/or restore:
    a. Rare and threatened species and habitats
    b. Water bodies and riparian zones
    c. Landscape connectivity, including wildlife corridors
    d. Representative Sample Areas, as identified in Principle 6; and
    e. High conservation values, as identified in Principle 9.
7) Measures to assess, prevent, and mitigate negative impacts of management activities on:
    a. Environmental values, as identified in Principle 5, 6 and Principle 9; and
    b. Social Values, as identified in Principle 2 to Principle 5 and Principle 9
8) A description of the monitoring programme, as identified in Principle 8, including:
    a. Growth and yield, as identified in Principle 5
    b. Environmental values, as identified in Principle 6
    c. Operational impacts, as identified in Principle 10
    d. High conservation values, as identified in Principle 9; and
    e. Monitoring systems based on stakeholder engagement planned or in place, as identified in Principle 2 to Principle 5 and Principle 9; and
    f. Maps describing the natural resources and land use zoning on the forest management unit.

Annex E Conceptual framework for planning and monitoring

The purpose of this checklist is to help The Organisation identify where there may be gaps or non-conformance in their monitoring.

1) Monitoring in 8.2.1 is sufficient to identify and describe the environmental impacts of management activities, including:

		Yes / NA	No
a.	The results of regeneration activities (Criterion 10.1);		
b.	The use of ecologically well-adapted species for regeneration (Criterion 10.2)		
c.	Invasiveness or other adverse impacts associated with any Alien species within and outside the management unit (Criterion 10.3);		
d.	The use of Genetically modified organisms to confirm that they are not being used. (Criterion 10.4);		
e.	The results of silvicultural activities (Criterion 10.5);		
f.	Number of Adverse impacts to environmental values from fertilisers (Criterion 10.6);		
g.	List of fertilisers and application rates kept ongoing		
h.	Any damage from fertiliser use documented including remedy as occurs		
i.	Adverse impacts from the use of pesticides (Criterion 10.7)		
j.	Pesticides used are checked against FSC prohibited list and NZ exempt list on introduction of new pesticide;		
k.	Checks are made to ensure environmental damage is avoided after spray releases;		
l.	Adverse impacts from the use of biological control agents (Criterion 10.8);		
m.	Any biological control agents are documented by outside agency on release;		
n.	The impacts from natural hazards (Criterion 10.9);		
o.	The impacts of infrastructural development, transport activities and silviculture to rare and threatened species, habitats, ecosystems, landscape values water and soils (Criterion 10.10);		
p.	Soil stabilisation including roading is *monitored* ongoing or until stability achieved;		
q.	The impacts of harvesting and extraction of timber and non-timber forest products, environmental values, merchantable wood waste and other products and services (Criterion 10.11);		
r.	Environmentally appropriate disposal of waste materials (Criterion 10.12)		

2) Monitoring in 8.2.1 are sufficient to identify and describe social impacts of management activities, including where applicable:

		Yes / No NA	
a.	Evidence of illegal or unauthorized activities (Criterion 1.4);		
b.	Compliance with applicable laws, local laws, ratified international conventions and obligatory codes of practice (Criterion 1.5);		
c.	Resolution of disputes and grievances (Criterion 1.6, Criterion 2.6, Criterion 4.6);		
d.	Programs and activities regarding workers' rights (Criterion 2.1);		
e.	Gender equality, sexual harassment and gender discrimination (Criterion 2.2);		
f.	Programmes and activities regarding occupational health and safety (Criterion 2.3);		
g.	Payment of wages (Criterion 2.4);		
h.	Worker training (Criterion 2.5);		
i.	Where pesticides are used, the health of workers exposed to pesticides (Criterion 2.5 and Criterion 10.7)		
j.	The identification of Indigenous Peoples and local communities and their legal and customary rights (Criterion 3.1 and Criterion 4.1);		
k.	Full implementation of the terms in binding Agreements (Criterion 3.2 and Criterion 4.2);		
l.	Indigenous Peoples and community relations (Criterion 3.2, Criterion 3.3 and Criterion 4.2);		
m.	Protection of sites of special cultural, ecological, economic, religious or spiritual significance to Indigenous Peoples and local communities (Criterion 3.5 and Criterion 4.7);		
n.	The use of traditional knowledge and intellectual property (Criterion 3.6 and Criterion 4.8);		
o.	Local economic and social development (Criterion 4.2, Criterion 4.3, Criterion 4.4, Criterion 4.5);		
p.	The production of diversified benefits and/or products (*Criterion* 5.1);		
q.	Actual compared to projected annual harvests of timber and non-timber forest products (Criterion 5.2);		
r.	The use of local processing, local services and local value added manufacturing (Criterion 5.4);		
s.	Long-term economic viability (Criterion 5.5);		
t.	High conservation values 5 and 6 identified in Criterion 9.1.		

3) Monitoring procedures in 8.2.2 are sufficient to identify and describe changes in environmental conditions, including where applicable:

Yes / No
NA

a.	Environmental values and ecosystem functions including carbon sequestration and storage Criterion 6.1);		
b.	Rare and threatened species (Criterion 6.4);		
c.	Rare and threatened species populations and habitat monitored;		
d.	Representative Sample Areas (Criterion 6.5);		
e.	Large – representative areas health and restoration programs are monitored;		
f.	Naturally occurring native species and biological diversity (Criterion 6.6);		
g.	Maintenance is monitored;		
h.	Water bodies and water quality (Criterion 6.7);		
i.	Landscape values (Criterion 6.8);		
j.	Large - Trials monitored;		
k.	Conversion of natural forest to plantations (Criterion 6.9);		
l.	The status of plantations established after 1994 (Criterion 6.10);		
m.	High conservation values 1 to 4 identified in Criterion 9.1.		

Annex F Identifying biodiversity requirements for small plantations

Annex F provides guidance on the biodiversity requirements for small plantations, those with a management unit of less than 100 hectares (described in section 5: Notes on the Use of Indicators). The following process steps will assist *The Organisation** to meet the requirements of criteria 6.1 through 6.5. This Annex uses, Significant Natural Areas (SNA) or their equivalent, for example, SEA, ASCV.

A. Identification and protection of environmental values (refer to 6.1)

Does the management unit contain indigenous vegetation, water courses or has continuous cover indigenous harvest areas?

Yes	***No***
↓	↓
Go to A1	***No requirements***

A1. Requirements for The Organisation

a) Carry out animal pest and weed control to ensure maintenance of indigenous plant communities and associated wildlife.
b) Riparian margins are mapped and protection measures are implemented (refer to 6.7)

B. Identification and protection of threatened species and their habitats (refer to 6.2 and 6.4)

Has the local authority completed their SNA mapping in your area?

Yes	***No***
↓	↓
Go to B1	***Go to B2***

B1. Does the management unit or area downstream of the management unit contain a SNA?

Yes	***No***
↓	↓
Go to B3	***No further requirements***

B2. Carry out the requirements of 6.1.1 and 6.1.2 to gather information and identify priorities for protection as per the guidance. **Go to B3**

B3. Requirements of Forest Manager

a) SNAs or areas identified B2 are identified on maps
b) Stock is excluded by fencing from the SNAs or areas identified B2
c) Invasive Plant Control program in place for SNAs or areas identified B2 sufficient to ensure maintenance of indigenous plant communities.
d) Animal Pest Control Program in place within management unit sufficient to ensure maintenance of species associated with the SNAs or areas identified in B2
e) Opportunities are identified to enhance the resilience of the SNAs or areas identified in B2 - for example, buffers to protect against harvesting affects, corridor linkages with other SNAs or areas identified in B2.

Annex G Strategies for maintaining high conservation values

Strategies for maintaining high conservation values may not necessarily preclude harvesting (plantations only). However, the only way to maintain some high conservation values will be through protection of the *High conservation value area** that supports them.

HCV 1 – *Protection zones*, harvest prescriptions, and/or other strategies to *protect** *threatened**, endangered, endemic species, or other concentrations of *biological diversity** and the ecological communities and *habitats** upon which they depend, sufficient to prevent reductions in the extent, integrity, quality, and viability of the *habitats** and species occurrences. Where enhancement is identified as the *objective**, measures to develop, expand, and/or *restore** *habitats** for such species.

HCV 2 – Strategies that fully maintain the extent and intactness of the *forest** *ecosystems** and the viability of their biodiversity concentrations, including plant and animal *indicator** species, keystone species, and/or guilds associated with large intact *natural forest** *ecosystems**. Examples include *protection zones** and set-aside areas, with any commercial activity in areas that are not set-aside being limited to low *intensity** operations that fully maintain *forest** structure, composition, regeneration, and disturbance patterns at all times. Where enhancement is identified as the *objective**, measures to *restore** and reconnect *forest** *ecosystems**, their intactness, and *habitats** that support natural *biological diversity**.

HCV 3 – Strategies that fully maintain the extent and integrity of rare or *threatened ecosystems**, *habitats**, or *refugia**. Where enhancement is identified as the *objective**, measures to *restore** and/or develop rare or *threatened ecosystems**, *habitats**, or *refugia**.

HCV 4 – Strategies to *protect** any water catchments of importance to *local communities** located within or downstream of the *management unit**, and upstream and upslope areas within the unit that are particularly unstable or susceptible to erosion. Examples may include *protection zones**, harvest prescriptions, chemical use restrictions, and/or prescriptions for road construction and *maintenance**, to *protect** water catchments and upstream and upslope areas. Where enhancement is identified as the *objective**, measures to *restore** water quality and quantity. Where identified HCV 4 *ecosystem services** include climate regulation, strategies to maintain or enhance carbon sequestration and storage.

HCV 5 – Strategies to *protect** the community's and/or *Indigenous Peoples**' needs in relation to the *forest** *management unit** developed in cooperation with representatives and members of *local communities** and *Indigenous Peoples**.

HCV 6 - Strategies to *protect** the cultural values developed in cooperation with representatives and members of *local communities** and *Indigenous Peoples**.

Annex H HCV framework

HCV 1 – Species diversity. Concentrations of *biological diversity including endemic species, and *rare**, *threatened** or endangered species, that are *significant** at global, regional or national levels.**

IDENTIFICATION OF HCV 1

1. Description of *Best Available Information** in the country for identifying HCV1: *Best Available Information** in this context includes an assessment by an ecologist to determine whether a site has concentrations of biodiversity that are nationally or globally significant. Past assessments (SNA, PNA etc.) may identify sites as being nationally significant. If not, it is recommended that an assessment is carried out by an experienced qualified ecologist.
2. Description of interested and affected stakeholders:

   Interested and affected stakeholders will vary depending on the *forest** location but could often include: local communities and *iwi**; environmental, economic and social organizations; and government organisations like district and regional councils, and the Department of Conservation.
3. Description of *culturally appropriate engagement** for identifying HCVs:

   An ecologist can assess for HCV1 including drawing on local knowledge to determine if the criteria have been met.
4. Examples of rare / threatened / endangered species in the country
   http://rarespecies.nzfoa.org.nz/
   https://nztcs.org.nz

   Examples are:

   - The Iwitahi orchid reserve which has population of RTE native orchard under an approximate 17 ha of plantation forest
   - Cook Road Forest
   - Whatoro forest – significant kiwi population in a strategic location linking Trounson Park to Kaihu Forest Park.
5. Geographic areas where HCV1 is likely present: HCV1 can be in any geographic areas in NZ.
6. Maps of HCV1 areas in the country: No national level mapping of FSC HCV1 areas exists, however, regional and national databases such as territorial authority mapping (SNAs), DOC PNAP (Protected Natural Areas Programme) identify significant areas, and in some instances specifically identify areas that are nationally or globally significant. LENZ, DOC threat classification and the FOA rare species website provide useful references.
7. Threats to HCV1 areas in the country:

   - The spread of plant *pest** species.
   - The spread or increase in population of introduced animal *pests**, e.g. possums, cats, mustelids, pigs, and wallaby.
   - Loss of habitat when tree felling in neighbouring plantation forestry where a threatened species has spread to the plantation area

New Zealand's indigenous (native) plants and animals evolved without predatory or browsing mammals. Humans introduced animals and plants that are now considered *pests** and these introduced *pests** have a major impact on indigenous (native) biodiversity (http://www.mfe.govt.nz/publications/environmentalreporting/environment-aotearoa-2015-biodiversity/impacts-biodiversity). Alien animal species eat indigenous animals and plants and compete with them for food or habitat. Possums, rats, and stoats pose the greatest threat to indigenous plants and animals and are present across most of the country. They prey on indigenous birds and have contributed to declines in populations of forest birds such as the North Island kōkako, kererū, kākāriki, yellow head (mōhua), and brown creeper. Possums also eat large quantities of indigenous vegetation and are a major cause of decreasing distributions of indigenous tree species – such as pōhutukawa, Hall's tōtara, kāmahi, māhoe, tawa, and rātā. In the process they can also change the composition and structure of native forests. Possums, rats and mice also slow forest regeneration by eating seeds and seedlings. Other *pests**, such as feral goats, red deer, and Himalayan tahr, have a more limited distribution, but when concentrated in large numbers, they can have significant effects on forest and alpine ecosystems.

STRATEGIES FOR MAINTAINING HCV1

1) Clear identification of HCV1 areas in the forest management system. protection zones, harvest prescriptions, and/or other strategies to protect threatened, endangered, endemic species, or other concentrations of biological diversity and the ecological communities and habitats upon which they depend, sufficient to maintain the extent, integrity, quality, and viability of the habitats and species occurrences.
2) Where enhancement is identified as the objective, measures to develop, expand, and/or restore habitats for such species are in place.

MONITORING HCV1

Establishing a *monitoring* program that assesses:

- The status and area of HCV 1, through monitoring of indicator or flagship species as indicators of habitat quality or changes in the species.
- The effectiveness of the activities carried out to conserve, maintain or increase HCV 1 according to the scale, intensity and risk of the operations
- Compliance with agreements established with neighbours and stakeholders, where applicable.

The monitoring programme defines the appropriate scope, scale and frequency to detect changes in the HCV, in relation to the initial assessment.

HCV 2 – *Landscape-level *ecosystems** and mosaics. *Intact Forest Landscapes** and large *landscape**-level *ecosystems** and *ecosystem**

mosaics that are *significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.**

IDENTIFICATION OF HCV 2

1. Description of *Best Available Information** in the country for identifying HCV2: In NZ, *Intact Forest Landscapes** and large landscape-level ecosystems and ecosystem mosaics are often designated as conservation/forest parks or national parks and are outside of MU. However in some cases where the intact landscape adjoins the MU and the adjoining sections of the MU are managed as protection zone, these sections of the MU may add to or be part of the larger significant landscape.
2. Description of interested and affected stakeholders: Interested and affected stakeholders will vary depending on the forest location but could often include: local communities and *iwi**; environmental, economic and social organizations; and government organisations like district and regional councils, and the Department of Conservation.
3. Description of *Culturally appropriate engagement** for identifying HCVs: DOC or an ecologist can assess for HCV2 including drawing on local knowledge to determine if the criteria have been met.
4. Examples of HCV2 areas in the country: conservation or forest parks and National parks are located throughout New Zealand. Examples are Raukumara Conservation Park, Kaimanawa Forest Park, and Kahurangi National Park.
5. Geographic areas where IFLs or other types of HCV2 is likely present: HCV2 can be in any geographic areas in NZ.
6. Maps of HCV2 areas in the country: DOC National, Conservation and Forest Park maps http://www.intactforests.org/data.ifl.html
7. Threats to HCV2 areas in the country: Where FSC certified plantations adjoin or form part of an intact forest landscape, large landscape-level ecosystem or ecosystem mosaic, planning is required to ensure plantation activities do not adversely impact the landscape values. Threats include:
   - The spread of wilding conifers.
   - Other plant *pest** species.
   - The spread or increase in population of introduced animal *pests**, e.g. possums, cats, mustelids, pigs, and wallaby.
   - Incremental ecosystem loss through forestry activities.

STRATEGIES FOR MAINTAINING HCV2

1) Identify where HCV2 occur adjacent to the MU.
2) Manage protection zones that adjoin HCV by adopting strategies that fully maintain the extent and intactness of the forest landscapes and large landscape-level ecosystems and ecosystem mosaics and the viability of their biodiversity concentrations, including plant and animal indicator species, keystone species, and/or guilds associated with large intact natural forest

ecosystems. These strategies shall be developed in conjunction with the manager of the adjacent land to the MU with the intention to protect these HCVs.

3) The *core area** of each *Intact Forest Landscape** within the management unit is protected, comprising at least 80% of the *Intact Forest Landscapes** within the management unit (Motion 65, GA2014 and ADVICE-20-007-018 V1-0).

MONITORING HCV2

Establishing a monitoring program that assesses:

- The surface area and status of HCV 2;
- The presence of indicator or flag species of the identified landscape status;
- The implementation and effectiveness of activities carried out to maintain and/or improve HCV 2;
- The presence or absence of human disturbance for HCV 2;

The monitoring programme defines the appropriate scope, scale and frequency to detect changes in the HCV, in relation to the initial assessment.

HCV3 – *Ecosystems and *habitats**. *Rare*, threatened**, or endangered *ecosystems**, *habitats** or *refugia**.**

IDENTIFICATION OF HCV3

1. Description of *Best Available Information** in the country for identifying HCV3: An assessment by an ecologist to determine whether a site qualifies as a rare, threatened or endangered ecosystem. In some instances, past assessments (SNA, PNA etc.) may identify sites that are particularly rare. If not, it is recommended that an assessment is carried out by an experienced qualified ecologist. Several national priorities for protecting rare and threatened indigenous biodiversity relate to rare, threatened or endangered ecosystems.

National Priority 1 land environments have 20% or less remaining under indigenous cover (https://www.mfe.govt.nz/more/biodiversity/national-policy-statement-biodiversity/statement-national-priorities-biodiversity).

National Priority 2 includes indigenous vegetation associated with sand dunes and *wetlands** that are now uncommon. These are often poorly mapped in regional council databases.

National Priority 3 ecosystems include indigenous vegetation associated with 'originally rare' terrestrial ecosystem types not covered by priorities 1 and 2 (https://www.landcareresearch.co.nz/publications/factsheets/rare-ecosystems).

2. Description of Interested and affected stakeholders: Interested and affected stakeholders will vary depending on the forest location, but could often include: local communities and *iwi**; environmental, economic and social organizations; and government organisations like district and regional councils, and the Department of Conservation.

3. Description of *culturally appropriate engagement** for identifying *HCV*s: An independent assessment by an experienced, qualified ecologist is necessary to determine whether the site meets *HCV*3.

4. Examples of HCV3 ecosystems and habitats in the country:

- Rangitaiki *wetlands** (Kaingaroa Forest).
- Waiotapu Geothermal Reserve (Kaingaroa Forest).
- Duneland and dune lakes (Te Hiku Forest)

5. Geographic areas where HCV3 is likely present: *HCV*3 could be located throughout New Zealand.

6. Maps of HCV3 areas in the country: No maps of FSC *HCV* exist, however, national databases such as territorial authority mapping (SNAs), LENZ, DOC *threat* classification and the FOA *rare species* website provide useful references.

   The National Priority 1 land environments maps identify, at a national level, our most rare and *threatened environments** and ecosystems across New Zealand (http://www.mfe.govt.nz/more/biodiversity/national-policy-statement-biodiversity/statement-national-priorities-biodiversity)

   See maps under the 6 naturally uncommon ecosystem (National Priority 3) categories - https://www.landcareresearch.co.nz/publications/factsheets/rare-ecosystems

7. Threats to HCV3 areas in the country: Refer to HCV1.

   The threats include:

- The spread of wilding conifers and other plant *pest** species.
- The spread or increase in population of introduced animal *pests**, e.g. possums, cats, mustelids, pigs, and wallaby.
- Loss of habitat through neighbouring forestry operations e.g. tree felling.

STRATEGIES FOR MAINTAINING HCV3

1) Strategies that fully maintain the extent and integrity of rare or threatened ecosystems, habitats, or refugia.
2) Where enhancement is identified as the *objective*, measures to restore and/or develop rare or threatened ecosystems, habitats, or refugia are in place.

MONITORING HCV3

Establish a monitoring program that assesses:

- The area and status of HCV 3: comparing it every year
- The implementation and effectiveness of the activities carried out to maintain or increase the HCV 3, to confirm whether the objectives are being met.
- The reduction in size and geographic presence of the ecosystem or habitat in

the area.

The monitoring programme must have defined the appropriate scope, scale and frequency to detect changes in the HCV, in relation to the initial assessment.

HCV4 – *Critical *ecosystem services**. Basic *ecosystem services** in *critical** situations, including *protection** of water catchments and control of erosion of vulnerable soils and slopes.**

IDENTIFICATION OF HCV4

1. Description of additional *Best Available Information** in the country for identifying HCV4:
   Ecosystem services are defined as the benefits people obtain from ecosystems. These include: provisioning services such as food, forest products and water; regulating services such as reducing floods, drought, land degradation, air quality, climate and disease; supporting services such as soil formation and nutrient cycling; and cultural services and cultural values such as recreational, spiritual, religious and other nonmaterial benefits. Criticality refers to the importance and risk for natural resources and environmental and socio-economic values. An ecosystem service is considered to be critical where a disruption of that service is likely to cause, or poses a threat of, severe negative impacts on the welfare, health or survival of local communities, on the environment, or on HCVs;

   The following areas may on assessment be considered HCV4 where a disruption of that service is likely to cause, or poses a threat of, severe negative impacts on the welfare, health or survival of local communities:

   Legal community water supply catchments within or downstream of the MU where the activity of the MU is likely to cause, or poses a threat of, severe negative impacts.

   *Very high risk erosion** areas or areas identified during *pre-harvest** planning as having very high *risk* of erosion.

   Areas subject to a soil conservation order.

   Forest protecting significant infrastructure or communities from flood events.

2. Description of Interested and affected stakeholders: Interested and affected stakeholders will vary depending on the forest location, but could often include: local communities and *iwi**; environmental, economic and social organizations; and government organisations like district and regional councils, and the Department of Conservation. Forest managers, local communities, *iwi**, The Ministry for Environment, local and regional councils.

3. Examples of HCV4 critical ecosystem services in the country: Legal community water supply catchments within or downstream of the MU where the activity of the MU is likely to cause, or poses a threat of, severe negative impacts.

   - Torupatutahi Soil conservation area (Kaingaroa Forest)
   - Mangatu Slip (Gisborne)
   - Hunua (Auckland) water supply catchments.

4. Geographic areas where HCV4 is likely present: HCV4 could be located

throughout New Zealand.

5. Maps of HCV4 areas in the country: Maps of New Zealand's lakes and rivers are available online (https://www.niwa.co.nz/freshwater-and-estuaries/nzffd/NIWA-fish-atlas/map-ofNZ-rivers), which along with information on the likelihood of high intensity rainfall events (https://www.niwa.co.nz/information-services/hirds) can be used to highlight areas at risk of flooding.

   ESC and/or The Land Resource Information System includes soil erosion type and severity maps for the country (https://lris.scinfo.org.nz/layer/48054-nzlrierosion-type-and-severity/) and can inform more detailed erosion assessments.

   Regional and District plans outlining amenity and landscape significance.

6. Threats to HCV4 areas in the country:
   The most widespread cause of altered river flow from water takes appears to be irrigation, although other uses such as hydroelectricity are important in some catchments. There is currently no national-scale data on water use, and the analysis so far is done with consented information. Climate change is predicted to exacerbate pressures on water flows and the availability of water (http://www.mfe.govt.nz/sites/default/files/media/Environmental%20reporting/our-fresh-water-2017_1.pdf). Forest management was not raised as a factor threating to reduce of water quantity. However, plantation forests can affect water flows, but are close to natural when compared to other land uses.

7. Key threats in relation to forestry are:

   - Climate change including increased and more intense rainfall events.
   - Large scale harvesting on vulnerable sites.

STRATEGIES FOR MAINTAINING HCV4

1) Strategies to protect any water catchments of importance to local communities located within or downstream of the management unit, and areas within the unit that are particularly unstable or susceptible to erosion.
2) Examples may include protection zones, harvest area limitations or requirement to ensure a permanent forest cover, chemical use restrictions, and/or prescriptions for road construction and maintenance, to protect water catchments and upstream and upslope areas.
3) Where enhancement is identified as the objective, measures to restore water quality and quantity are in place and avoid future degradation.
4) Where identified HCV4 ecosystem services include climate regulation, strategies to maintain or enhance carbon sequestration and storage are in place.

MONITORING HCV4

Establish a monitoring program that assesses:

– The implementation and effectiveness of activities carried out to maintain

and/or improve HCV 4, so that compliance with the established objectives can be confirmed. Namely, that harvesting practices do not affect water bodies, and that barriers have been established and are maintained to control fires.
- The quality and quantity of water for large plantation forest companies and MU.
- The incidence of landslides or gullies in the MU, affected areas, their control and status.
- Incidence and control of forest fire and incipient fires in the MU, affected areas, control and status.

The monitoring program must have defined the appropriate scope, scale and frequency to detect changes in the HCV, in relation to the initial assessment.

HCV5 – Community needs. Sites and resources fundamental for satisfying the basic necessities of *local communities or *Indigenous Peoples** (for livelihoods, health, nutrition, water, etc.), identified through *engagement** with these communities or *Indigenous Peoples**.**

IDENTIFICATION OF HCV5

1. Description of additional *Best Available Information** in the country for identifying HCV5: Both exotic plantation and natural forests provide recreational opportunities including hiking, mountain biking, hunting, bird watching, food collecting and medicinal plant collecting (http://www.TeAra.govt.nz/en/protected-areas/page-5). Several planted forests in New Zealand provide recreational opportunities to the people who visit them, including walking, mountain biking, horse riding, running, and exercising dogs (http://www.landcareresearch.co.nz/__data/assets/pdf_file/0019/77032/1_4_Yao.pdf). Where these activities occur on private land, landowners work with local communities to agree access protocols.

   Clarification: Exotic plantations and associated industries are often major employers in rural communities, thus supporting the livelihoods of many members of these communities.

   Forests provide the basis for many traditional uses, among them collection of edible products of the forests (fruiting berries of indigenous plants, fern root, seeds, etc.), timbers for carving and building, physical remedies derived from trees, leaves, berries, fruits, bark and moss used to treat particular ailments, among others (https://www.landcareresearch.co.nz/__data/assets/pdf_file/0017/43910/maori_values_native_forest.pdf).

   However, traditional subsistence living is almost totally absent in New Zealand, so none of the above activities could be considered as being of fundamental importance to satisfy basic livelihood needs. Therefore, HCV5 sites are rare in New Zealand's planted forests.

   Generally, there are few examples where forest recreation is fundamental to basic necessities, perhaps the only example could be Whakarewarewa Forest and its significant contribution to tourism and recreational business in Rotorua.

2. Description of Interested and affected stakeholders: Local communities, *iwi**, Doc, territorial authorities, recreation groups.

3. Description of *culturally appropriate engagement** for identifying HCVs: Engagement with a community representative group, territorial authority or DOC and with *mana whenua** through FIPC agreed tikaanga. Refer to *culturally appropriate engagement**.

4. Examples of HCV5 sites and resources fundamental for local communities in the country:

   - Whakarewarewa Core Mountain Bike Area.
   - Blue and Green Lake Covenants (Whakarewarewa Forest, Rotorua).

5. Geographic areas where HCV5 is likely present: HCV5 could be located throughout New Zealand.

6. Maps of HCV5 areas in the country: No FSC HCV5 maps exist, however Territorial Authority planning maps provide a resource that could be used to help identify *HCV5* areas, for example significant amenity sites or fisheries.

7. Threats to HCV5 areas in the country:

   - Forest management activities.
   - Restricting access.
   - Conversion to other land uses.

STRATEGIES FOR MAINTAINING HCV5

1) Strategies to protect the community's and/or Indigenous Peoples' needs in relation to the management unit are developed in cooperation with representatives and members of local communities and Indigenous Peoples.

MONITORING HCV5

Establish a monitoring program that assesses:

- The implementation of the strategies established to maintain and/or enhance the HCV; allowing to confirm if the objectives were achieved.
- Whether the management is affecting the identified HCV 5.
- Permanent access to HCV 5 used by local communities, Indigenous Peoples or *iwi**.
- Type of resource and volume used by local communities, Indigenous Peoples or *iwi** to cover their basic needs.

The monitoring programme must have defined the appropriate scope, scale and frequency to detect changes in the HCV, in relation to the initial assessment.

HCV 6 – Cultural values. Sites, resources, *habitats and *landscapes** of global or national cultural, archaeological or historical significance, and/or of *critical** cultural, ecological, economic or religious/sacred importance for the**

traditional cultures of *local communities or *Indigenous Peoples**, identified through *engagement** with these *local communities** or *Indigenous Peoples**.

IDENTIFICATION OF HCV 6

1. Description of *Best Available Information** in the country for identifying HCV6: Internationally significant heritage sites World heritage sites are designated by UNESCO under the World Heritage Convention, which provides for the protection of places that are of outstanding universal value. New Zealand has three and the map from UNESCO website identifies their location on the New Zealand territory (http://whc.unesco.org/en/statesparties/NZ).

   Significant heritage sites are scattered throughout New Zealand, but mainly are found in or around urban areas (http://www.heritage.org.nz/the-list).

   Consultation with *mana whenua** may identify HCV6 where sites have significant cultural heritage. Noting some may be silent file where location and description are not made public.

2. Description of Interested and affected stakeholders: *Iwi** (*mana whenua**) and local communities, The Department of Conservation, Heritage New Zealand

3. Description of *Culturally appropriate engagement** for identifying HCVs: Engagement with a registered archaeologist or consultation with *mana whenua** through FIPC agreed tikaanga. Refer to *Culturally appropriate engagement**. geographic areas where HCV6 is likely present: HCV6 could be located throughout New Zealand.

4. Examples of HCV6 significant cultural values in the country:

   - Caves Historic Site, Kaingaroa Forest
   - Takiroa Rock Art Shelter, Takiroa, Otago.

5. Maps of HCV6 areas in the country: Certificate holder GIS. Heritage NZ maps and archaeological site records.

   Nationally significant heritage sites under Heritage New Zealand archaeological sites only and under local authorities' administration. There is a list online that serves as a recognition tool and where any individual can propose new sites through a written application. The list of heritage sites of national significance is divided into five parts, based on the type of sites (http://www.heritage.org.nz/the-list).

6. Threats to HCV6 areas in the country: Forest management activities.

   International significance heritage sites According to UNESCO (https://whc.unesco.org/en/soc/?action=list&id_search_state=115), the factors affecting world heritage site of Te Wahipounamu – South West New Zealand in 2004 relate to oil spill and effects arising from use of transportation infrastructure. Potential logging is listed as one factor affecting the site identified in previous reports.

   National significance heritage sites under HNZ -archaeological sites only- and under local authorities' administration. Damage can be caused to both archeological sites and national heritage sites during harvesting, extraction and replanting. Potential threats to such sites from forest management is the restriction of access for Māori communities to hunt, fish, extract plants, and maintain contact with resources for traditional use and sacred places.

STRATEGIES FOR MAINTAINING HCV6

1) Strategies to protect the cultural values are developed in cooperation with representatives and members of local communities and Indigenous Peoples.

MONITORING HCV6

Establish a monitoring program that assesses:

- The implementation of the strategies established to maintain and/or enhance HCV 6; allowing to confirm if the objectives were achieved.
- Whether the management is affecting the identified HCV 6.
- Permanent access to HCV 6, with which local communities, Indigenous Peoples or *iwi** have a religious/cultural/economic linkage with the area or the forest.
- Changes in the status of the HCV 6 with indicators accepted and credible by local communities, Indigenous Peoples or *iwi** who have a religious/cultural/economic linkage with the area or the forest.

The monitoring programme must have defined the appropriate scope, scale and frequency to detect changes in HCV 6, in relation to the initial assessment.

Annex I List of rare and threatened species in the country or region

In New Zealand, the Department of conservation maintains and updates a database of known animal species and their conservation status. This information is broken down in separate documents based on each animal family (Hominidae).

This information can be found here: https://www.doc.govt.nz/about-us/science-publications/*Conservation*-publications/nz-threat-classification-system/

Annex J Guidance notes

In the interest of readability and overall document flow most of the guidance in this document has been presented here, in a separate annex. Crucial pieces of guidance are located with their indicators.

For each indicator that states “Guidance can be found in Annex: J” here you will find that guidance, broken down by principles in numerical order.

Principle 1 Guidance

Indicator 1.2.3

Large – The Organisation can provide forest boundary information to be placed on the FSC NZ website nz.fsc.org.

Indicator 1.4.1

Measures can be operating the following:

1) Forest roads have gates and/or have controlled access to areas of high-risk; and/or
2) Temporary roads are physically closed off after harvesting; and/or
3) Forest roads are patrolled or monitored to detect and prevent illegal access to the forest; and/or
4) Personnel and resources have been assigned to detect and control illegal activities promptly, within their legal rights.

Indicator 1.5.1

In meeting this Indicator, The Organisation can consider the policies, resolutions and recommendations of the International Union for the Conservation of Nature, IUCN.

Indicator 1.7.1

Includes, but is not limited to, non-collusion under the Commerce Act 1986.

Principle 2 Guidance

Indicator 2.1.1

Where the New Zealand legislation contains ILO provisions compliance with New Zealand laws is sufficient for meeting the requirements of this indicator. This includes compliance with the following Acts:

- Health & Safety at Work Act 2015;
- Accident Compensation Act 2001;
- Employment Relations Act 2000;

- Holidays Act 2003;
- Human Rights Act 1993;
- Minimum Wage Act 1983;
- Parental Leave and Employment Protection Act 1987;
- Privacy Act 1993;
- Equal Pay Act 1972;
- Wages Protection Act 1983.

Indicator 2.1.3

Documents available on-line are sufficient to meet this indicator.

The existence of claims may not be made available to the forest manager by the Crown or claimant. Where this is the case the forest manager cannot be expected to have the relevant documentation.

Indicator 2.3.1

The Approved Code of Practice (ACOP) is a minimum standard. The Health & Safety at Work Act is goal setting legislation based on leadership, risk management and engagement and allows for companies to manage their risks in the best way possible. New control methods may be identified which surpass those of the existing ACOP.

SafeTree (www.safetree.nz) provides resources on forest safety management for owners, managers, contractors, foremen and workers.

Indicator 2.4.3

The living wage can be obtained from the independently calculated national living wage produced by the New Zealand Family Centre Social Policy Unit at http://www.livingwage.org.nz/

Forestry Employment Standards are created by The Forestry and Wood Processors Council.

The Organisation may find it useful to include policies that provide for part-time and under-training workers. For example:

1) How to progress workers in training, or work creation schemes, to where they are full time and fully trained
2) How to manage seasonal or part-time workers on piece rates where they may not be able to meet minimum hourly rates.

Indicator 2.5.1

Safetree certification can provide a means of verification, for example *workers* and contractors certified to either the:

1) Professional Forest Worker or high risk tasks such as tree felling and

breaking are available at https://safetree.nz/training/, or
2) Safetree Contractor Certification at https://safetree.nz/certification/.

Indicator 2.5.2

Records can be kept by the contractor but are available for review.

Indicator 2.6.1

This provision provides for union representation, where the workers are members. The union for forestry workers in New Zealand is the Forestry Workers Network

Indicator 2.6.4

Relevant legislation includes the Employment Relations Act 2000, the Wage Protection Act 1983, the Accident Compensation Act, and the Health and Safety at Work Act.

Principle 3 Guidance

Indicator 3.2.4

Observing the following steps may assist in developing Free, Prior and Informed Consent:

1) Mandated representatives of *Tangata whenua** organisations are engaged by mutually agreed communication protocols.
2) Formal meeting minutes are recorded and agreed.
3) *Tangata whenua** are informed of:
    a. The economic, social, and environmental value (by the delegation of control of their resources) to The Organisation.
    b. Their right to withhold consent to the proposed management activities to the extent necessary to protect rights, customary obligations and resources and *taonga**; and agreed communication protocols.

Indicator 3.2.8

Refer to 4.3 as guidance and as a means to incorporate 3.2.8 in a whole community approach.

Indicator 3.5.2

Protection may include processes that involve *Tangata whenua** to monitor and access the site.

Principle 4 Guidance

Indicator 4.1.1

Local communities that may be affected include:

1) Territorial authorities, including wards and Council Community Boards
2) Adjacent townships or groups of dwellings
3) *Tangata whenua** (addressed in Principle 3 of this standard)
4) Forest recreational, user or conservation groups
5) Affected or interested community groups
6) Neighbours and neighbouring communities

Indicator 4.3.1

Large – The Organisation can meet the standard by providing and/or offering a combination or all of the following:

1) Employment:
    a. Using a majority of local businesses and suppliers
    b. Advertising or promoting employment in local media
    c. Participating in relevant local forum and/or initiatives.
2) Training:
    a. An identifiable provision in contracts
    b. Direct training initiatives
    c. Support for local training organisations through funding, sites and resources
    d. Scholarships
    e. Internships.
3) Other services:
    a. Using a majority of local businesses and suppliers
    b. Provision of other services beneficial to local communities through licenses, contracts and agreements.

Small and medium – The Organisation can meet the standard by giving preference to local people and services wherever possible.

Indicator 4.4.1

Large – The Organisation can meet the standard by:

1) Participating in relevant local forum, and/or initiatives; and/or
2) Supporting (for example through long-term supply agreements) to existing and new processing; and/or
3) Engaging with local iwi* regarding social and economic development.

Small and medium – The Organisation considers relevant opportunities as they arise.

Indicator 4.4.2

The Organisation can:

1) Use a majority of local businesses and suppliers; and/or
2) Support existing and new processing (for example through long-term supply agreements); and/or
3) Provide for activities (such as recreation) that generate meaningful social and economic benefit; and/or
4) Provide for other services beneficial to local communities through

licences, contracts and agreements.

Indicator 4.4.4

1) For non-freehold land, the agreement of the landowners may be obtained
2) Where practical, a permit system, appropriate to the nature of access or any other access management method that accurately records forest use can be implemented by The Organisation to support public access policy.
3) Access through forestry areas shall not be permitted where it will lead to adverse effects, e.g., impact safety and health, affect the growth and protection of the trees, increase fire risk or put at risk sensitive ecological and cultural areas
4) Known sportfish and game bird habitats within the certified forest area may be documented
5) Terms and conditions of existing public access rights are respected
6) Public-access rights are on The Organisation's website (including formal public access routes, public access easements and formed and unformed legal roads) and clearly signposted at the entry point, where required.

Indicator 4.6.3

Compliance with the relevant provisions of Property Act, Human Rights Act and/or the Fencing Act are among options available for the fulfilment of the requirements of this indicator.

Indicator 4.6.4

Disputes where The Organisation has no control or influence, i.e. between outside parties, may not be covered by the standard.

Indicator 4.7.3

Compliance with this indicator can be supported via the Heritage New Zealand Pouhere Taonga Act 2014, Wildlife Act 1953, Conservation Act 1987, Resource Management Act 1991, and the Treaty of Waitangi Act 1975.

Indicator 4.8.1

Compliance with this indicator can be supported via the Patents Act 1953 and 2013, Trademarks Act 2002, the Designs Act 1953, and Plant Variety Rights Act 1987.

Principle 5 Guidance

Indicator 5.2.2

Productive capacity may be informed by productivity indices, estate models, growth models and past historical records.

Indicator 5.2.4

Unplanned events such as wind events, fire, and *pest** incursions may result in changes to short and long-term yields. The Organisation should record and evaluate the effect of such events on the sustained yield should they occur.

Indicator 5.4.1

To support compliance with this indicator, The Organisation should make reasonable attempts to:

1) Use a majority of local businesses and suppliers; and/or
2) Support existing and new processing, for example, through long-term supply agreements; and/or
3) Provide for other services beneficial to local communities through licenses, contracts and agreements.

Indicator 5.5.1

The organisation can meet the standard by following a budget consistent with the management plan where significant variances in the budget are explained; and/or The Organisation should be liquid and capable of paying invoices.

Principle 6 Guidance

Indicator 6.1.2

The identification of Acutely or chronically threatened environments can be made easier by using the Land Environment NZ (LENZ) system. Information is available through Nature Heritage Publications on the proportion and percentage for many regions. Protected Natural Areas (PNA) and Significant Natural Areas (SNA) databases will assist in identifying important areas. Regional Council and Territorial Authority Plans may highlight these areas. DOC is also a good source of information.

This assessment will help inform the identification of HCV 1, 2, 3 and 4.

Indicator 6.1.3

This should be timed to allow the appropriate decisions to be made around harvesting and re-planting.

Criterion 6.2

Small – To assist in the requirements of Criterion 6.2, The Organisation can use the assessment sheet in Annex F “Identifying Biodiversity Requirements for Small Plantations” or a similar alternative.

Indicator 6.2.2

Reference to the New Zealand Environmental Code of Practice for Plantation Forestry will assist this assessment process. The assessment should include consideration of the potential for the following:

1) Soil erosion
2) Water quality and hydrological impact
3) Compaction and changes to soil productivity
4) Changes to invasive exotic flora or fauna abundance
5) Potential impacts on any areas identified as having High conservation value
6) Impacts to poorly represented, threatened or endangered species
7) Pesticide or fertiliser impacts (by runoff, spray drift or spillage)
8) Visual changes to significant landscapes identified in Regional or District Plans, or very prominent landscapes
9) Community and recreation impacts
10) Damage to riparian/stream buffer strips.

Indicator 6.3.7

Measures undertaken need to be relevant and of a scale to the potential adverse impact, e.g. if accelerated erosion occurs, then appropriate mitigation may be the establishment of constructed *wetlands** to absorb sediment run-off.

Criterion 6.4

Small – To assist in the requirements of Criterion 6.4, The Organisation can use the assessment sheet in Annex F "Identifying Biodiversity Requirements for Small Plantations" or a similar alternative.

Indicator 6.4.2

Guidance for the management of rare and threatened species can be obtained from:

1) The NZFOA Guidance for managing rare species in pine forests guidelines on rare and threatened species in the management unit
2) DOC
3) Regional Councils and Territorial authorities.

Indicator 6.4.6

In limited instances trapping of threatened species is acceptable, provided it is carried out legally. Examples include authorised trapping or collection for scientific purposes

Indicator 6.4.8

A harvest plan may include:

a. Planning of size and spacing of harvest areas to assist movement of rare and threatened species; and
b. harvest methods to protect the identified corridors.

Indicator 6.5.1

Generalised information can be found on the LENZ and Land Cover Database (LCDB) databases. Overlaid with the protection database, threatened environments can then be mapped to highlight critical existing ecosystems and opportunities for restoration where they have been lost or severely degraded. However, the LENZ system does not always identify *dunelands** and *wetlands** well.

Indicator 6.5.3

Modified threatened environments 1 or 2, *wetlands** or *dunelands** ecosystems that occur within the management unit are examples of priority environments for restoration due to their high value.

Indicator 6.5.4

1) Undertake following the principles of protecting and expanding native ecosystems
2) Modified threatened environments* 1 or 2, *wetlands** or *dunelands** ecosystems that occur within the management unit are examples of priority environments for restoration due to their high value.
3) Restoration will often be concentrated around riparian margins e.g. threatened floodplain forest and coastal setbacks* where the width is key to determining the viability of the reserve. If the coastal environment has a stable substrate, a width of 50m may be suitable depending on wind exposure conditions; however, if it is duneland*, factor in the shoreline fluctuation from multi-decadal erosion cycles* needs to be factored in.
4) International standards for the practices of ecological restoration are available on the Society for Ecological Restoration's website - http://www.ser.org/?page=SERStandards.

Indicator 6.6.3

When considering ecological projects, the following may be used to assist The Organisation in prioritising any ecological effort:

1) Guidance on priorities provided in the document 'Protecting Our Places, Information About the Statement of National Priorities for Protecting Rare and Threatened Biodiversity on Private Land', MfE, April 2007 (or updated equivalent)
2) Security of tenure and the ability to achieve long-term ecological management outcomes
3) The level of community or *Tangata whenua** interest in an area or project
4) DOC priorities for species management
5) The anticipated ecological benefits and relative costs of the effort compared to alternative projects within the management unit.

Indicator 6.6.5

The main reasons for the *active restoration** are to:

1) Significantly increase the survival of the threatened species for which

the habitat has been protected; and/or
2) Increase the viability of the representative sample area; and/or
3) Assist in compliance with the requirements of 6.5.7.

Indicator 6.7.1

While 10m is the minimum, slope, soil stability and future harvest disturbance should be considered when defining the width of the riparian zone.

Indicator 6.7.3

1) The assessments for increases in setback* include consideration of
    a. Compliance with 6.7.1
    b. Increase of a riparian zone for local factors of viability and health of the riparian zone, safety at future harvest, future disturbance of the riparian zone.
2) The Climate Change Response Act and Climate Change Regulations have different requirements depending on whether the forest is pre-1990 or post-1989 forest. Where removal of plantation species to improve riparian protection may result in carbon liabilities, The Organisation may choose to leave >30% of plantation trees unharvested within riparian zones to avoid liabilities and meet Indicator 6.7.4. This decision will be dependent on local* variabilities, such as exposure to windthrow and safety.

Indicator 6.7.4

Large and medium

1) Riparian *setback** establishment under 6.7.4 can be progressive as different reaches of a catchment are harvested.
2) There is no requirement to fell existing crop trees located in the riparian until they are normally scheduled for harvesting.
3) A fully implemented 6.7.4 will take one rotation from the date of this standard to complete.
4) Different catchments can use either of the two methods for establishing riparian *setbacks**, or all catchments could use the same method.
5) A number of options are suitable to determine 3rd order streams, this includes, but is not limited to, the Stahler system, the NIWA River Environment Classification (REC), the DOC National Sub catchment Ranking or The Organisation‘s own knowledge and GIS system (whichever is the more accurate for the locality).
6) The national stream priority mapping developed in Approaches to the Selection of a Network of Freshwater Ecosystems within New Zealand for Conservation by West et al (2019) may be useful when determining which stream reaches could benefit from comprehensive riparian protection.
7) Deciding which riparian management approach is to be followed, and mapping the corresponding planting setbacks before harvesting begins in a catchment, will help ensure subsequent harvesting within the catchment follows the same riparian management approach.

Indicator 6.7.10

This can be planting and/or extra *pest** control, where necessary.

Indicator 6.7.11

This could entail larger riparian margins, restricting the number of stream haul-through points and harvest corridors, or plan re-planting to limit future riparian damage.

Indicator 6.7.13

Where a major storm event in excess of 5% AEP (NES-PF threshold) occurs, prevention may not be possible, but planning should consider the risk of higher intensity events and should seek to ensure compliance with 6.7.10.

Indicator 6.7.14

Relevant codes of practice include the "NZ Environmental Code of Practice for Plantation Forestry" and The Forest Practice Guides and any subsequent updates to these documents.

Indicator 6.7.15

It is important to consider whether measures being undertaken are relevant and of a scale to the adverse impact. For example, if accelerated erosion occurs then appropriate mitigation may be the establishment of constructed *wetlands** to absorb sediment run-off and the retirement of erosion prone areas from clear-felling.

Indicator 6.7.16

Principally this is using erosion susceptibility mapping. However, due to the methodology and scale of erosion susceptibility mapping some land may be more appropriately mapped in a higher or lower category. In carrying out an assessment of erosion susceptibility, local landscapes containing historic erosion will elevate likelihood of risk and the presence of sensitive downstream environments increases the potential consequences. A summary of the process to update the ESC mapping is provided by Te Uru Rākau at https://www.mpi.govt.nz/dmsdocument/28542/send which also provides a list of approved providers that can field assess and make changes where needed. Also, a background report by Landcare Research is available at https://www.mpi.govt.nz/dmsdocument/7998/direct.

Indicator 6.7.18

This indicator is included in light of a lack of research identifying effective and efficient methods to transition to suitable soil stabilising land uses. It is anticipated that this indicator will become redundant when this information is available nationally.

Erosion monitoring techniques may include but are not limited to LiDAR, aerial photography and field inspections that link management practices to the erosion events and quantify sediment movement. Further monitoring guidance is available at

https://www.gdc.govt.nz/assets/Files/Documents/LandcareReport_GDC_Storm_initiated-debris-flows-and-plantation-Forestry_protocol_final.pdf.
Monitoring should also identify where sediment has reached water bodies.

Indicator 6.7.19

This indicator is included in light of a lack of research identifying effective and efficient methods to transition to suitable soil stabilising land uses. It is anticipated that this indicator will become redundant when this information is available nationally.

Indicator 6.7.20

Due to the erosion susceptibility mapping scale, some land may be more appropriately mapped in a higher or lower category. In carrying out an assessment of erosion risk, local landscapes containing historic erosion will elevate likelihood of risk and the presence of sensitive downstream environments increases the potential consequences.

Indicator 6.8.1

Economic and environmental resilience can be more easily achieved by undertaking one or more of the following:

1) Environmental resilience:
    a. Maintaining a mix of production and reserve areas within the management unit.
    b. Maintaining the ecological health of natural ecosystems within and downstream of the management unit.
2) Economic resilience:
    a. Choosing a species mix which:
        i. Caters well to local conditions; or
        ii. Enables The Organisation to respond rapidly to changing market requirements; or
        iii. Can supply a diversity of markets.
    b. Using a diversity of genotypes;
    c. Having a mix of age classes and/or rotation lengths;
    d. Using a variety of silvicultural regimes;
    e. Establish species that meet a diverse range of markets and product requirements;
    f. Demonstrating an understanding of future market trends;
    g. Taking into account local markets/processors;
3) If only radiata pine and Douglas fir are used within the Management Unit, The Organization may consider the use of alternative species, based on the study of the social, environmental, and economic values and impacts of those alternative species. The Organization may use those alternative species in planting, if the study proves that they are appropriate in terms of the requirements of this criterion and the standard in general.;
4) The Organisation may, if possible, produce information demonstrating that the environmental, social and economic performance of exotic species is significant; or
5) Appropriate to size and scale, The Organisation can engage in

operational trials or research of exotic species other than radiata and Douglas fir. This may be met by participating in a collaborative trial.

Indicator 6.9.3

This refers to lands within the management unit or lands that are being considered to be added to the management unit.

Principle 7 Guidance

Indicator 7.4.1

Management plans generally consist of a variety of documents and resources which will be updated as information is received including from stakeholder engagement, science and technical sources, and changing environmental social and economic circumstances.

Principle 8 Guidance

Indicator 8.3.1

Management plans generally consist of a variety of documents and resources which will be updated individually as information is received from stakeholder engagement, science, technical sources, and changing environmental social and economic circumstances.

Principle 9 Guidance

Indicator 9.1.2

Stakeholders will depend on the values identified and may include:

1) *Tangata whenua**
2) DOC
3) Local Conservation groups
4) Outdoor recreation groups
5) Adjoining landowners
6) Neighbours
7) Territorial authorities; and
8) Local community groups.

Principle 10 Guidance

Indicator 10.2.1

Controlled trials to determine whether species are ecologically adapted can be undertaken within the MU provided controls are sufficient to prevent negative impacts on the environment.

Indicator 10.3.2

Following a *decision support system** may help The Organisation to prevent wilding spread and use the wilding spread risk calculator: http://wildingconifers.org.nz/assets/wilding-conifer-Guidelines-for-using-the-DSS-for-new-Forest-plantings.pdf

Indicator 10.9.2

A management plan including emergency procedures to react to and manage natural disturbances and hazards may assist in mitigating these impacts.

Indicator 10.11.4

This may be applied in a forest landscape perspective, where a mosaic of age classes, within or outside the MU, contributes to the retention of trees.

Annex K Glossary of terms

This glossary includes internationally accepted definitions whenever possible. These sources include, for instance, the Food and Agriculture Organization of the United Nations (FAO), the Convention on Biological diversity (1992), the Millennium Ecosystem Assessment (2005) as well as definitions from online glossaries as provided on the websites of the World Conservation Union (IUCN), the International Labour Organization (ILO) and the Invasive Alien species Programme of the Convention on Biological diversity. When other sources have been used they are referenced accordingly.

The term 'based on' means that a definition was adapted from an existing definition as provided in an international source.

Words used in the International Generic Indicators, if not defined in this Glossary of Terms or other normative FSC documents, are used as defined in the Shorter Oxford English Dictionary or the Concise Oxford Dictionary.

Active Restoration: A programme that involves direct intervention management to increase the survival and recovery of species or ecosystems. Such a programme is in advance of maintenance. This could involve supplementary planting, feeding or breeding programmes, reintroducing species lost to the area, and enhancing natural hydrological functions and processes. This could include pest control in advance of maintenance.

Adaptive management: A systematic process of continually improving management policies and practices by learning from the outcomes of existing measures (Source: based on World Conservation Union (IUCN). Glossary definitions as provided on IUCN website).

Affected stakeholder: Any person, group of persons or entity that is or is likely to be subject to the effects of the activities of a management unit. Examples include, but are not restricted to (for example in the case of downstream landowners), persons, groups of persons or entities located in the neighborhood of the management unit. The following are examples of affected stakeholders:

- Local communities
- Indigenous Peoples
- *Workers*
- Forest dwellers
- Neighbors
- Downstream landowners
- Local processors
- Local businesses
- Tenure and use rights holders, including landowners
- Organizations authorized or known to act on behalf of Affected stakeholders, for example social and environmental NGOs, labor unions, etc.
  (Source: FSC-STD-01-001 V5-2).

Alien species: A species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce (Source: Convention on Biological diversity (CBD), Invasive Alien species Programme. Glossary of Terms as provided on CBD website).

Applicable law: Means applicable to The Organisation as a legal person or business enterprise in or for the benefit of the management unit and those laws which affect the implementation of the FSC Principles and Criteria. This includes any combination of statutory law (Parliamentary-approved) and case law (court interpretations), subsidiary regulations, associated administrative procedures, and the national constitution (if present) which invariably takes legal precedence over all other legal instruments (Source: FSC-STD-01-001 V5-2).

Aquifer: A formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs for that unit to have economic value as a source of water in that region. (Source: Gratzfeld, J. 2003. Extractive Industries in Arid and Semi-Arid Zones. World Conservation Union (IUCN)).

Best Available Information (updated for the FSS of New Zealand): Data, facts, documents, expert opinions, and results of field surveys or consultation with stakeholders that are most credible, accurate, complete, and/or pertinent and that can be obtained through reasonable effort and cost, subject to the scale and intensity of the management activities and the precautionary approach. For example:

- Large – Best Available Information includes formal assessment and information gathering exercises
- Small and medium – Best Available Information can be what The Organisation knows and observes, what is learnt from neighbours, and other local stakeholders, together with existing assessments and mapping.

Binding Agreement: A deal or pact, written or not, which is compulsory to its signatories and enforceable by law. Parties involved in the agreement do so freely and accept it voluntarily.

Biological diversity: The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems (Source: Convention on Biological diversity 1992, Article 2).

Biological control agents: Organisms used to eliminate or regulate the population of other organisms (Source: based on FSC-STD-01-001 V4-0 and World Conservation Union (IUCN). Glossary definitions as provided on IUCN website).

Coarse (assessment): A desktop exercise assessing existing data rather than collecting new data.

Confidential information (updated for the FSS of New Zealand): Private facts, data and content that, if made publicly available, might put at risk The Organisation, its business interests or its relationships with stakeholders, clients and competitors. Examples of Confidential information include data and content:

- Related to investment decisions
- About intellectual property rights
- Which is client confidential
- Which is, by law, confidential
- Whose dissemination could put at risk the protection of wildlife species and habitats; and
- About sites which are of special cultural, ecological, economic, religious or spiritual significance to Indigenous Peoples or local communities (see Criteria 3.5 and 4.7) as requested by these groups.

Conflicts between the Principles and Criteria and laws: Situations where it is not possible to comply with the Principles and Criteria and a law at the same time (Source:

FSC-STD-01-001 V5-2).

Connectivity: A measure of how connected or spatially continuous a corridor, network, or matrix is. The fewer gaps, the higher the connectivity. Related to the structural connectivity concept; functional or behavioural connectivity refers to how connected an area is for a process, such as an animal moving through different types of landscape elements. Aquatic connectivity deals with the accessibility and transport of materials and organisms, through groundwater and surface water, between different patches of aquatic ecosystems of all kinds. (Source: based on R.T.T. Forman. 1995. Land Mosaics. The Ecology of Landscapes and Regions. Cambridge University Press, 632pp).

Conservation/protection: These words are used interchangeably when referring to management activities designed to maintain the identified environmental or cultural values in existence long-term. Management activities may range from zero or minimal interventions to a specified range of appropriate interventions and activities designed to maintain, or compatible with maintaining, these identified values (Source: FSC-STD-01-001 V5-2).

Conservation Areas Network: Those portions of the management unit for which conservation is the primary and, in some circumstances, exclusive objective; such areas include Representative Sample Areas, conservation zones, protection areas, connectivity areas and high conservation value areas.

Conservation zones and Protection areas: Defined areas that are designated and managed primarily to safeguard species, habitats, ecosystems natural features or other site-specific values because of their natural environmental or cultural values, or for purposes of monitoring, evaluation or research, not necessarily excluding other management activities. For the purposes of the Principles and Criteria, these terms are used interchangeably, without implying that one always has a higher degree of conservation or protection than the other. The term ‘protected area’ is not used for these areas, because this term implies legal or official status, covered by national regulations in many countries. In the context of the Principles and Criteria, management of these areas should involve active conservation, not passive protection (Source: FSC-STD-01-001 V5-2).

Consultation: The act of asking advice or opinion from other persons or parties, and of deliberating together over that advice or opinion. When consulting, the consulting person or persons must do so with an open mind and not have carried out any actions that would prevent the opinion or advice being actioned. Adequate information and time are provided for those consulted to form a view.

Continuous Cover (Forest): The use of silvicultural systems which maintain the forest canopy at one or more levels without clear felling. The requirement is the management of forests using ecological principles which mimic natural processes, to maintain the forest canopy at one or more levels. Harvest removals are by single tree or small coupe felling, seeking to enhance other forest values.

Core Area: The portion of each Intact Forest Landscape designated to contain the most important cultural and ecological values. Core areas are managed to exclude industrial activity. Core areas meet or exceed the definition of Intact Forest Landscape.

Critical: The concept of criticality or fundamentality in Principal 9 and HCVs relates to irreplaceability and to cases where loss or major damage to this HCV would cause serious prejudice or suffering to Affected stakeholders. An ecosystem service is considered to be critical (HCV 4) where a disruption of that service is likely to cause, or poses a threat of, severe negative impacts on the welfare, health or survival of local communities, on the environment, on HCVs, or on the functioning of significant

infrastructure. The notion of criticality here refers to the importance and risk for natural resources and environmental and socio-economic value. (Source: FSC-STD-01-001 V5-2).

Criterion (pl. Criteria): A means of judging whether or not a Principle (of forest stewardship) has been fulfilled (Source: FSC-STD-01-001 V4-0).

Culturally appropriate [mechanisms]: Means/approaches for outreach to target groups that are in harmony with the customs, values, sensitivities, and ways of life of the target audience.

Culturally appropriate engagement: Following standard and reasonable consultation and engagement norms practised in NZ with individuals or mandated representatives, and includes, but is not limited to:

1. Consultation under the provisions of the Resource Management Act 1991, Heritage New Zealand Pouhere Taonga Act 2014, and other relevant legislation
2. Direct engagement of Affected stakeholders with the appropriate person(s) or mandated representative using methods such as:
    a. Over-the-fence meetings, telephone calls, email for individuals or validated representatives such as neighbours, rights holders, etc.
    b. Group meetings, group email, for groups with multiple representatives or directly affected people.
    c. Participation in organised community forum.

For iwi the above apply, but should also be undertaken with respect to tikaanga Māori.

Customary law: Interrelated sets of customary rights may be recognized as customary law. In some jurisdictions, customary law is equivalent to statutory law, within its defined area of competence and may replace the statutory law for defined ethnic or other social groups. In some jurisdictions customary law complements statutory law and is applied in specified circumstances (Source: based on N.L. Peluso and P. Vandergeest. 2001. Genealogies of the political forest and customary rights in Indonesia, Malaysia and Thailand, Journal of Asian Studies 60(3):761–812).

Customary rights: Rights which result from a long series of habitual or customary actions, constantly repeated, which have, by such repetition and by uninterrupted acquiescence, acquired the force of a law within a geographical or sociological unit (Source: FSC-STD-01-001 V4-0).

Decision Support Systems (DSS): A clearly defined and documented process that provides a structured framework to help improve the effectiveness of decision making. Components of a DSS include assessment Criteria, procedures and rules or guidelines to manage how operational activities are undertaken and how risks are managed. The assessment Criteria may include operational and economic, legal and industry agreements, physical and social factors like soil/geology, topography, rainfall, hydrology, ecology, visual, downstream values, neighbours, community, Māori and cultural. Management procedures, rules or guidelines would include meeting industry Best Management Practices, or requirements more stringent than these.

Dispute: for the purpose of the IGI, this is an expression of dissatisfaction by any person or organization presented as a complaint to The Organisation, relating to its management activities or its conformity with the FSC Principles and Criteria, where a response is expected (Source: based on FSC-PRO-01-005 V3-0 Processing Appeals).

Dispute resolution process: The process whereby reasonable effort shall be made to resolve grievances (that are not vexatious or frivolous) initially through negotiation,

and if negotiation is unsuccessful, through an agreed unbiased third-party facilitator/mediator. If mediation is unsuccessful then the case may be referred to arbitration.

Negotiation: The process of discussions between parties aimed at reaching an agreement over common issues.

Facilitation/Mediation: The process where an independent and impartial third-party assist those in dispute to negotiate an agreement.

Arbitration: An alternative to litigation where the parties in disputes submit their case to an arbitrator appointed under the Arbitration Act 1996, who makes a decision that is binding.

Dispute of substantial duration: Dispute that continues for more than twice as long as the predefined timelines in the FSC System (this is, for more than 6 months after receiving the complaint, based on FSC-STD-20-001).

Dispute of substantial magnitude: For the purpose of the International Generic Indicators, a dispute of substantial magnitude is a dispute that involves one or more of the following:

- Affects the legal or customary rights of Indigenous Peoples and local communities;
- Where the negative impact of management activities is of such a scale that it cannot be reversed or mitigated;
- Physical violence;
- Destruction of property;
- Presence of military bodies;
- Acts of intimidation against forest *workers* and stakeholders.

Dunelands: Dunelands are coastal areas that owe their physical, landscape and ecological character to the movement of sand by wind. Duneland vegetation covers ranges from bare sand to low grasses, sedges and herbs to mature coastal forest.

Ecological district: A geographical area that has a characteristic landscape and range of biological communities. (Source: McEwen, W. Mary; Biological Resources Centre (N.Z.), New Zealand. Dept. of Conservation. (1987). Ecological regions and districts of New Zealand. Wellington, N.Z.: Dept. of Conservation. ISBN 0-478-01000-1)

Ecological region: A geographical region that has a characteristic landscape and range of biological communities. (Source: McEwen, W. Mary; Biological Resources Centre (N.Z.), New Zealand. Dept. of Conservation. (1987). Ecological regions and districts of New Zealand. Wellington, N.Z.: Dept. of Conservation. ISBN 0-478-01000-1)

Economic viability: The capability of developing and surviving as a relatively independent social, economic or political unit. Economic viability may require but is not synonymous with profitability (Source: based on the definition provided on the website of the European Environment Agency).

Ecosystem: A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit (Source: Convention on Biological diversity 1992, Article 2).

Ecosystem function: An intrinsic ecosystem characteristic related to the set of conditions and processes whereby an ecosystem maintains its integrity (such as primary productivity, food chain, biogeochemical cycles). Ecosystem functions include such processes as decomposition, production, nutrient cycling, and fluxes of nutrients

and energy. For FSC purposes, this definition includes ecological and evolutionary processes such as gene flow and disturbance regimes, regeneration cycles and ecological seral development (succession) stages. (Source: based on R. Hassan, R. Scholes and N. Ash. 2005. Ecosystems and Human Well-being: Synthesis. The Millennium Ecosystem Assessment Series. Island Press, Washington DC; and R.F. Noss. 1990. Indicators for monitoring biodiversity: a hierarchical approach. Conservation Biology 4(4):355–364).

Ecosystem services: The benefits people obtain from ecosystems. These include:

- provisioning services such as food, forest products and water
- regulating services such as regulation of floods, drought, land degradation, air quality, and climate
- diseases supporting services such as soil formation and nutrient cycling
- cultural services and cultural values such as recreational, spiritual, religious and other non- material benefits. (Source: based on R. Hassan, R. Scholes and N. Ash. 2005. Ecosystems and Human Well-being: Synthesis. The Millennium Ecosystem Assessment Series. Island Press, Washington DC).

Engaging / engagement: The process by which The Organisation communicates, consults and/or provides for the participation of interested and/or affected stakeholders ensuring that their concerns, desires, expectations, needs, rights and opportunities are considered in the establishment, implementation and updating of the management plan.(Source: FSC-STD-01-001 V5-2).

Environmental Impact Assessment (EIA): Systematic process used to identify potential environmental and social impacts of proposed projects, to evaluate alternative approaches, and to design and incorporate appropriate prevention, mitigation, management and monitoring measures. (Source: based on Environmental impact assessment, guidelines for FAO field projects. Food and agriculture organization of the United Nations (FAO). Rome, FSC-STD-01-001 V5-2).

Environmental values (updated for the FSS of New Zealand): The following set of elements of the biophysical and human environment:

- Ecosystem functions (including carbon sequestration and storage)
- Biological diversity
- Water resources
- Soils
- Atmosphere
- Landscape values (including cultural and spiritual values)
- Biophysical and biogeochemical processes and functions
- Air and air quality
- Light and darkness; and
- Quiet and noise

The actual worth attributed to these elements depends on human and societal perceptions. (Source: FSC-STD-01-001 V5-2).

Equivalent ecological effort: Is expenditure (either direct spend or in-kind contribution) on biodiversity-related projects to compensate for the shortfall in the conservation areas network. Equivalent ecological effort that would qualify, is additional to maintenance and shall produce real and measurable biodiversity gain. For clarity, this can include projects carried out to meet other ecological objectives. The equivalent ecological effort required for a given hectare shortfall is based on the area shortfall x the benchmark dollar spend per hectare for management of conservation zones. This can be calculated, but is not limited to, one or a combination of the following methods:

1. The resources used for maintenance of conservation areas network described in Criteria 6.4 – 6.8 within the management units managed by other organisations, and/or
2. The resources required for maintenance of similar protected areas managed by the Department of Conservation.

For example: If the equivalent spent on protected areas by Department of Conservation is $8/ha/annum and the reserve shortfall in a District or Region is 100ha, the equivalent ecological effort spend required is $8 x 100ha = $800/annum.

Erosion Susceptibility Classification (ESC): means the system that determines the risk of erosion on land across New Zealand based on environmental characteristics, including rock type and slope, and that:

- classifies land into the following 4 categories of erosion susceptibility
- according to level of risk: low (green), moderate (yellow), high (orange), and very high (red); and
- provided in the electronic tool referred to in item 1 of Schedule 2 (Source: http://www.mpi.govt.nz/growing-and-producing/Forestry/overview/national-environmental-standards-for-plantation-Forestry/erosion-susceptibility-classification/)

Exotic species: Refer to Alien species.

Externalities: The positive and negative impacts of activities on stakeholders that are not directly involved in those activities, or on a natural resource or the environment, which do not usually enter standard cost accounting systems, such that the market prices of the products of those activities do not reflect the full costs or benefits (Source: FSC-STD-01-001 V5-2).

Fair compensation: Remuneration that is proportionate to the magnitude and type of services rendered by another party or of the harm that is attributable to the first party.

Fertiliser: Mineral or organic substances, most commonly N, P2O5 and K20, which are applied to soil for the purpose of enhancing plant growth.

Fine level evaluation: An on the ground evaluation that will include, but not limited to:

- vegetation types present and condition
- fauna present and known habitat requirements and relationships
- threatened species distributions, habitat and ranges
- focal, indicator or umbrella species
- seral stages and ecotones
- micro-landscapes, particular physical features, and landforms
  any evidence of threats to ecosystem values present, such as animal pest damage, pathogens, or invasive plant or fungal pests
- The benefit of expanding the area of a reserve to secure the viability of the ecosystems; guided by the following site Criteria:
  a) biologically viable shape and size
  b) socially and economically logical
  c) suitable for restoration to habitat for species being considered
  d) links to other reserve areas
  e) buffering from adjoining land uses pests and disturbance events like fire and wind.

Focal species: Species whose requirements for persistence define the attributes that must be present if that landscape is to meet the requirements of the species that occur there (Source: Lambeck, R., J. 1997. Focal Species: A multi-species Umbrella for Nature Conservation. Conservation Biology vol 11 (4): 849-856.).

Forest: A tract of land dominated by trees (Source: FSC-STD-01-001 V5-2. Derived from FSC Guidelines for Certification Bodies, Scope of Forest Certification, Section 2.1 first published in 1998, and revised as FSC-GUI-20-200 in 2005, and revised again in 2010 as FSC-DIR-20-007 FSC Directive on Forest Management Evaluations, ADVICE-20-007-01).

Forestry: the science and craft of creating, managing, using, conserving and repairing forests, woodlands, and associated resources for human and environmental benefits (Source: Dictionaryofforestry.org. 2008-10-22).

Formal and informal workers organization: association or union of *workers*, whether recognized by law or by The Organisation or neither, which have the aim of promoting *workers* rights and to represent *workers* in dealings with The Organisation particularly regarding working conditions and compensation.

Free, Prior, and Informed Consent (FPIC): A legal condition whereby a person or community can be said to have given consent to an action prior to its commencement, based upon a clear appreciation and understanding of the facts, implications and future consequences of that action, and the possession of all relevant facts at the time when consent is given. Free, prior and informed consent includes the right to grant, modify, withhold or withdraw approval (Source: based on the Preliminary working paper on the principle of Free, Prior and Informed Consent of Indigenous Peoples (…) (E/CN.4/Sub.2/AC.4/2004/4 8 July 2004) of the 22nd Session of the United Nations Commission on Human Rights, Sub-commission on the Promotion and Protection of Human Rights, Working Group on Indigenous Populations, 19–23 July 2004).

Gender equality: Gender equality or gender equity means that women and men have equal conditions for realizing their full human rights and for contributing to, and benefiting from, economic, social, cultural and political development (Source: adapted from FAO, IFAD and ILO workshop on 'Gaps, trends and current research in gender dimensions of agricultural and rural employment: differentiated pathways out of poverty', Rome, 31 March to 2 April 2009.).

Genetically modified organism: An organism in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. (Source: based on FSC-POL-30-602 FSC Interpretation on GMO (Genetically Modified Organisms)).

Genotype: The genetic constitution of an organism (Source: FSC-STD-01-001 V5-2).

Geopreservation: The act of ensuring the survival of the best representative examples of the broad diversity of a country's geological features, landforms, soil sites and active physical processes so that we can understand its unique geological history and development of its landforms and evolution of its biota.

Grassland: Land covered with herbaceous plants with less than 10% tree and shrub cover (Source: UNEP, cited in FAO. 2002. Second Expert Meeting on Harmonizing Forest-Related Definitions for use by various stakeholders).

Habitat: The place or type of site where an organism or population occurs (Source: based on the Convention on Biological diversity, Article 2).

Habitat features: Forest stand attributes and structures, including but not limited to:

- Old commercial and non-commercial trees whose age noticeably exceeds the average age of the main canopy;
- Trees with special ecological value;
- Vertical and horizontal complexity;
- Standing dead trees;
- Dead fallen wood;

- Forest openings attributable to natural disturbances;
- Nesting sites;
- Small wetlands, bogs, fens;
- Ponds;
- Areas for procreation;
- Areas for feeding and shelter, including seasonal cycles of breeding;
- Areas for migration;
- Areas for hibernation.

Hapu: A number of whānau from a common ancestor. Sub-tribe (Source: Waitangi Tribunal 1991).

High conservation value (HCV): Any of the following values:

- HCV1: Species Diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.
- HCV 2: Landscape-level ecosystems and mosaics. Intact Forest
- Landscapes, large Landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.
- HCV 3: Ecosystems and habitats. Rare, threatened, or endangered
- ecosystems, habitats or refugia.
- HCV 4: critical ecosystem services. Basic ecosystem services in critical situations, including Protection of water catchments and control of erosion of vulnerable soils and slopes.
- HCV 5: Community needs. Sites and resources fundamental for satisfying the basic necessities of local communities or Indigenous Peoples (for example for livelihoods, health, nutrition, water), identified through engagement with these communities or Indigenous Peoples.
- HCV 6: Cultural values. Sites, resources, habitats and landscapes of
- global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples. (Source: based on FSC-STD-01-001 V5-2).

High conservation value areas: Zones and physical spaces which possess and/or are needed for the existence and maintenance of identified high conservation values.

High grading: High grading is a tree removal practice in which only the best quality, most valuable timber trees are removed, often without regenerating new tree seedlings or removing the remaining poor quality and suppressed understory trees and, in doing so, degrading the ecological health and commercial value of the Forest. High grading stands as a counterpoint to sustainable resource management (Source: based on Glossary of Forest Management Terms. North Carolina Division of Forest Resources. March 2009).

Illegal: Contrary to or forbidden by law, especially criminal law.

Incursion: An invasion or attack.

Indicator: A quantitative or qualitative variable which can be measured or described, and which provides a means of judging whether a management unit complies with the requirements of an FSC criterion. Indicators and the associated thresholds thereby define the requirements for responsible Forest management at the level of the management unit and are the primary basis of Forest evaluation (Source: FSC-STD-

01-002 V1-0 FSC Glossary of Terms (2009)).

Indigenous Peoples (updated for the FSS of New Zealand): People and groups of people that can be identified or characterized as follows:

- The key characteristic or criterion is self-identification as Indigenous Peoples at the individual level and acceptance by the community as their member;
- Historical continuity with pre-colonial and/or pre-settler societies;
- Strong link to territories and surrounding natural resources;
- Distinct social, economic or political systems;
- Distinct language, culture and beliefs;
- Form non-dominant groups of society;
  Resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities.
  (Source: adapted from United Nations Permanent Forum on Indigenous, Factsheet 'Who are Indigenous Peoples' October 2007; United Nations Development Group, 'Guidelines on Indigenous Peoples' Issues' United Nations 2009, United Nations Declaration on the Rights of Indigenous Peoples, 13 September 2007). For the purposes of this standard indigenous peoples should be taken to mean tangata whenua.

Infrastructure (updated for the FSS of New Zealand): In the context of Forest management, roads, bridges, culverts, log landings, quarries, impoundments, buildings and other structures required in the course of implementing the management plan and for non-Forest infrastructure that may be present within the Forest includes powerlines, pipelines, telecommunication towers, etc.

Intact Forest Landscape: a territory within today's global extent of Forest cover which contains Forest and non-Forest ecosystems minimally influenced by human economic activity, with an area of at least 500 km2 (50,000 ha) and a minimal width of 10 km (measured as the diameter of a circle that is entirely inscribed within the boundaries of the territory) (Source: Intact Forests / Global Forest Watch. Glossary definition as provided on Intact Forest website. 2006-2014).

Intellectual property: Practices as well as knowledge, innovations and other creations of the mind (Source: based on the Convention on Biological diversity, Article 8(j); and World Intellectual Property Organization. What is Intellectual Property? WIPO Publication No. 450(E)).

Intensity: A measure of the force, severity or strength of a management activity or other occurrence affecting the nature of the activity's impacts (Source: FSC-STD-01-001 V5-2).

Interested stakeholder: Any person, group of persons, or entity that has shown an interest, or is known to have an interest, in the activities of a management unit. The following are examples of interested stakeholders.

- Conservation organizations, for example environmental NGOs;
- Labor (rights) organizations, for example labor unions;
- Human rights organizations, for example social NGOs;
- Local development projects;
- Local governments;
- National government departments functioning in the region;
- FSC National Offices;
- Experts on particular issues, for example high conservation values.

- Members of the FSC SDG
  (Source: FSC-STD-01-001 V5-2)

Iwi: A group of hapu from a common ancestor. Tribe, people. (Source: Waitangi Tribunal, 1991).

Internationally accepted scientific protocol: A predefined science-based procedure which is either published by an international scientific network or union, or referenced frequently in the international scientific literature (Source: FSC-STD-01-001 V5-2).

Invasive species: Species that are rapidly expanding outside of their native range. Invasive species can alter ecological relationships among native species and can affect ecosystem function and human health (Source: based on World Conservation Union (IUCN). Glossary definitions as provided on IUCN website).

Kaitiaktanga: Customary and traditional stewardship practices.

Lands and territories: Lands or territories that indigenous peoples or local communities have traditionally owned, or customarily used or occupied, and where access to natural resources is vital to the sustainability of their cultures and livelihoods.

Landscape: A geographical mosaic composed of interacting ecosystems resulting from the influence of geological, topographical, soil, climatic, biotic and human interactions in a given area. (Source: based on World Conservation Union (IUCN). Glossary definitions as provided on IUCN website).

Landscape values: Landscape values can be visualized as layers of human perceptions overlaid on the physical landscape. Some landscape values, like economic, recreation, subsistence value or visual quality are closely related to physical landscape attributes. Other Landscape values such as intrinsic or spiritual value are more symbolic in character and are influenced more by individual perception or social construction than physical landscape attributes.

Legal: In accordance with primary legislation (national or local laws) or secondary legislation (subsidiary regulations, decrees, orders, etc.). Legal also includes rule-based decisions made by legally competent agencies where such decisions flow directly and logically from the laws and regulations. Decisions made by legally competent agencies may not be legal if they do not flow directly and logically from the laws and regulations and if they are not rule-based but use administrative discretion. (Source: FSC-STD-01-001 V5-2).

Legally competent: Mandated in law to perform a certain function (Source: FSC-STD-01-001 V5-2).

Legal registration: National or local legal licence or set of permissions to operate as an enterprise, with rights to buy and sell products and/or services commercially. The licence or permissions can apply to an individual, a privately-owned enterprise or a publicly owned corporate entity. The rights to buy and sell products and/or services do not carry the obligation to do so, so legal registration applies also to an organisation operating a management unit without sale of products or services; for example, for unpriced recreation or for Conservation of biodiversity or habitat. (Source: FSC-STD-01-001 V5-2).

Legal status: The way in which the management unit is classified according to law. In terms of tenure, it means the category of tenure, such as communal land or leasehold or freehold or State land or government land, etc. If the management unit is being converted from one category to another (for example, from State land to communal indigenous land) the status includes the current position in the transition

process. In terms of administration, legal status could mean that the land is owned by the nation as a whole, is administered on behalf of the nation by a government department, and is leased by a government Ministry to a private sector operator through a concession (Source: FSC-STD-01-001 V5-2).

Living wage: The remuneration received for a standard work week by a worker in a particular place sufficient to afford a decent standard of living for the worker and her or his family. Elements of a decent standard of living include food, water, housing, education, health care, transport, clothing, and other essential needs including provision for unexpected events (Source: A Shared Approach to a Living Wage. ISEAL Living Wage Group. November 2013).

Local: Local can be defined depending on the circumstance, but for the purposes of the standard is generally within the District(s) and Region(s) the management unit is located, and/or a community that is potentially affected by the activities undertaken by The Organisation under the scope of their certification. For the purposes of 5.4.1 local can be either the North or South Island relevant to the location of the management unit.

Local communities: Communities, including tangata whenua groups (iwi and hapu), of any size that are in or adjacent to the management unit, and also those that are close enough to have a significant impact on the economy or the environmental values of the management unit or to have their economies, rights or environments significantly affected by the management activities or the biophysical aspects of the management unit. (Source: FSC-STD-01-001 V5-2).

Local laws: The whole suite of primary and secondary laws (acts, ordinances, statutes, decrees) which is limited in application to a particular geographic district within a national territory, as well as secondary regulations, and tertiary administrative procedures (rules / requirements) that derive their authority directly and explicitly from these primary and secondary laws. Laws derive authority ultimately from the Westphalian concept of sovereignty of the Nation State (Source: FSC-STD-01-001 V5-2).

Long-term: The timescale of the Forest owner or manager as manifested by the objectives of the management plan, the rate of harvesting, and the commitment to maintain permanent Forest cover. The length of time involved will vary according to the context and ecological conditions and will be a function of how long it takes a given ecosystem to recover its natural structure and composition following harvesting or disturbance, or to produce mature or primary conditions. (Source: FSC-STD-01-002 V1-0 FSC Glossary of Terms (2009)).

Maintenance (in relation to the Conservation areas network): Actions aimed at preventing irreversible decline of species or ecosystems in the short term and any decline in the long-term and enabling natural regeneration to take place including in particular an animal and plant pest control programme and prevention of external disturbance.

Management objective: Specific management goals, practices, outcomes, and approaches established to achieve the requirements of this standard.

Management plan: The collection of documents, reports, records and maps that describe, justify and regulate the activities carried out by any manager, staff or organisation within or in relation to the management unit, including statements of objectives and policies. (Source: FSC-STD-01-001 V5-2).

Management plan monitoring: Follow up and oversight procedures for the purpose of evaluating the achievement of the management objectives. The results of the monitoring activities are utilized in the implementation of Adaptive management.

Management Unit: A spatial area or areas submitted for FSC certification with clearly defined boundaries managed to a set of explicit long-term management objectives which are expressed in a management plan. This area or areas include(s) facilities and area(s) within or adjacent to this spatial area or areas under legal title or management control of or operated by or on behalf of The Organisation, for the purpose of contributing to the management objectives; and also includes conservation areas networks established to satisfy the 10% reserve set aside.

Managerial control: Responsibility of the kind defined for corporate directors of commercial enterprises in national commercial law, and treated by FSC as applicable also to public sector organizations (Source: FSC-STD-01-001 V5-2).

Mana whenua: Territorial rights, power from the land, authority over land or territory, jurisdiction over land or territory – power associated with possession and occupation of tribal land.

Monitor/monitoring: Follow-up and oversight procedures for the purpose of evaluating the achievement of the management objectives. The results of the monitoring activities are utilized in the implementation of Adaptive management.

Multi-decadal erosion cycles: Multi-decadal erosion cycles of sandy beaches are driven by changing environmental conditions including climatic variability and sediment supply and may result in an order of magnitude greater change than shoreline fluctuations associated with short-term weather events.

National laws: The whole suite of primary and secondary laws (acts, ordinances, statutes, decrees), which is applicable to a national territory, as well as secondary regulations, and tertiary administrative procedures (rules / requirements) that derive their authority directly and explicitly from these primary and secondary laws (Source: FSC-STD-01-001 V5-2).

Native ecosystems: An ecosystem whose presence in a particular area is the result of only natural process, with little human intervention. In the context of New Zealand forestry and legislation, native ecosystems are synonymous with natural areas.

Native species: Species, subspecies, or lower taxon, occurring within its natural range (past or present) and dispersal potential (that is, within the range it occupies naturally or could occupy without direct or indirect introduction or care by humans) (Source: Convention on Biological diversity (CBD). Invasive Alien species Programme. Glossary of Terms as provided on CBD website).

Natural conditions/native ecosystem: For the purposes of the Principles and Criteria and any applications of restoration techniques, terms such as ‘more natural conditions’, ‘native ecosystem’ provide for managing sites to favor or restore native species and associations of native species that are typical of the locality, and for managing these associations and other environmental values so that they form ecosystems typical of the locality. Further guidelines may be provided in FSC Forest Stewardship Standards (Source: FSC-STD-01-001 V5-2).

Natural forest (updated for the FSS of New Zealand): A forest area with many of the principal characteristics and key elements of native ecosystems, such as complexity, structure and biological diversity, including soil characteristics, flora and fauna, in which all or almost all the trees are native species, not classified as plantations.
‘Natural forest’ includes the following categories:

- Forest affected by harvesting or other disturbances, in which trees are being or have been regenerated by a combination of natural and artificial regeneration with species typical of natural forests in that site, and where many of the above-ground and below-ground characteristics of the natural forest are

still present. In boreal and north temperate Forests which are naturally composed of only one or few tree species, a combination of natural and artificial regeneration to regenerate Forest of the same native species, with most of the principal characteristics and key elements of native ecosystems of that site, is not by itself considered as conversion to plantations;

- natural forests which are maintained by traditional silvicultural practices including natural or assisted natural regeneration;
- Well-developed secondary or colonizing forest of native species which has regenerated in non-forest areas;
- The definition of 'natural forest' may include areas described as wooded ecosystems, woodland and savannah.

The description of natural forests and their principal characteristics and key elements may be further defined in FSC Forest Stewardship Standards, with appropriate descriptions or examples.

'Natural forest' does not include land which is not dominated by trees, was previously not forest, and which does not yet contain many of the characteristics and elements of native ecosystems. Young regeneration may be considered as natural forest after some years of ecological progression. FSC Forest Stewardship Standards may indicate when such areas may be excised from the management unit, should be restored towards more natural conditions, or may be converted to other land uses.

FSC has not developed quantitative thresholds between different categories of forests in terms of area, density, height, etc. FSC Forest Stewardship Standards may provide such thresholds and other guidelines, with appropriate descriptions or examples. Pending such guidance, areas dominated by trees, mainly of native species, may be considered as natural forest.

Thresholds and guidelines may cover areas such as:

- Other vegetation types and non-forest communities and ecosystems included in the management unit, including grassland, bushland, wetlands, and open woodlands;
- Very young pioneer or colonizing regeneration in a primary succession on new open sites or abandoned farmland, which does not yet contain many of the principal characteristics and key elements of native ecosystems. This may be considered as natural forest through ecological progression after the passage of years;
- Young natural regeneration growing in natural forest areas may be considered as natural forest, even after logging, clear-felling or other disturbances, since many of the principal characteristics and key elements of native ecosystems remain, above-ground and below-ground;
- Areas where deforestation and forest degradation have been so severe that they are no longer 'dominated by trees' may be considered as non-forest, when they have very few of the principal above-ground and below-ground characteristics and key elements of natural forests. Such extreme degradation is typically the result of combinations of repeated and excessively heavy logging, grazing, farming, fuelwood collection, hunting, fire, erosion, mining, settlements, infrastructure, etc. FSC Forest Stewardship Standards may help to decide when such areas should be excised from the management unit, should be restored towards more natural conditions, or may be converted to other land uses.

  (Source: FSC-STD-01-001 V5-2).

In addition, the NZ FSS-PF defines natural forests as Areas of land which are

predominantly covered in indigenous tree species that are naturally established, including managed indigenous forest areas where regeneration is supplemented by planting of indigenous species. This includes vegetation that is native or endemic to an area and is growing naturally, i.e. has not been planted.

Natural Hazards: Disturbances that can present risks to social and environmental values in the management unit but that may also comprise important ecosystem functions; examples include drought, flood, fire, landslide, storm, avalanche, earthquake, coastal erosion, volcanism, etc.

Non-timber forest products (NTFP): All products other than timber derived from the management unit (Source: FSC-STD-01-001 V5-2).

Objective: The basic purpose laid down by The Organisation for the forest enterprise, including the decision of policy and the choice of means for attaining the purpose (Source: based on F.C. Osmaston. 1968. The Management of forests. Hafner, New York; and D.R. Johnston, A.J. Grayson and R.T. Bradley. 1967. Forest Planning. Faber & Faber, London).

Obligatory code of practice: A manual or handbook or other source of technical instruction which The Organisation must implement by law (Source: FSC-STD-01-001 V5-2).

Occupational accident: An occurrence arising out of, or in the course of, work which results in fatal or non-fatal injury (Source: International Labour Organization (ILO). Bureau of Library and Information Services. ILO Thesaurus as provided on ILO website).

Occupational disease: Any disease contracted as a result of an exposure to risk factors arising from work activity (Source: International Labour Organization (ILO). Bureau of Library and Information Services. ILO Thesaurus as provided on ILO website).

Occupational injuries: Any personal injury, disease or death resulting from an occupational accident (Source: International Labour Organization (ILO). Bureau of Library and Information Services. ILO Thesaurus as provided on ILO website).

Organism: Any biological entity capable of replication or of transferring genetic material (Source: Council Directive 90/220/EEC).

The Organisation: The person or entity holding or applying for certification and therefore responsible for demonstrating compliance with the requirements upon which FSC certification is based (Source: FSC-STD-01-001 V5-2).

Pest: A pest is a plant, animal, fungi, micro-organism or pathogen that is adversely affecting something of value. A pest is something in the wrong place e.g. the brushtail possum is a valued Australian native animal but a pest in New Zealand as it threatens New Zealand's indigenous biodiversity. In the FSC context a pest is either a plant or animal that is adversely affecting the plantation crop or the indigenous biodiversity values of the management unit.

Peatland: Is constituted by flooded and soggy areas, with large accumulations of organic material, covered by a layer of poor vegetation associated with a certain degree of acidity, and which presents a characteristic amber color (Source: Aguilar, L. 2001. About Fishermen, Fisherwomen, Oceans and tides. IUCN. San Jose (Costa Rica)).

Pesticide: Any substance or preparation prepared or used in protecting plants or wood, or other plant products, or human health, or livestock or biodiversity from pests; in controlling pests; or in rendering such pests harmless. (This definition includes, but

is not limited to insecticides, rodenticides, acaricides, molluscicides, larvaecides, fungicides and herbicides). (Source: FSC-POL-30-001 FSC Pesticides Policy (2005).

Plantation (updated for the FSS of New Zealand): A forest area established by planting or sowing with using either alien or native species, often with one or few species, regular spacing and even ages, and which lacks most of the principal characteristics and key elements of natural forests. The description of plantations may be further defined in FSC Forest Stewardship Standards, with appropriate descriptions or examples, such as:

- Areas which would initially have complied with this definition of 'plantation' but which, after the passage of years, contain many or most of the principal characteristics and key elements of native ecosystems, may be classified as natural forests.
- Plantations managed to restore and enhance biological and habitat diversity, structural complexity and ecosystem functionality may, after the passage of years, be classified as natural forests.
- Boreal and north temperate forests which are naturally composed of only one or few tree species, in which a combination of natural and artificial regeneration is used to regenerate forest of the same native species, with most of the principal characteristics and key elements of native ecosystems of that site, may be considered as natural forest, and this regeneration is not by itself considered as conversion to plantations.
  (Source: FSC-STD-01-001 V5-2)

In addition, the NZ FSS-PF defines plantations as a forest area established by planting or sowing with either alien or native species, often with one or few species, regular spacing and even ages, and which lacks most of the principal characteristics and key elements of natural forests.

Precautionary approach: An approach requiring that when the available information indicates that management activities pose a threat of severe or irreversible damage to the environment or a threat to human welfare, The Organisation will take explicit and effective measures to prevent the damage and avoid the risks to welfare, even when the scientific information is incomplete or inconclusive, and when the vulnerability and sensitivity of environmental values are uncertain (Source: based on Principle 15 of Rio Declaration on Environment and Development, 1992, and Wingspread Statement on the Precautionary Principle of the Wingspread Conference, 23–25 January 1998).

Pre-harvest [condition]: The diversity, composition, and structure of the forest or plantation prior to felling timber and appurtenant activities such as road building.

Principle: An essential rule or element; in FSC's case, of forest stewardship. (Source: FSC-STD-01-001 V4-0).

Principles of Protecting and Expanding Natural Areas:

1. Biologically viable shape and size;
2. Socially and economically logical;
3. Suitable for restoration to habitat for species being considered;
4. Links to other reserve area;
5. Buffering from adjoining land uses, pests and disturbance event like fire and wind;
6. Reflect proportion and representation of ecosystems. [from 10.5.10];
7. Culturally important.

Protection: See definition of conservation.

Protection Area/Protection Zone: See definition of conservation Zone.

Publicly available: In a manner accessible to or observable by people generally (Source: Collins English Dictionary, 2003 Edition).

Rare species (updated for the FSS of New Zealand): Species that are uncommon or scarce, but not classified as threatened. These species are located in geographically restricted areas or specific habitats or are scantily scattered on a large scale. They are approximately equivalent to the IUCN (2001) category of Near Threatened (NT), including species that are close to qualifying for, or are likely to qualify for, a threatened category in the near future. They are also approximately equivalent to imperiled species (Source: based on IUCN. (2001). IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN. Gland, Switzerland and Cambridge, UK).
In addition, New Zealand defines rare species based on the NZ Threat Classification System. These include Species that are uncommon or scarce, but not classified as threatened. Species classified under the NZ Threat Classification System (revised 2007) as 'At Risk - Relict' and 'At Risk - Naturally Uncommon. "

1) Relict = Taxa that have undergone a documented decline within the last 1000 years, and now occupy < 10% of their former range and meet one of the following Criteria:
   a. A 5000–20 000 mature individuals; population stable (±10%)
   b. B > 20 000 mature individuals; population stable or increasing at > 10%
2) Naturally Uncommon = Taxa whose distribution is confined to a specific geographic area or which occur within naturally small and widely scattered populations, where this distribution is not the result of human disturbance.

Ratified: The process by which an international law, convention or agreement (including multilateral environmental agreement) is legally approved by a national legislature or equivalent legal mechanism, such that the international law, convention or agreement becomes automatically part of national law or sets in motion the development of national law to give the same legal effect. (Source: FSC-STD-01-001 V5-2).

Reasonable: Judged to be fair or appropriate to the circumstances or purposes, based on general experience (Source: Shorter Oxford English Dictionary).

Reduced impact harvesting: Harvesting (or logging) using techniques to reduce the impact on the residual stand (Source: based on Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests, IUCN 2006).

Refugia: An isolated area where extensive changes, typically due to changing climate or by disturbances such as those caused by humans, have not occurred and where plants and animals typical of a region may survive (Source: Glen Canyon Dam, Adaptive management Program Glossary as provided on website of Glen Canyon Dam website).

Representative Sample Areas: Portions of the management unit delineated for the purpose of conserving or restoring viable examples of an ecosystem that would naturally occur in that geographical region.

Resilience: The ability of a system to maintain key functions and processes in the face of stresses or pressures by either resisting or adapting to change. Resilience can be applied to both ecological systems and social systems (Source: IUCN World Commission on Protected Areas (IUCN-WCPA). 2008. Establishing Marine Protected Area Networks – Making it Happen. Washington D.C.: IUCN-WCPA National Oceanic and Atmospheric Administration and The Nature Conservancy.).

Resource consent: A formal approval from respective governmental council to implement activities that the council haven't clearly identified in their plan as either permitted or prohibited. It could include the following:

- using or subdividing land
- taking water
- discharging contaminants in water, soil or air
- using or occupying coastal space.
  (Source: https://www.building.govt.nz/projects-and-consents/)

Restore / Restoration: These words are used in different senses according to the context and in everyday speech. In some cases 'restore' means to repair the damage done to environmental values that resulted from management activities or other causes. In other cases 'restore' means the formation of more natural conditions in sites which have been heavily degraded or converted to other land uses. In the Principles and Criteria, the word 'restore' is not used to imply the recreation of any particular previous, pre-historic, pre-industrial or other pre-existing ecosystem (Source: FSC-STD-01-001 V5-2).
The Organisation is not necessarily obliged to restore those environmental values that have been affected by factors beyond the control of The Organisation, for example by natural disasters, by climate change, or by the legally authorized activities of third parties, such as public infrastructure, mining, hunting or settlement. FSC-POL-20-003 The Excision of Areas from the Scope of Certification describes the processes by which such areas may be excised from the area certified, when appropriate.
The Organisation is also not obliged to restore environmental values that may have existed at some time in the historic or pre-historic past, or that have been negatively affected by previous owners or organizations. However, The Organisation is expected to take reasonable measures to mitigate, control and prevent environmental degradation which is continuing in the management unit as a result of such previous impacts.

Restoration (Restore): Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. (Source: Society for Ecological Restoration, Science & Policy Working Group, Version 2, October 2004).

Riparian zone: Interface between land and a water body, and the vegetation associated with it. Riparian zone vegetaion can consist of indigenous, exotic or mixed species.

Risk: The probability of a negative impact arising from any activity in the management unit combined with its seriousness in terms of consequences. (Source: FSC-STD-01-001 V5-2).

Rodenticides: Poison used to kill rodents.

Scale: A measure of the extent to which a management activity or event affects an environmental value or a management unit, in time or space. An activity with a small or low spatial scale affects only a small proportion of the Forest each year, an activity with a small or low temporal scale occurs only at long intervals (Source: FSC-STD-01-001 V5-2).

Scale, intensity and risk: See individual definitions of the terms scale, intensity and risk.

Seral: Natural stages of natural forest succession.

Setback: the distance from the edge of a surface freshwater body (river, stream, lake, wetland) to a production area, such as fenced-off livestock or the edge of a cultivated land use. A setback is defined in the National Environmental Standards for Plantation

Forestry5 (NES-PF) as ‘the distance measured horizontally from a feature or boundary that creates a buffer within which certain activities cannot take place’ (Source: Tasman District Council, Landcare Health NZ, Riparian setback distances from water bodies for high-risk land uses and activities, 2020).

Significant: For the purposes of Principle 9, HCVs 1, 2 and 6 there are three main forms of recognizing significance.

- A designation, classification or recognized conservation status, assigned by an international agency such as IUCN or Birdlife International
- A designation by national or regional authorities, or by a responsible national conservation organisation, based on its concentration of biodiversity
- A voluntary recognition by The Organisation, based on available information, or of the known or suspected presence of a significant biodiversity concentration, even when not officially designated by other agencies.

Any one of these forms will justify designation as HCVs 1, 2 and 6. Many regions of the world have received recognition for their biodiversity importance, measured in many different ways. Existing maps and classifications of priority areas for biodiversity conservation play an essential role in identifying the potential presence of HCVs 1, 2 and 6 (Source: FSC-STD-01-001 V5-0).

Silviculture: The art and science of controlling the establishment, growth, composition, health and quality of Forests and woodlands to meet the targeted diverse needs and values of landowners and society on a sustainable basis. (Source: Nieuwenhuis, M. 2000. Terminology of Forest Management. IUFRO World Series Vol. 9. IUFRO 4.04.07 SilvaPlan and SilvaVoc).

Stakeholder: See definitions for affected stakeholder and interested stakeholder.

Statutory law or statute law: The body of law contained in Acts of Parliament (national legislature) (Source: Oxford Dictionary of Law).

Substantial Magnitude (disputes of): A dispute that involves one or more of the following:

- Affects the legal or customary rights of Indigenous Peoples and local communities;
- Where the negative impact of management activities is of such a scale that it cannot be reversed or mitigated;
- Physical violence;
- Destruction of property;
- Acts of intimidation against Forest *workers* and stakeholders.

Tangata whenua: 'People of the land'. In relation to a particular area, means the iwi, hapü and whānau, that hold mana whenua (customary authority associated with tino rangatiratanga) over that area. (Source: RMA 1991).
Tangata whenua includes, mandated:

- Iwi and hapu who have mana whenua (verified through adjudication or a signed agreement of all overlapping claimants) over lands within or adjoining the management unit;
- Māori landowners or governance entities who hold legal ‘ownership’ rights within the management unit mandated by the landowners; and
- Iwi, hapu and landowners whose customary rights may be affected by management activities within the management unit.

Taonga: Treasured possessions; includes both tangible and intangible treasures.

Tenure: Socially defined agreements held by individuals or groups, recognized by legal statutes or customary practice, regarding the ‘bundle of rights and duties’ of ownership, holding, access and/or usage of a particular land unit or the associated

resources there within (such as individual trees, plant species, water, minerals, etc.). (Source: World Conservation Union (IUCN). Glossary definitions provided on IUCN website).

Threat: An indication or warning of impending or likely damage or negative impacts (Source: based on Oxford English Dictionary).

Threatened environments: The Threatened Environment Classification is a combination of three national databases: Land Environments New Zealand (LENZ), classes Land Cover Database (LCDB) and the protected areas network (reflecting areas legally protected for the purpose of natural heritage Protection). The classification combines this information into a simple and practical GIS tool. 'Threatened environments' (categories 1 to 5) are those in which much indigenous vegetation has been cleared and/or only a small proportion of what remains is legally protected. The Threatened Environment Classification is managed by Landcare Research.

Threatened species: Species that meet the IUCN (2001) Criteria for Vulnerable (VU), Endangered (EN) or Critically Endangered (CR), and are facing a high, very high or extremely high risk of extinction in the wild. These categories may be re-interpreted for FSC purposes according to official national classifications (which have legal significance) and to local conditions and population densities (which should affect decisions about appropriate Conservation measures) (Source: based on IUCN. (2001). IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN. Gland, Switzerland and Cambridge, UK.).

The Organisation (NZ)/Organization (US): The person or entity holding or applying for certification and therefore responsible for demonstrating compliance with the requirements upon which FSC certification is based. This is often the Forest manager or Forest owner.

Timber harvesting level: The actual harvest quantity executed on the management unit, tracked by either volume (e.g. cubic meters or board feet) or area (e.g. hectares or acres) metrics for the purpose of comparison with calculated (maximum) allowable harvest levels.

Timely manner: As promptly as circumstances reasonably allow; not intentionally postponed by The Organisation; in compliance with applicable laws, contracts, licenses or invoices.

Tino rangatiratanga: The right of Tangata whenua to exercise full authority and control over their lands, resources and taonga.

Traditional Knowledge: Information, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity (Source: based on the definition by the World Intellectual Property Organization (WIPO). Glossary definition as provided under Policy / Traditional Knowledge on the WIPO website).

Traditional peoples: Traditional peoples are social groups or peoples who do not self-identify as indigenous and who affirm rights to their lands, Forests and other resources based on long established custom or traditional occupation and use (Source: Forest Peoples Programme (Source: Marcus Colchester, 7 October 2009)).

Uphold: To acknowledge, respect, sustain and support (Source: FSC-STD-01-001 V5-2).

Use rights: Rights for the use of resources of the management unit that can be defined by local custom, mutual agreements, or prescribed by other entities holding access rights. These rights may restrict the use of particular resources to specific

levels of consumption or particular harvesting techniques. (Source: FSC-STD-01-001 V5-2).

Verifiable targets: Specific goals, such as desired future Forest conditions, established to measure progress towards the achievement of each of the management objectives. These goals are expressed as clear outcomes, such that their attainment can be verified, and it is possible to determine whether they have been accomplished or not.Verifiable targets should be developed that include, but are not limited to:

- Site productivity, yield of all products harvested;
- Growth rates, regeneration and condition of the vegetation;
- Composition and observed changes in the flora and fauna;
- Water quality and quantity;
- Soil erosion, compaction, fertility and carbon content;
- Wildlife populations, biodiversity and status of high conservation values;
- Sensitive cultural and environmental resources;
- Stakeholder satisfaction with engagement;
- Benefits of management operations provided to local communities;
- Number of occupational accidents; and
- Overall economic viability of the management unit.

Very high-risk erosion: Areas classified as Very High-Risk Erosion Susceptibility by the Erosion Susceptibility Classification within the National Environmental Standards for Plantation Forestry Regulations.

Very Limited portion: The area affected shall not exceed 0.5% of the area of the management unit in any one year, nor affect a total of more than 5% of the area of the management unit. (Source: based on FSC-STD-01-002 V1-0 FSC Glossary of Terms (2009)).

Vexatious: Instituted without sufficient grounds and serving only to cause annoyance to the defendant.

Wahi tapu: Place sacred to Māori in the traditional, spiritual, religious, ritual or mythological sense. (Source: Historic Places Act 1993).

Wahi tupuna: Place important to Māori for its ancestral significance and associated cultural and traditional values (Source: Heritage New Zealand Pouhere Taonga Act 2014)

Waste materials: unusable or unwanted substances or by-products, such as:

- Hazardous waste, including chemical waste and batteries;
- Containers;
- Motor and other fuels and oils;
- Rubbish including metals, plastics and paper; and
- Abandoned buildings, machinery and equipment.

Water bodies (including water courses): Seasonal, temporary, and permanent brooks, creeks, streams, rivers, ponds, and lakes. Water bodies include riparian or wetland systems, lakes, swamps, bogs, coastal waters, lagoons, estuaries, springs.

Water scarcity: A water supply that limits food production, human health, and economic development. Severe scarcity is taken to be equivalent to 1,000 cubic meters per year per person or greater than 40% use relative to supply (Source: Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-Being: Policy Responses. Findings of the Responses Working Group. Washington DC: Island Press, Pages 599-605).

Water stress: Occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes deterioration of freshwater resources in terms of quantity (aquifer over-exploitation, dry rivers, etc.) and quality (eutrophication, organic matter pollution, saline intrusion, etc.). (Source: UNEP, 2003, cited in Gold Standard Foundation. 2014. Water Benefits Standard).

Wetlands: Transitional areas between terrestrial and aquatic systems in which the water table is usually at or near the surface or the land is covered by shallow water (Source: Cowarding, L.M., Carter, V., Golet, F.C., Laroe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. DC US Department: Washington).
Under the Ramsar Convention, wetlands can include tidal mudflats, natural ponds, marshes, potholes, wet meadows, bogs, peatlands, freshwater swamps, mangroves, lakes, rivers and even some coral reefs (Source: IUCN, No Date, IUCN Definitions – English).

Whānau: Extended family or family group, a familiar term of address to many people - the primary economic unit of traditional Māori society.

Workers: All employed persons including public employees as well as 'self-employed' persons. This includes part-time and seasonal employees, of all ranks and categories, including laborers, administrators, supervisors, executives, contractor employees as well as self-employed contractors and sub-contractors (Source: ILO Convention C155 Occupational Safety and Health Convention, 1981).

Working Forest area: The production area + plantation forest infrastructure.

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New Zealand Rock Lobster Industry Council

Paua Industry Council

FISHERIES INSHORE NEW ZEALAND

Inshore Fishing Industry contribution to the Ministerial Inquiry on Land Use

6 April 2023

Summary

Cyclones Hale and Gabrielle had significant impacts on the inshore fishing industry, most of which were caused by or exacerbated by land use decisions. Fishing industry operations were affected by woody debris on beaches (preventing the launching of fishing vessels), debris and silt in the sea (threatening vessel safety and damaging fishing gear), and damage to land-based seafood holding and processing facilities and other essential infrastructure. Fishing vessels were prevented from operating, with flow-on economic impacts on local and regional seafood businesses and employees.

Siltation, woody debris and coastal landslides damaged marine habitats that are essential for the lifecycles of fish and shellfish, interfered with predator-prey interactions, and had direct impacts (e.g., stress, mortality) on many marine species. The consequences of harm to marine species and their habitats are ongoing and may result in reduced productivity of harvested species.

The cyclones provide a stark illustration of the prevalent and long-standing failure, by decision-makers in central and regional government, to implement their clear legal obligations to avoid, remedy or mitigate any adverse effects of land use and terrestrial activities on fisheries and the wider marine environment.

In comparison with the Resource Management Act, the Natural and Built Environment Bill and Spatial Planning Bill will weaken requirements to address the impacts of land use on the marine environment. The fishing industry recommends strengthening legislation and policy to require a truly integrated approach to management across the land/sea boundary. More importantly, there should be a much stronger focus on, and accountability for, effective implementation of legislative requirements and best practice guidance.

Contents

Introduction

1. The fishing industry welcomes the opportunity to contribute to the Ministerial Inquiry on Land Use arising from the damage caused by Cyclones Hale and Gabrielle in Te Tairawhiti, Gisborne and Wairoa. This submission is made by the NZ Rock Lobster Industry Council, the Pāua Industry Council and Fisheries Inshore New Zealand on behalf of our members who are quota owners and commercial fishers of rock lobster, pāua and inshore finfish species.

2. We note that the Terms of Reference for the Inquiry include reporting on '*patterns in storm damage to nearby sea and fisheries*'. Our submission focuses on impacts on fisheries and highlights the need for more effective integrated management (in terms of both legislation and implementation) across the land/sea boundary in relation to planning for suitable land uses and controlling the effects of land use. In particular, the submission:

    - Summarises the experiences and observations of commercial fishers in the affected regions for rock lobster and provides information on expected impacts on pāua fisheries (information on inshore finfish impacts is being compiled and will be forwarded separately shortly);
    - Analyses the legislative and policy framework and its implementation with respect to integrated management of adverse effects that cross the land/sea boundary; and
    - Provides some ideas for solutions to improve integrated management.

3. We would be happy to discuss any of the matters raised in this submission with the Panel.

Impacts and experience

Question: What effects have you experienced?

4. Impacts of Cyclones Hale and Gabrielle on the fishing industry include (a) impacts on commercially harvested species and their habitats, and (b) operational impacts on the activity of fishing and land-based facilities. Both of these types of impacts can have economic consequences for commercial fishers and quota owners. While the economic consequences of operational impacts are immediate and obvious, the consequences of harm to marine species and habitats can play out over many years.

5. We note that the cyclone impacts of particular interest to the Ministerial Inquiry are those arising from (or exacerbated by) land use. Land use decisions contribute to cyclone damage in the marine environment from sedimentation, woody debris, and freshwater inundation. Sedimentation is the most studied of these impacts. It can be experienced on a spectrum ranging from small amounts of rain clouding up a creek and veiling a bay with fine silt for a day or two, to severe mass rainfall events causing wide scale deposition of sediment on the seafloor. In a storm event, terrestrial sediment can be washed out of flooded rivers or can enter the marine environment from slips on coastal land. Once in the marine environment, sediment can be resuspended by high seas (in the same storm event and subsequent events). While there is uncertainty about the effects of ongoing small scale sedimentation events on inshore fisheries, Cyclones Hale and Gabrielle provide examples of sedimentation and other land use-related impacts at the extreme end of the spectrum.

6. However, cyclones also have impacts on the marine environment that are not directly related to land use – for instance, large waves can damage coastal algal communities, shift loose substrates such as boulders or shingle, and redistribute marine sediments. Impacts related to land-use can exacerbate and compound these other types of cyclone impacts in the marine environment.

Rock lobster fishery

7. The rock lobster fishery in Te Tairawhiti/Gisborne/Wairoa comprises the Quota Management Area known as CRA3. The CRA3 rock lobster industry was significantly affected by damage to coastal waters and ecosystems and land based facilities, caused by Cyclones Hale and Gabrielle and exacerbated by land use impacts such as forestry debris and silt washed downstream.

Cyclone-related impacts on rock lobster

8. Rock lobsters require complex rocky habitats for various stages of their life cycles. Puerulus (larval stage) and juvenile rock lobsters inhabit holes and crevices in hard substrates and adults are found in reef habitats, where they live in crevices, caves, and rocky overhangs. Coastal landslides (**Figure 1**), high levels of sedimentation and woody debris can smother essential rocky habitats and interfere with settlement success and survival of larval and juvenile lobsters – e.g., by modifying or removing settlement and nursery substrates, and removing habitats that provide shelter and refuge from predation.

Figure 1: Land north of Gisborne has slumped into the sea and smothered productive rock lobster reef habitat[1]

9. Rock lobsters are predators that forage on benthic invertebrates such as bivalves, pāua and echinoderms. Large seaweeds (kelp) on reef habitats are important for providing habitat and food for the prey species of rock lobsters. High levels of sedimentation and woody debris can directly reduce the availability of rock lobster prey and turbid water can reduce the growth of seaweeds that provide habitat for prey species (see further discussion on kelp impacts below).

10. Sediment, debris and freshwater flows can also cause significant direct stress and mortality to rock lobsters. Research on a related lobster species (*Jasus lalandii*) in the Benguela ecosystem (South Africa and Namibia) found a strong negative correlation between rock lobster catches and major flood events from the Orange River. It has been postulated that the largest flood event from this river – which, in 1988, discharged 80.9 million tons of sediment (almost five times the average annual sediment input) – may have been a major contributor to the subsequent significant declines in growth rates and productivity of both the South African and Namibian rock lobster fisheries through smothering of near-shore food resources, although freshwater effects were probably also important. New Zealand scientists have suggested that similar (albeit smaller spatial scale) impacts may be occurring in New Zealand's coastal environment, especially in regions such as Hawkes Bay.[2]

[1] Credit for all photographs: Salve Zame, Gisborne Fisheries.
[2] Morrison, M. A., Lowe, M. L., Parsons, D. M., Usmar, N. R., & McLeod, I. M. (2009). A review of land-based effects on coastal fisheries and supporting biodiversity in New Zealand. New Zealand Aquatic Environment and Biodiversity Report, 37, 100

Operational impacts on rock lobster fisheries

11. Following the cyclones, forestry debris (logs, branches and slash) covered the coastline at depths of up to a metre creating access problems for many rock lobster vessels which are launched off beaches (**Figure 2**). The coastline north of Tolaga Bay was badly affected and damage was particularly severe north of Tokomaru Bay. Five commercial rock lobster vessels operate in the area to the north of Tokomaru Bay, and 13 vessels in the area between Gisborne and Tokomaru Bay.

12. Rock lobster vessel operators have reported other impacts on their operations, including:

    - Floating logs and branches posed substantial safety risk to fishing vessels, including risk of collision, hull damage, loss of propellers and rudders, and potential sinking (**Figure 3**); and
    - Woody debris and silt clogged rock lobster pots and caused loss and damage to bait and deployed fishing gear. Entanglement of fishing gear means that additional time and effort must be spent to salvage and repair the gear, resulting in additional operating time and lost fishing opportunity (**Figures 4 & 5**).

Figure 2: Boat launching site at Mahia

Figure 3: Debris in the water north of Tokomaru Bay

Figure 4: Woody debris clogging a lobster pot

Figure 5: Silt on bait in a rock lobster pot

13. The cyclones resulted in the suspension of fishing operations and loss of income for periods of several weeks (to date). These economic impacts adversely affect not only the vessel operators and crew, but all the land based staff involved in storing, transport and distribution of the product.

14. The cyclones also caused serious damage to seafood industry land-based facilities from the large quantities of silt washed into buildings with floodwaters. This silt exacerbated the damage to mechanical and electrical equipment and considerably extended the difficulty and cost of the clean-up through having to physically remove and dispose of the silt build-up and clear it from facilities such as the biofilters used to maintain lobsters in shore based tanks.

15. Infrastructure damage to roading, bridges, utilities and other services (exacerbated by silt and woody debris in floodwaters) also affected the rock lobster industry. Roading damage prevented and substantially delayed distribution of rock lobster product, leading to partial closures of production facilities and impacts on employment for staff. Facilities in Gisborne were affected by the loss of essential utilities such as water for approximately four weeks.

Pāua fishery

16. The pāua fishery in Te Tairawhiti/Gisborne/Wairoa is part of the Quota Management Area known as PAU2, which covers the southern half of the North Island.[3] Commercial harvesting in PAU2 is restricted to the area of the east coast between Turakirae Head and Blackhead (Wairarapa). Although there is no commercial pāua harvesting in Te Tairawhiti/ Gisborne/Wairoa, the coastline in this area supports customary and recreational pāua harvesting.

17. We had hoped to provide the Ministerial inquiry with observations from commercial pāua divers on the Wairarapa coast, as a proxy for direct observation of impacts on pāua in Te Tairawhiti/ Gisborne/ Wairoa. However, Wairarapa pāua divers have not been able to get into the water to conduct planned surveys in recent weeks due to adverse sea conditions.

18. Adverse sea conditions (poor visibility) are increasingly typical for the commercial pāua fishery in the northern parts of the Wairarapa, as this area was already affected by terrestrial sediment run off prior to the cyclones. Divers have reported that the number of days of suitable diving visibility have much reduced over the last decade or so in the northern part of the fishery. Anecdotal information from divers indicates that the turbid water is correlated with forestry clear felling and subsequent wash out of sediments into the inshore area. The prevailing current (which flows north to south) and localised gyres are believed to exacerbate these conditions.

Cyclone-related impacts on pāua

19. Although pāua are well adapted to the big seas that accompany severe storm events, exceptionally high waves or long period sea swells can be destructive. For example:

    - Big seas can destroy pāua habitat by washing ashore the small to medium size rocks and boulders which shelter juvenile pāua. Even if juveniles avoid being washed ashore, they remain vulnerable to predation in more exposed habitats. For example, in 2019 a north-west storm destroyed much of the preferred pāua habitat along the Marlborough Sounds northern faces (the outer coast between Cape Jackson and the entrance to Pelorus Sound). This area is only now starting to show signs of a slow recovery; and
    - Exceptionally high seas can physically throw adult pāua ashore by smashing them with boulder wash or tearing them off softer substrates such as mudstone. For example, this has been observed at Flat Point in the Wairarapa.

20. While high seas are not a consequence of land use, cyclonic impacts associated with land use (as described below) can make pāua more vulnerable to the effects of high seas.

21. For example, freshwater inundation from flooding events – a natural phenomenon that is influenced by land use decisions – has been observed to kill pāua. If a major river flood coincides with an onshore wind (as occurred with Cyclones Hale and Gabrielle) a freshwater layer is held inshore, sitting on top of the saltwater. At low tide, pāua in the subtidal area are bathed in freshwater which quickly kills them. Pāua in deeper water are weakened by higher

[3] PAU2 is the area of sea south of a line drawn from Cape Runaway in the east to Tirua Point in the west.

freshwater levels in the mixed zone and may lose suction and be tossed ashore by wave action. These types of effects have previously been observed in the Catlins and at Vernon Boulder Bank in Marlborough.

22. Pāua are particularly vulnerable to the effects of sedimentation because they require stable substrates (e.g., rocky reef) for settlement and attachment. The available research confirms that pāua are affected by sedimentation at all stages of their lifecycle:[4]

    - Sedimentation is a significant factor influencing variability in recruitment[5] success in pāua. Layers of sediment on preferred settlement habitats interfere with settlement cues and decrease the amount of physical area available for settlement, as well as reducing surface area for grazing during metamorphosis from the free-swimming larval stage to recognisable pāua. Sediment causes mortality in settled pāua larvae, with effects persisting even after sediment is removed. These effects are therefore likely to be experienced in heavy rainfall events leading to short exposures to high sediment levels;
    - Juvenile pāua live in cryptic habitat (e.g., crevices), primarily under large boulders. Sedimentation modifies the behaviour of juveniles by causing them to move out of cryptic habitat as sediment accumulates, exposing the juveniles to an increased risk of predation (e.g., by starfish) and dislodgement in more open habitats; and
    - High rates of sedimentation have been linked to direct mortality in adult pāua. This has been explained by sudden localised changes in sediment distribution after storm swells, which forces pāua off preferred substrates or buries them. Increased sedimentation essentially reduces the carrying capacity for adults by reducing good habitat, which can hinder the rate of population rebuild after a mortality event such as a storm. There are numerous anecdotal reports of pāua mortality following sedimentation and storm events.

23. The impacts on pāua of woody debris such as forestry slash have not been studied. It is likely that woody debris contributes to disturbance of pāua habitat and may, in some circumstances, smother adult and juvenile pāua.

Operational impacts on pāua fisheries

24. As noted above, commercial pāua harvesting does not take place in Te Tairawhiti/Gisborne/ Wairoa. However, further south in the commercially harvested area, the following operational impacts on pāua fisheries could be expected from cyclone events:

    - Loss of diving days as a consequence of increased turbidity;
    - Risks to vessels from woody debris in the sea; and

[4] Full references for the cited research are available in McCowan, T. (2019). Ecosystem approaches to management of pāua fisheries: Review and considerations. Pāua Industry Council. Available here .
[5] 'Recruitment', in fisheries, is the process whereby young fish pass through various life stages and become available to be harvested.

- Loss of access to dive locations. Pāua divers typically fish from small trailered vessels and dive crews operate from multiple remote locations along the coast, launching and retrieving vessels from small ramps or across the beach. Therefore:
  - An accumulation of woody debris on beaches would temporarily prevent access to launching and landing sites (and cost and effort may be incurred in clearing the sites); and
  - Damage to infrastructure such as rural coastal roads and bridges would render some dive locations inaccessible or more costly to access from alternative launching points.

25. The sustainability and abundance of sedentary species such as pāua depends primarily on local conditions and local fishing effort rather than on stock-wide factors. Controlling harvesting activity at a fine spatial scale, including by spreading harvesting effort across different areas, is therefore an important part of the way in which the pāua industry manages commercial harvesting. The spreading of commercial catch helps ensure that pāua are abundant at a local level, providing better fishing opportunities for customary and recreational fishers. Fine-scale catch spreading arrangements are described in industry fisheries plans which are approved by the Minister for Oceans and Fisheries under section 11A of the Fisheries Act 1996.[6] Impacts arising from land use – e.g., sedimentation, debris on beaches, loss of infrastructure – that prevent harvesting in an area may interfere with industry catch spreading arrangements which are important for ensuring the local abundance and sustainability of pāua fisheries.

The important role of kelp and other habitat-forming species

26. Sedimentation can also have an indirect impact on marine species by damaging kelp (large seaweeds) which are a critical component of the marine ecosystem and are important habitats and food sources for commercially harvested species. Seaweeds such as the giant bladder kelp *Macrocystis pyrifera* provide the main food source for pāua. The presence of kelp on reef habitats increases structural complexity and provides habitat and food for prey species for rock lobster. Seaweeds also buffer wave energy to protect juvenile habitats for many marine species, provide shelter and refuge habitats, and have a role in determining larval dispersal dynamics for pāua.

27. Sedimentation arising from storm and high rainfall events is one of the most significant drivers of variability in *Macrocystis* abundance. Sedimentation interferes with the settlement and early development microscopic stages of kelps and can also limit the productivity of adult kelp by increasing water turbidity and reducing the availability of light for photosynthesis.[7]

28. The fishing industry has no direct information on the impact of cyclones Hale and Gabrielle on seaweed habitats on the east coast of the North Island, but the available research from other locations suggests that (a) it is likely that the cyclones have damaged kelp beds, at least temporarily, and (b) damage to kelp beds will have flow-on effects on commercially harvested species that are dependent on these habitats, such as rock lobster and pāua. If kelp is damaged

[6] PAU2 (Wairarapa) Fisheries Plan 2022 [Draft]; Kaikoura/Canterbury Pāua (PAU3) Fisheries Plan 2020 [Approved]; Chatham Islands Pāua (PAU4) Fisheries Plan [Approved]; Fisheries Plan for the Pāua Fisheries PAU5A, PAU5B & PAU 5D 2021 [awaiting approval]; Pāua fisheries plan for PAU7 2020 [Endorsed].
[7] See McCowan, T (2019).

(e.g., by an accumulation of sediment or woody debris), it can grow back relatively quickly. However, if the holdfast is destroyed or completely smothered and the kelp plant dies, recovery of kelp beds is likely to be very slow – as shown in post-earthquake monitoring at Kaikōura.

29. Other important fisheries nursery habitats can also be modified or destroyed by sedimentation, especially those composed of habitat-forming (biogenic) species – e.g. green-lipped and horse mussel beds, seagrass meadows, bryozoan and tubeworm mounds, sponge gardens.[8]

Policy framework

Question: How do current laws, policies and rules influence the way we use our land? What works well? What is unhelpful?

30. The fishing industry's primary concerns about land use legislation and policy are:

    - The adequacy of legislative requirements for decision makers to avoid, remedy or mitigate any adverse effects on fisheries and the wider marine environment; and
    - Whether the legislative requirements are implemented effectively in practice.

31. Cyclones Hale and Gabrielle have demonstrated that our legislative framework allows land to be used and developed in ways that harm the marine environment and have negative social and economic impacts on the fishing industry and others who use and value marine resources. This is not a new finding – it is simply a dramatic illustration of an ongoing failing. Adverse effects on fisheries and the marine environment (particularly effects arising from sedimentation) are not unique to Te Tairawhiti/Gisborne/ Wairoa and nor are they unique to forestry land use. The problem is prevalent – to varying extents – around the country.

32. However, it is not a failing in the law itself – on the contrary, the relevant legislation clearly requires councils to control adverse effects on the marine environment that arise from land use and terrestrial activities. Adverse environmental effects have occurred in spite of the clear legal requirements.

Resource Management Act requirements are very clear

33. The Resource Management Act 1991 (**RMA**) contains numerous provisions that require councils to consider the impacts that land uses may have on the marine environment, and to ensure that any adverse effects are avoided, remedied or mitigated.

34. The purpose of the RMA is *to promote the sustainable management of natural and physical resources* and 'sustainable management' includes *avoiding, remedying, or mitigating any adverse effects of activities on the environment* (RMA s.5). The definition of 'environment' (RMA s.2) includes all natural and physical resources and the social and economic conditions which affect or are affected by natural and physical resources – in other words, RMA decision makers have an obligation to manage activities within their jurisdiction so as to avoid, remedy or mitigate adverse effects on fisheries resources and the activity of fishing.

[8] Morrison, M. A., Lowe, M. L., Parsons, D. M., Usmar, N. R., & McLeod, I. M. (2009). A review of land-based effects on coastal fisheries and supporting biodiversity in New Zealand. New Zealand Aquatic Environment and Biodiversity Report, 37, 100

35. It is also relevant to note that 'fisheries resources' is defined very broadly in the RMA[9] and is not limited to harvested fish species – it means *any 1 or more stocks or species of fish, aquatic life [*defined as *any species of plant or animal life that, at any stage in its life history, must inhabit water, whether living or dead, including seabirds (whether or not in the aquatic environment)], or seaweed*.

36. The RMA requires regional councils to achieve integrated management – which includes integration of the management of the effects of activities across the land/sea boundary. In particular:

    - The primary function of regional councils is to establish, implement and review *objectives, policies, and methods* ***to achieve integrated management*** *of the natural and physical resources of the region* (RMA s.30(1));
    - Regional councils must prepare a Regional Policy Statement which contains objectives, policies, and methods *to* ***achieve integrated management*** *of natural and physical resources* (RMA s.59);
    - Regional councils must also prepare a Regional Coastal Plan, which can form part of a broader regional plan where that is *appropriate in order to* ***promote the integrated management*** *of a coastal marine area and any related part of the coastal environment* (RMA s.64). This recognises that activities on the land can have effects on the sustainability of natural and physical resources in the sea and that objectives, policies and methods – such as rules – may be required to manage those effects; and
    - In carrying out its functions in preparing a regional plan, a regional council must have regard to regulations relating to the conservation, management, or sustainability of fisheries resources (RMA s.66(2)(c)(iii)). This active obligation requires councils to explicitly consider how the activities they manage may interact with the sustainability and management of fisheries resources.

New Zealand Coastal Policy Statement

37. Regional policy statements, regional plans and district plans must give effect to the New Zealand Coastal Policy Statement 2010 (**NZCPS**) (RMA ss.62(3), 67(3)(b), 75(3)(b)). The NZCPS requires an integrated approach to the management of terrestrial activities that have adverse effects in the marine environment. Of particular relevance:

    - NZCPS Policy 4, Integrated management, requires councils to –

    provide for the integrated management of natural and physical resources in the coastal environment, ***and activities that affect the coastal environment****. This requires:*
    (a) co-ordinated management or control of activities within the coastal environment, and which could cross administrative boundaries, particularly:
    (i) the local authority ***boundary between the coastal marine area and land****; and…*
    (c) particular consideration of situations where…
    (iv) ***land use activities affect, or are likely to affect, water quality in the coastal environment and marine ecosystems through increasing sedimentation****...*

[9] The RMA adopts the definition of 'fisheries resources' in the Fisheries Act.

- NZCPS Policy 5 Land or waters managed or held under other Acts, requires councils to –

*(1) Consider **effects on land or waters in the coastal environment** held or managed under:*
(a) the Conservation Act 1987 and any Act listed in the 1st Schedule to that Act; or
*(b) **other Acts for conservation or protection purposes**;*
and, having regard to the purposes for which the land or waters are held or managed:
*(c) **avoid adverse effects of activities that are significant in relation to those purposes**; and*
(d) otherwise avoid, remedy or mitigate adverse effects of activities in relation to those purposes…

The Fisheries Act includes provisions to protect 'habitats of particular significance for fisheries management' (**HPSFM**, FA s.9). The NZCPS requires that significant adverse effects on any HPSFM that are identified under the Fisheries Act must be avoided.[10] While NZCPS Policy 5 provides useful integration between the Fisheries Act and RMA in relation to HPSFM, it does not detract from the general RMA obligation to avoid, remedy or mitigate adverse effects on all fisheries habitats.

- NZCPS Policy 22, Sedimentation, requires councils to –

(1) Assess and monitor sedimentation levels and impacts on the coastal environment.
*(2) **Require** that subdivision, use, or **development will not result in a significant increase in sedimentation in the coastal marine area**, or other coastal water.*
*(3) **Control the impacts of vegetation removal on sedimentation including the impacts of harvesting plantation forestry**...*

National Environmental Standard for Plantation Forestry

38. The fishing industry's submission on the proposed National Environmental Standard for Plantation Forestry (NES-PF) in 2015 was highly critical of the lack of consideration of plantation forestry impacts on the marine environment and inshore fisheries.

39. More recently, we have identified the following general shortcomings of the NES-PF in relation to adequately managing adverse effects of forestry activities on fisheries and the marine environment:

- The NES-PF does not consider impacts of forestry activities on marine fisheries – although it contains numerous references to fish, fish spawning and fish passage, these apply to freshwater fisheries only;
- The permitted activity standards require that forestry-related activities (e.g., afforestation, earthworks, quarrying, operation of harvesting machinery, mechanical land preparation, replanting, fuel storage) must not be carried out within 30m of the coastal marine area.[11] However, the NES-PF does not acknowledge that forestry activities that take place more than 30m away from the coastal marine area can also have adverse effects on the marine environment. While a 30m setback from the coastal marine area is useful for managing certain types of adverse effects, it does not adequately avoid, remedy or mitigate adverse effects arising from high sediment loadings and slash from forestry activities further inland; and

[10] Fisheries New Zealand has not formally recognised any HPSFM.
[11] NES-PF regulations 14, 28, 54, 68, 74, 78 & 104.

- Rules in plans may be more stringent than the NES-PF only in specified circumstances, including in order to give effect to NZCPS policy 22 (sedimentation) – but not in order to give effect to NZCPS policy 4 (integrated management) or policy 5 (land or waters held or managed under other Acts). Rules may also be more stringent in order to manage forestry activities *within* specified 'unique and sensitive environments' – but not in order to manage activities that have adverse effects on *offsite* 'unique and sensitive environments' (e.g., habitats of marine fisheries).[12]

40. For forestry activities that do not meet the permitted activity standards (e.g., forestry on certain categories of erosion-prone land), the NES-PF allows councils control or discretion over *measures to address effects of harvesting on… the coastal marine area.*[13]

Council adoption of RMA requirements in regional plans is variable

41. In our view, the legislative requirements in the RMA and NZCPS are very clear. However, the fishing industry's participation in regional council planning processes over recent years tells a different story – it is often a battle to convince councils to recognise the need to manage adverse effects on fisheries resources and the marine environment of terrestrial activities within their jurisdiction. While some regional councils have included or propose to include provisions in their plans to promote integrated management and to control impacts on fisheries resources and marine habitats across the land/sea boundary (e.g., Taranaki, Nelson), the plans of some other councils are silent, weak or actively resistant (e.g., Marlborough) in relation to these requirements.[14]

42. In the areas covered by the Ministerial Inquiry (Gisborne District and Hawkes Bay Region), the regional planning documents have not been updated by the relevant councils in recent years and, therefore, the fishing industry has not had opportunity to provide input to the plans. However, a brief review indicates that the operative regional plans for the two regions contain explicit and relatively strong policies requiring decision-makers to avoid adverse effects on marine fisheries resources, fish habitats (e.g., fish spawning and nursery areas) and fishing grounds.

Implementation of RMA and planning requirements has been poor

43. The adverse effects of Cyclones Hale and Gabrielle on fisheries resources, fish habitats and the fishing industry have not arisen from any obvious shortcomings in either the statutory provisions of the RMA or, from our brief examination, the two councils' regional plans – instead, the councils have not given effect to the clear provisions of the RMA and their own regional plans.

44. The reasons for this failure are not something that we are able to comment definitively on. However, one of the fishing industry's main frustrations with the RMA is that the coastal marine

[12] NES-PF regulation 6.
[13] NES-PF regulation 70 (controlled activities) and regulation 71 (restricted discretionary activities).
[14] E.g., fishing industry submissions on the Proposed Marlborough Environment Plan seeking explicit recognition of impacts of terrestrial activities on fisheries resources and fish habitats (in particular, sedimentation impacts) were rejected by the Council.

area is not given balanced consideration by decision-makers with appropriate expertise. In our experience:

- Although regional councils' functions and responsibilities can significantly affect the sustainability of fisheries resources and users of marine resources, councils tend to focus primarily on the terrestrial environment and have very limited expertise and experience in marine management. For many council decision-makers, the marine environment seems to be 'out of sight, out of mind'; and
- At a central government level, the RMA allocates responsibility for coastal matters to the Minister of Conservation. This leads to the coastal marine area being viewed primarily as a 'protection' environment, rather than an environment that supports a wide range of uses and values, including customary use rights, recreational uses, and commercial uses including fishing.

45. Proper consideration of the impacts of land uses on marine fisheries habitats and fisheries sustainability therefore tend to fall through the gaps for central and local government.

Proposed RMA replacement legislation reduces requirements for integrated management

46. It is extremely concerning to the fishing industry that the proposed replacement of the RMA with the Natural and Built Environment Bill (**NBE Bill**) and the Spatial Planning Bill (**SP Bill**) would reduce the consideration that must be given to integrated management across the land/sea boundary compared to equivalent RMA provisions. If the Bills are enacted as introduced:
    - There will be no provisions equivalent to the current RMA requirements for regional councils, when preparing regional policy statements and regional plans, to have regard to management plans, regulations and bylaws prepared under the Fisheries Act;[15]
    - Decisions that affect the marine environment and fisheries resources and habitats will be made by bodies whose members are not required to have any knowledge, expertise or skills related to the marine environment;[16]
    - An extremely narrow definition of integrated decision making will be implemented under the SP Bill which requires integrated decision making only across two other terrestrial planning statutes – the Land Transport Management Act 2003 and the Local Government Act 2002 – and does not require any integration with significant marine management legislation such as the Fisheries Act; and
    - Decision makers (i.e., primarily, unelected regional planning committees) will not accountable for the impacts of their decisions on the sustainability of fisheries resources or the marine environment generally – instead, the consequences (and real costs) of decisions under the SP Act and NBE Act that affect fisheries will be borne directly by fishing sectors.

[15] i.e., RMA ss.61(2) & 66(2)(c).

[16] This includes regional planning committees, Boards of Inquiry, the Limits and Targets Review Panel and Independent Hearing Panels. In contrast, the NBE Bill does require relevant expertise for other environmental domains – e.g., urban and rural interests must be represented on a regional planning committee, and freshwater expertise must be included in an Independent Hearings Panel.

47. We note and endorse the sentiment expressed by the Parliamentary Commissioner for the Environment, Hon Simon Upton, in his recent submission on the NBE Bill and SP Bill:[17]

> *The reforms represented by the bills seem to be rooted in the premise that failure to achieve better environmental and planning outcomes under the RMA is the result of legal deficiencies in that statute – deficiencies that can be rectified by passing new laws. While some strengthening of the law is needed, my conclusion is that* ***the main barriers to better environmental outcomes aren't legal ones****. They are, rather, rooted in:*
> *• a lack of willingness to use some of the powers that the RMA provided (although this is starting to change);*
> *• insufficient high-quality information to inform many existing regulations let alone the much more demanding world of targets, limits and other protections envisaged by the proposed legislation;*
> *• an inability to articulate the scale of the transition that faces some communities let alone how such a transition might be accomplished.*

Solutions – improving integrated management of marine impacts of land use

Question: What is your vision for the future of land use in the region?

48. The fishing industry seeks a truly integrated management approach, including effective integration across agencies (central, regional and local) and statutes, engagement with tangata whenua and all stakeholders, and integrated consideration of impacts across different environmental domains (e.g., land and sea).

49. More specifically, we would like to be confident that decisions about appropriate land uses take account of any impacts on the marine environment (including effects of low probability but high potential impact) and that the use of land will not have an adverse effect on the marine environment, and specifically on fisheries resources and fish habitats.

50. This is our vision not only for Te Tairawhiti/Gisborne/Wairoa, but for land use throughout New Zealand.

Question: What do we need to do to achieve this vision?

51. As part of a fully integrated approach, we seek a shift away from single-objective policies (e.g., policies that are aimed only at incentivising the planting of trees as a carbon sink) and towards more joined-up policies that are designed to achieve multiple environmental, social and economic outcomes.

52. We recommend that the RMA replacement legislation (NBE Bill and SP Bill) should strengthen, rather than weaken, requirements for integrated management across the land/sea boundary.

[17] Parliamentary Commissioner for the Environment. Submission on the Natural and Built Environment Bill and Spatial Planning Bill. February 2023. Available here

The fishing industry submissions on the Bills set out some practical ways this could be achieved, including:[18]

- Requiring Regional Spatial Strategies (RSS, prepared under the SP Bill) to identify matters that are significant because of their impacts across the land/sea boundary or the freshwater/coastal water boundary, so that steps must then be taken to address these issues in an NBE plan. For example, an RSS should identify areas where current land uses are incompatible with the vision and objectives for the coastal environment of a region, or where land uses have a negative effect on areas of the marine environment that require protection, restoration or enhancement;
- Requiring decision makers to have particular regard to plans and other instruments made under the Fisheries Act;
- Requiring the relevant decision-making and/or advisory bodies to have expertise, skills and knowledge related to marine resource management; and
- Providing for the active involvement of the Minister for Oceans and Fisheries in decision-making processes in order to protect the integrity of the fisheries management regime and uphold the Crown's obligations under the Maori Fisheries Settlement.

53. We also note that the way in which the NBE Bill splits responsibilities for planning and regulation (which lies with unelected regional planning committees) from responsibilities for implementation (by councils) significantly reduces accountability for achieving good environmental outcomes on land and in the marine environment.

54. We suggest that national guidance and direction, whether in the form of the NES-PF or the National Planning Framework under the proposed NBE Bill, could be strengthened to require the effective control of adverse effects in the marine environment arising from permitted plantation forestry activities (addressing the short-comings we identify above).

55. However, we are aware that if existing requirements and standards are not being effectively implemented by councils, then strengthening the statutory and policy requirements will not necessarily result in improved environmental performance. Instead, greater attention should be given to effective implementation – e.g.:

- Central government could provide stronger support and expertise to assist councils in carrying out their responsibilities;
- Central government and councils could improve the guidance provided to forestry operators to ensure compliance with the NES-PF;
- Forestry industry organisations could develop and disseminate best practice guidance and enhance training for forestry operators;
- Councils could provide better oversight and review of harvest management plans; and

[18] See submissions to the Environment Committee on the Natural and Built Environment Bill and the Spatial Planning Bill, March 2023, from the NZ Rock Lobster Industry Council here and here; Pāua Industry Council here and here; and Seafood NZ here and here.

- Councils could improve their monitoring and enforcement of rules, and the collection of information to inform decision-making.

Question: Which groups need to be involved in developing solutions and what is the best way for these groups to be involved?

56. The fishing industry's involvement in developing solutions to the issues within scope of the Ministerial Inquiry should occur at two levels.

57. First, we consider it is essential that strong and well informed 'marine voices' are heard during the preparation of all planning documents under the RMA and replacement legislation. It is also important that these voices reflect the full range of uses and values of the marine environment – i.e., the marine environment is a sustainable use and production environment, as well as being a natural environment with biodiversity values that require effective protection from threats. Groups with expertise in fisheries and fishing interests that should be involved at an early stage in planning processes include national and regional commercial fishing industry groups, iwi and hapū, recreational fishing representatives, and Fisheries New Zealand.

58. Secondly, the fishing industry should participate in ongoing discussions directly with forest industry representatives. Although we have concerns about the impact of forestry activities on fisheries and fish habitats, the forestry and fishing sectors also have important interests in common – both are export-driven primary production sectors with a necessary focus on sustainability and a significant role in supporting regional economies. Fishing industry representatives have previously met with the Forest Owners' Association to discuss issues of common interest, including plantation forestry impacts on the marine environment. We intend to seek ongoing discussion with forestry industry representatives as we believe that best practice approaches developed and implemented within industry sectors are often the most effective way of improving environmental performance.

Thursday 6th April 2023

To Ministerial Inquiry into Land Use.

My email address is am.mcewen@xtra.co.nz and I live in Waikanae on the Kapiti Coast

This is a personal submission.

I consent to this submission being published on the web site.

A very good film (22 minutes in duration) of the establishment of Mangatu Forest was made by the Forest Research Institute in 1979/80. Crown Law obtained a video copy of it for me to use as part of my evidence to the 2012 Waitangi Tribunal hearing and I used it again as part of my evidence at the 2018 hearing. Because it is not available on the Scion website, I had an MP4 copy made from the video, that I can share with the panel, if you give me an email address to use for the sharing. I recommend that the panel does have a look at it.

I refer in several places to evidence presented by hydrologist John Waugh to the Combined Gisborne Inquiry of the Waitangi Tribunal in 2002. I have a copy of the full document that I can make available to you.

Other documents referred to are generally footnoted and publicly available.

I also want to apologise for the fact my submission is not as well constructed, edited nor presented according to my usual standards. I had an operation last week and spent 5 days in hospital following the operation. Recovery is ongoing, and my powers of concentration are not as focussed as I would have liked when completing the submission.

I would be very happy to clarify any aspects of my submission if this would assist the panel.

Andrew McEwen

Thursday 6th April 2023.

Ministerial Enquiry into Land Use

ministeriallanduseinquiry@mfe.govt.nz.

Thank you for the opportunity to submit on an important issue.

About Submitter

I am Andrew McEwen, a professional forester for 61 years. I remain active through the NZ Institute of Forestry and Tane's Tree Trust, on a voluntary basis, but not in paid employment.

For the purposes of this submission, the more relevant parts of my career are:

- I was significantly involved in the corporatisation/privatisation of the former State Forests, including the East Coast forests Mangatu, Ruatoria and Tokomaru.
- As part of that involvement, I was one of those drafting the Crown forestry licence, including the water and soil covenants that applied to each of the three East Coast forests.
- In 2012 I was engaged by the Crown as an expert witness in the Waitangi Tribunal hearing of the Mangatū Wai 814, part of the Tūranganui A Kiwa District Inquiry. In 2018 the Crown engaged me again for re-hearing of the same issue. I have continued to follow that inquiry and in 2022 I was asked to submit two affidavits on a matter associated with the inquiry, one to a Supreme Court appeal and one to a High Court appeal.
- A former President of the New Zealand Institute of Forestry ("NZIF") for six years and a current member (since 2016) of the NZIF Registration Board.

History of flooding and the push for afforestation

I am disappointed the scope of the enquiry seems to be focussed on events since 1988, the year cyclone Bola struck. In particular, the statement in the second paragraph:

> *Following the devastation caused by Cyclone Bola in 1988, tens of thousands of hectares of trees were planted on highly erodible land in Tairāwhiti/Gisborne with the intention of stabilising slopes.*

Large scale afforestation on highly erodible land in Tairāwhiti/Gisborne began nearly 30 years earlier when the former NZ Forest Service was instructed by government to create a large forest in the headwaters of the Waipaoa River. The 1973 publication *The Story of Mangatu: The forest which healed the land*[1] written by F Allsop records floods on the East Coast going back to 1853. There were further floods in 1876 and 1879. These floods all occurred while the forest cover in the headwaters of the Waipaoa was intact. Partial conversion to pasture had taken place before the flood of 1894 and progressed further by the flood of 1906, one of the biggest experienced in the district. Floods then increased in frequency and intensity in 1910, 1914, 1916 and 1918. Particularly bad floods occurred in 1932, 1938, 1944, 1948 and 1950.

In 1953, the Poverty Bay Catchment Board began construction of a flood control scheme in the lower reaches of the Waipaoa River to protect the intensively farmed alluvial plain from repeated inundation, a scheme that was completed in 1961.

Concerns about erosion date at least as far back as the 1890s. The following are taken from pages 20-21 of the Allsop book.

Newly-sown areas were subject to soil wash. Slips appeared, some earth slumps and flows took place, and gullies began to form. After heavy rain in December 1893 and January 1894, well before

[1] Allsop, F., 1973 *The story of Mangatu: The forest which healed the land.* New Zealand Forest Service Information Series No 62. Government Printer. This publication is available in digital form at https://scion.contentdm.oclc.org/digital/collection/p20044coll6/id/648/

deforestation was complete, a survey of 29 OOO hectares of the pasture land showed that slips had occurred over 3.6 percent of it. This rain caused floods in the Gisborne district. Government geologists working in the catchment- of interest as a potential oilfield - in the early 1900s warned against the dangers in a report on the area, stating "The conditions favouring the occurrence of slips and soil-creeps, which after rain are likely to take place on slopes in any deforested area as soon as the roots have decayed, are all present in the Gisborne district". The country is hilly; a large proportion of the underlying rocks is argillaceous, and in consequence the soil over much of the area is clayey; the climate is characterized by periods of dry weather a month or six weeks in duration, followed by a week or fortnight of rain, which in some seasons of the year is likely to be torrential. Even without the aid of drought-cracks the water quickly penetrates to the rock, and the soil slides off. In wet seasons every hillside is scarred with slips, while on the gentler lower slopes soil-creeps are common."

The geologists' report also summarises the likely effects of deforestation in the Waipaoa catchment as "greatly increased sheet-washing of the soils; great increase in the number of slips, slumps, and rain-gullies; aggradation of the stream-beds; wandering of the streams over valley bottoms; lateral erosion of the river-banks; burying of culverts and bridges; filling-in of the Gisborne Harbour; and more severe and frequent floods". The remedies they suggested were for the forest to be retained in the headwater valleys, or, if necessary, for these areas to be "rewooded".

The above shows that over 100 years ago, there was concern about the effects of erosion arising from land converted from forest to pasture, the impact on downstream infrastructure was recognised and there were suggestions remaining forest should be retained and that converted areas should be reforested.

Allsop's book shows concerns about the volumes of erosion debris in water courses and fears that as the aggradation of the river bed advanced downstream it would reduce the effectiveness of the Catchment Board's flood control scheme. Beds of minor streams had, in places been raised by as much as 30 metres. Alluvial flats in the upper catchments of the Waipaoa and Mangatu rivers had been buried.

The Catchment Board established an experimental area in the Te Weraroa Stream but eventually concluded that costly engineering structures, unsupported by an improved vegetation cover were ineffective as a solution to the erosion problem.

In 1955, on the recommendation of the Poverty Bay Catchment Board, the Soil Conservation and Rivers Control Council invited a group of well-qualified people to examine all aspects of the Waipaoa problem. Their recommendations, in summary, were:

1. Subsidised conservation farming on private property.
2. Subsidised planting of productive woodlots and for land stabilisation.
3. Complete afforestation of the 5,600 ha of crushed argillite areas. The main objective would be protection of the land from further erosion, but the panel envisaged some commercial afforestation could be possible.
4. Erection of engineering structures to complement the conservation measures.

The Soil Conservation and Rivers Control Council promptly endorsed the proposal, but there was opposition as some of the land was not badly affected by erosion and was very fertile. However, the land was virtually useless for farming owing to diminution of productive area, loss of fences, difficulty of mustering, etc. The downstream consequences of continued deterioration were also arousing great concern. Several Cabinet Ministers visited the area and on 3 August 1959 Cabinet approved a scheme for the Forest Service to acquire and reafforest 6,400 hectares of the Waipaoa catchment. In the end the area purchased and gazetted as State forest was 7,001 ha. A further 15 ha at Puha was purchased for a nursery. It was proposed the planting programme should be about 400 ha/year.

Planting started in 1960. By 31 March 1971 the greater part of the original area of the forest had been planted (5,405 ha). Acquisition and planting of additional land took the planted area to 10,370 ha by 1980.

Ruatoria forest was established between 1969 and 1986 when it had 11,260 stocked ha. Tokomaru was planted between 1976 and 1986 and had 12,595 ha. Over the 26 years from 1960 to 1986, the Forest Service had acquired the land and established a total of over 34,000 ha of forest, all with the primary objective of soil conservation.

A very good film (22 minutes in duration) of the establishment of Mangatu Forest was made by the Forest Research Institute in 1979/80. Crown Law obtained a video copy of it for me to use as part of my evidence to the 2012 Waitangi Tribunal hearing and I used it again as part of my evidence at the 2018 hearing. Because it is not available on the Scion website, I had an MP4 copy made from the video, that I can share with the panel, if you give me an email address to use for the sharing. I recommend that the panel does have a look at it.

A review of Allsop's book by Peter Olsen, at the time a senior forester in the Forest Service Rotorua Conservancy (including Mangatu), describes some of the problems faced and pays tribute to those who had been involved[2]:

THE STORY OF MANGATU, by F. Allsop, with photography by J. H. Johns. N.Z. Forest Service Information Series No. 62. Government Printer, Wellington. 100 pp., 42 plates

The old Biblical tale has it that in seven days God created the Earth. After you had worked at Mangatu Forest for a period you came to the conclusion that He had not made much of a job of it and in fact probably put Mangatu together as He was about to knock off.

For any of us with experience of Mangatu Forest establishment and the associated struggles with roads, rivers and massive slips, the fact that the first twelve years or so would be recorded in an official book of fine photographs would be accepted as evidence that somebody in authority had got their priorities right. The job demanded initiative, hard work, imagination and perseverence. This latter quality was particularly called for when stabilizing engineering works, such as debris dams, were overcome time and again by a frustratingly difficult mess of sliding mud often several hundred feet in depth. This, in my view, constituted the major achievement of the N.Z. Forest Service at Mangatu. A hopeless task, which had defeated many attempts over the years, was made to yield to the tremendous efforts of staff who, unskilled in many of the aspects of erosion control, took on this job and by their energy, faith and stubbornness caused visitors to remark on the changes they had wrought in such a short time.

It was my recollection of this admiration of the men who had the capacity and vision to achieve this result, expressed by visitors to the forest, which led to my disappointment with *The Story of Mangatu.* It is a shame that such a tale, supported by John Johns' usual high-quality pictures, should be told in the dullest of Public Service prose. It is a technically accurate account which gives little life to a project successfully prosecuted by dedicated staff of high morale. Archie Moore's postscript in Appendix 1 makes welcome mention of some of the early men on the job. I would have liked to see more mention particularly of these workmen who had the thankless continuing task of struggling in the clinging mud erecting and patching debris control structures, and exercising their ingenuity and flair for improvising where it counted - in the eroded grass roots.

The book will be popular owing to the presentation and impact of the photographs, from the dramatic front cover - mute testimony to past destruction of forest - to the even more dramatic, back cover showing the devastating effects of this mistaken policy. The publishers have made a good choice of format, and the presentation is worthy of any coffee-table-type publication. It is well worth buying, particularly if you have this sort of technical interest. For the lay person, for whom it is apparently intended, it would probably be worth while just for the pictures.

P.F.O

[2] *New Zealand Journal of Forestry*, Volume N.Z.J.For. 1974, Issue N.Z.J.For. 19(1) 1974, pp 145, **May 1974**

In 1963, the Soil Conservation & Rivers Control Council set up a technical committee of inquiry to look into the conservation problems of Poverty Bay – East Coast district and to make recommendations on a comprehensive control programme. In its 1967 report[3], the committee's conclusions were[4]:

1. Problems of exceptionally severe land erosion face a large section of the rural community in the district.
2. The problems call for urgent attention. Delay in facing the situation will make the task infinitely more difficult and unless remedial action is initiated soon, the ultimate cost to NZ may far exceed the cost of treatment now.
3. Rural areas show abnormal and long-continued decline in population and land values in back-country areas are extremely depressed.
4. The more difficult erosion problems are localised, but effects are widespread.
5. The cost of dealing with erosion problems are of such magnitude the farming community alone cannot economically cope with them.
6. Quick-fire methods of erosion control are not possible both on climatic and topographic grounds.
7. The problem cannot be solved in a piecemeal fashion by small-scale operations. Only a unified large scale attack will result in success
8. Diversified development is considered essential. Large sections of the eroding back country are unsuited to farming but can be effectively afforested.
9. Early activities of such development would involve mainly local resources with no unusually heavy demands on overseas funds.

In 1973, in his publication *Hold This Land*, a history of soil conservation in New Zealand[5], long standing authority on soil conservation in New Zealand, Lance McCaskill, commented on the severity and uniqueness of the East Coast erosion problem:

The next example is probably the most dramatic of all: it is usually known as the East Coast Project. When the Poverty Bay Catchment Board took office in 1945 it soon realised that one of its priority jobs was to produce a scheme for the control of the Waipaoa River as it flowed across the highly-fertile Poverty Bay flats. A plan was prepared by 1949, approved by Council in 1950, and completed some years later at a cost of something like 2 million dollars. While the initial work was planned, it was fully recognised that the long-term protection of the scheme depended on the control of the vast amounts of sediment coming from the seriously eroded catchment. In 1948 an area of 1,500 acres of the Te Weraroa sub-Catchment was leased and used for elaborate trials with both trees and structures in attempts to stabilise the country.

While some success was obtained, at great cost with various methods, it became obvious by 1959 that complete afforestation of the Catchment would provide the only hope of stabilising the worst areas of the hillsides and permanently protecting the flats. Such a task was quite beyond the means of the Catchment Board, so the Soil Council approached Government with the proposal that the New Zealand Forest Service should establish a production forest in the area. The Government tentatively approved $2,500,000 for acquisition of land, reforestation and silviculture by the New Zealand Forest Service; $1,100,000 for soil conservation works by the Soil Council and the Board on adjacent farms; and $400,000 for engineering works to hold back debris.

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[3] *Wise Land Use and Community Development*. The report of the Technical Inquiry into the Problems of the Poverty Bay – East Cape District of New Zealand. Published for the National Water and Soil Conservation Organisation by the Water and Soil Division, Ministry of Works. NZ Government Printer, 1970. This report is sometimes referred to as the Taylor report, after the chair of the committee, Norman Taylor, formerly Director, Soil Bureau, DSIR.

[4] I have somewhat edited the list of 9 conclusions in the interests of brevity.

[5] L W McCaskill, 1973. *Hold This Land; A history of soil conservation in New Zealand* A.H. & A.W. Reed Ltd. Extract from page 218-219.

In September 1988, a report was prepared for the office of the Parliamentary Commission for the Environment *An Economic Review of the Waipaoa Flood Control Scheme*[6].

1.7 Of particular importance for flood mitigation in the Waipaoa Catchment is control of soil erosion in the upper catchment. The unstable hill country is depositing huge quantities of material into the Waipaoa River and its tributaries. In addition to localised damage, the erosion causes heavy sedimentation of the river water. The deposited material results in much increased damage from flood inundation and also causes aggradation of the river bed. It is expected that continued aggradation of the Waipaoa River, raising mean bed levels, will eventually compromise the integrity of the protection scheme and associated land drainage.

Erosion control proposals should not be addressed in isolation of overall catchment requirements. Currently attempts to justify erosion control centre on the retention of pastoral land for production. This is especially difficult when the most effective measure is to retire the land permanently from pastoral production.

What are not being adequately addressed are the wider conservation issues associated with control of erosion. Sustaining rural production is not the only vindication for soil conservation practices, and in fact may not be viewed by the general public as the predominant impact. Due to the relative ease with which economists can quantify the production aspect, decision makers have fixated upon productive return at the expense of wider conservation impacts. The true social impacts to the nation of soil conservation include:

- retention of on-site productivity
- mitigation of downstream impacts of erosion, eg. on water quality, flooding
- preservation impacts, including retention of the soil resource for future generations, maintaining the potential for alternative uses in the future, and satisfaction gained by the community from the knowledge that the resource is being conserved.

[6] Available at https://pce.parliament.nz/media/13hg2unp/img-y02081349-0001.pdf

> In the reality of the East Cape situation, large scale afforestation is probably the only effective means of containing widespread erosion. The financial viability of forestry ventures decreases with distance from main centres, and with the use of poorer classes of land. Unfortunately, these constraints apply to the majority of the East Coast hill country.
>
> If the primary objective is land conservation, it is inappropriate to apply a productive return criteria as the overriding factor in deciding if afforestation is in the national good. A possible viewpoint is that if a forestry operation can at least break even financially in these areas, then the conservation values must result in a positive net benefit to society. In the past this concept has been accepted by government by the provision of subsidies for conservation work. However, future contributions, in whatever form, to augment commercial return should be seen as a social investment, rather than a subsidised hand out.
>
> Consideration of mechanisms for combining the conservation and commercial aspects are beyond the scope of this study. They will require co-ordination and co-operation between different arms of government.

In 1994, the Parliamentary Commissioner for the Environment published another report titled *Sustainable Land Management and the East Coast Forestry Project.*[7]

The introduction to the report starts:

> The Gisborne-East Coast region of the North Island comprises some 8500 km² of rugged hill country with small areas of rolling land and river flats. The region is underlain by erodible sedimentary rocks and subject to regular high intensity cyclonic storms and very high rates of uplift and natural erosion. As the natural forest cover has been replaced by pasture for extensive grazing, erosion rates have increased further.
>
> A connection between deforestation and increased erosion and flooding in the region, and the need for reafforestation, have been recognised by some for many decades. There have been a number of proposed or implemented schemes of government intervention aimed at land stabilisation and more sustainable land use patterns. However, changes in land use by landholders have been slow in the face of significant economic and social barriers, and pastoralism has continued to be the dominant land use in a depressed regional economy.
>
> In March 1988 Cyclone Bola, a very severe cyclonic storm, caused widespread damage from on-site erosion and downstream flooding. Direct government relief payments totalled NZ$111M; private losses and expenditure may have been at least as high.

The conclusions drawn from the investigation include:

[7] Report available at https://pce.parliament.nz/media/tkjefuy5/sustainable-management-and-the-east-coast-forestry-project-dec-1994-small.pdf .

1. **The East Coast region has very serious constraints to achieving sustainable land management.** The combination of physical, social and economic constraints to sustainable land management in the region is well documented. The extent and severity of erosion in the region is unique. The Gisborne District Council and the individual landholders do not have the financial resources to make significant changes towards more sustainable land management. Government assistance is clearly needed to change land use.

2. **A consistent Government policy on sustainable land management is highly desirable.** The East Coast Forestry Project should be based on broadly similar principles to those of the Rabbit and Land Management Programme in the South Island High Country.

3. **The East Coast Forestry Project, based on facilitating the development of commercial forestry, has the potential to assist the change to more sustainable land management in the region provided that:**
   - targeting of at-risk lands is improved;
   - potential erosion is recognised to be as important as present erosion;
   - opportunities are provided for secure protection of indigenous vegetation with high conservation value;
   - stakeholders are able to participate in ongoing decision-making and implementation;
   - all eligible landholders have effective access to the Project;
   - investment risks are recognised and provided for;
   - the Project is promoted more extensively;
   - accountability is provided by approved forestry or property management plans and monitoring programmes.

4. **The inherent or perceived risks of commercial forest establishment by investors and landholders is constraining achievement of land use change under the Project.**

5. **The use of public moneys to change land use for sustainable land management is acceptable.** The public cost of the Project has decreased over the first three years. No significant distortions to the regional economy have been apparent to date.

6. **The East Coast Forestry Project is not the only means of sustainable land management of the region.** Achievement of sustainable land management is an ambitious goal requiring a mix of measures and agencies. Ideally, the Project should form part of a comprehensive approach to future sustainable land management in the region, complemented by a range of other land uses, all within an integrated planning framework.

A further report on afforestation of Mangatu was evidence presented to the 2002 Waitangi Tribunal Hearing on the Combined District Inquiry (WAI 814) by John Waugh, a hydrologist.

The scope of his evidence was:

SCOPE OF EVIDENCE

12. I have been asked to give evidence to the Waitangi Tribunal about aspects of sections 26 and 30 of the Tribunal's statement of issues dated September 2001. Specifically, I have been asked to research and answer the following questions relating to those issues:

26.3.2.1 Why were the Mangatu lands selected as a potential site for a forestry scheme? Were other alternative lands considered, and if so, on what basis did Crown officials reject them?

26.3.2.10 What environmental protections currently apply to the Crown forest licences for the Mangatu Forest? Are those protections sufficient given the purpose of the forest to reduce erosion?

13. In relation to the afforestation at Mangatu and the Waipaoa River Flood Control Scheme I have also been asked to consider whether the scientific justifications for those projects put forward at that time were property reflective of scientific knowledge at the time. In addressing this I have considered both the evidence of Brad Coombes to the Tribunal (Wai 814 #A20 and summaries) as well as subsequent advances in scientific knowledge.

14. The first part of the report reviews the establishment of Mangatu Forest, what lands were to be planted and why were certain lands targeted. It also identifies the land purchased and gazetted.

15. The report examines whether other lands were considered (for afforestation) and on what basis Crown officials rejected such lands.

16. The broad question of the scientific justification put forward at the time of Mangatu Afforestation scheme (in the 1950's) is addressed. In particular three effects of afforestation are outlined in some detail

* Interception of rainfall by forest vegetation

* Decreases in runoff following afforestation, and hence a decrease in erosion

* The binding effect and influence of tree root systems

17. The adequacy of environmental protections under the Crown Forest Licences. This subject follows on logically from the technical material set out immediately above.

18. I then discuss the Waipaoa River Flood Control Scheme (WRFCS) in relation to the afforestation scheme and examine some of the underlying design concepts of the WRFCS.

19. Before concluding I review advances in scientific knowledge (1960- 2001) impacting upon both the afforestation scheme and WRFCS.

20. A summary of my findings concludes the report

The section of Waugh's Summary relating to afforestation and the conditions in the Crown forestry licence are:

Afforestation at Mangatu

145. The afforestation proposal and scheme which led to the establishment of Mangatu Forest was targeted on the severely eroding "crushed argillite" zone, some 14,000 acres (5,666 ha) mostly lying between the Mangatu and Waipaoa Rivers.

146. Some of this land, 49% or 3,407 ha was Maori land, while the remainder was purchased from European owners.

147. In part this afforestation scheme was promoted as a means of reducing aggradation in the Waipaoa River and the headwater tributaries. The major source of the accumulating gravels (bed-material) were the deepseated gullies in the "crushed argillite zone (see Figure 2).

148. Hamilton and Kelman (1952) in outling the perceived benefits of forest cover mention three characteristics

148.1 Interception of rainfall by the vegetation

148.2 Reduction in runoff under forest, compared with pasture 148.3 The binding effect of tree roots on the soil and rock.

149. I conclude that the scientists, government advisers and officials had a sound grasp of the basic principles applying to afforestation, soil conservation and river control engineering in the 1950's, even if there was relatively little in the way of scientific research available for New Zealand at that time.

150. Subsequent research in New Zealand and overseas, 1960-2002 have shown these concepts and principles to be well founded.

151. Interception at Mangatu reduces the rainfall reaching the ground under forest by 25% to 35%. This moisture is re-evaporated back into the atmosphere.

152. Under forest cover there is a substantial decrease in runoff, largely because of the interception loss, thus there is less flowing water and reduced soil erosion.

153. Furthermore, under forest cover, the soil is drier to a greater depth and for a greater time each year. Together with root binding, this helps to reduce earth flow movement. It also helps to absorb rainfall during storms, thus reducing flood runoff.

154. Root binding under mature Pinus radiata forest has been shown to considerably strengthen the soil mass, refer Appendix 2. This provides more stable slopes and substantially reduces the flow rates in areas of earthflow erosion.

155. When pine forest is felled 50% of the tensile strength of roots is lost in 18 months and the remainder within 3 years.

156. A replanted tree crop (Pinus radiata) needs to reach about age 8 years before reasonable reinforcement of the soil mass becomes effective. Research into the effects of the severe cyclone Bola storm (1988) clearly demonstrated this effect.

157. Hence with harvesting there is a "window" of increased risk of soil erosion of around 5 to 6 years, before the new crop begins to be effective in resisting erosion. In particular there is increased risk of "new" erosion being initiated by a severe storm.

158. Overall I conclude that the conditions of the Crown Forestry License are broadly appropriate as they relate to water and soil conservation matters and the prevention of erosion.

159. Afforestation has been successful in containing erosion of headwater hill country, giving greater land stability because of the binding effect of tree roots and the drying out of land under forest cover. Runoff has been reduced, even in flood events, and as a result soil erosion has also diminished. There is now (1998) evidence that afforestation has reduced sediment production from the existing deep seated gully erosion features which in places cover tens of hectares of land, Derose et al (1998).

160. One might construe the continued existence of deep seated gullies as a failure of afforestation, I would surmise that no new deep seated gully erosion features have been initiated under a mature forest cover and that sediment production in the period 1958-1992 substantially decreased, as reported by Derose et al (1998).

Protections relating to soil and water conservation in the sale of the former State forests

I was actively involved in the drafting of the standard form of the Crown forestry licence, that was used in all 99 licences granted in the 1999-92 period. Seven of the licences, including those relating to the three East Coast forests, Mangatu, Tokomaru and Ruatoria, contained a Water and soil covenant as specified in section 18(1)(d) of the Crown Forest Assets Act.

These covenants were created to assist in the control of soil erosion and flooding. They require the occupier of the land to replant following harvest, to prepare management plans, to gain prior approval for roading and harvesting and to comply with legislation, regulations and bylaws relating to soil and

water conservation. At the time the standard form of the covenants was drafted, the Resource Management Act 1991 had not been enacted and the Water and Soil Conservation Act 1967 had not been repealed, but we were aware these matters were in progress. Regional and Unitary Councils had been created. Consequently, we decided that while actions covered by the covenant needed Crown approval, this is given if the licensee has a certificate from the regional council (in this case the unitary Gisborne District Council) showing it has approved the actions.

Hydrologist John Waugh, gave evidence to the Waitangi Tribunal Combined Gisborne Inquiry hearing in a report date March 2002 (see earlier). One of the issues he was asked to consider was the environmental protections in Crown forestry licences.

ENVIRONMENTAL PROTECTION: CROWN FOREST LICENCES

86. This is then a convenient point to consider

26.3.10 What environmental protections currently apply to the Crown Forest Licences for the Mangatu Forest?"

Are these protections sufficient given the purpose of the forest (was) to reduce erosion?"

Licence provisions

87. The "environmental protections" in the Crown Forest Licence for Mangatu Forest apply to the whole forest and are set out in Appendix A, as "Protective Covenant No 2", which is a soil and water covenant. The purpose of this covenant is stated to be "to assist in the control of soil erosion and flooding".

88. The relevant provisions of the covenant are as follows:

89. The Occupier shall replant any stand of trees, which it fells…

89.1 During the planting season immediately following the felling and,

89. In a manner which will minimise soil erosion

89.3 Planting to be in Pinus radiata

90. There is provision for a delay in replanting and the use of alternative species subject to the issue by Gisborne Regional Council (GDC) of a certificate that such actions will not lead to increased soil erosion on the covenant area. This section also provides for GDC to impose additional conditions relating to the prevention of soil erosion, on the certificate issued by GDC.

Management Plan

91. The Occupier is required after consultation with the Regional Council (GDC) to produce "general work programmes covering the management of the covenant area". The specific focus of this management plan was to be "the impact of such programmes on the prevention of soil erosion". It was envisaged that a Management Plan would be operative for 10 years.

Prior Approval Required for Roading and Harvesting

92. The Occupier is required to obtain the prior approval of the Crown, prior to the felling of any stand of trees, or the construction of any road on the covenant area. This approval effectively requires the Occupier to obtain from the Regional Council (GDC) a certificate stating "that the granting of approval (for felling or road construction) will not lead to increased soil erosion on the covenant area"

Compliance with Statutory Requirements

93. This section of the Covenant requires the Occupier to comply with any requirements of the Regional Council imposed under any legislation, regulation or bylaw relating to soil and water conservation.

Appendix C "Special Management Restrictions"

94. This appendix sets out two statements relating to replanting.

95. The licence is required to "replant the area which was occupied by any stand of trees" ….. where the trees were felled and removed or destroyed by any means whatsoever. Such replanting shall be completed within two years of such felling, removal or destruction.

96. The second clause allows the above clause to be waived "where the crown is satisfied… the land can be converted to some other sustainable use". This clause specifically spells out that the Licence remains bound "by the provisions of the provisions of the Resource Management Act 1991".

Evaluation

97. In my opinion, given that the purpose of the forest was to reduce erosion, the provisions set out in the Crown Forest License are broadly appropriate, particularly as they link across to the local Regional Council and reference the Resource Management Act 1991. There appears to be provision for the Regional Council to impose additional conditions relating to the prevention of soil erosion and the Regional Council (GDC) have done so.

98. In a brief paper by Marden and Saunders (1992): "Harvest at Mangatu" the authors list constraints on logging or forest harvesting imposed to achieve the purpose of the RMA (1991) as follows:

- No mid slope (contour) roading and/or tracking across unstable earthflow country.
- Restriction on mechanical land preparation, aerial desiccation (by spraying) and/or burning
- Partial catchment harvesting in any one year.

99. This last point of "partial catchment harvesting" may cover one issue which the Crown Forest License "environmental protections" appear to have overlooked. This issue is important because of the "window" of risk (up to 6 years) of initiating accelerated erosion by a severe storm rainfall event occurring in the period between forest harvest (and consequent root decay) and the new forest crop (Pinus radiata) reaching about 8 years of age, at which point the vegetation and root mass begin to again provide effective protection to the soil.

100. These issues were discussed in some detail in the section above on scientific justification. The major solution to this erosion risk issue is to spread forest cutting throughout the available harvestable area (depending on year of planting). In overseas forests on hilly to steep terrain, small sub-catchment areas are clear felled in a single year, but surrounding land remains in forest. By limiting the felled sub-catchment size to say 100-200 ha (250-500 acres), the area vulnerable to the erosion from a severe storm (e.g. Cyclone Bola) is greatly limited. With immediate replanting the forest is eventually converted to a patchwork of sub-catchments with differing age classes, which again spreads the risk of storm damage.

101. The partial catchment harvest issue may not have been addressed in the licence but it has been through environmental legislation requirements. GDC and it's predecessor the East Cape Catchment Board has required permits (Section 34 Soil Conservation and Rivers Control Amendment Act 1959), or resource consents (RMA 1991) for all harvesting carried out at Mangatu Forest. Typical conditions have included:

- Limitations on land disturbance by roading or landing construction;
- Restricted ground based logging;

- Runoff water control measures;
- Split catchment harvesting with 5 years between harvesting each portion of large catchments feeding into significant gullying (or formerly gullying) watercourses;
- No burning of logging slash;
- Weedicide use generally limited to hand applied spot release spraying of replanted seedlings;
- High minimum restocking rates (typically 1250sph) the winter immediately following replanting, (T Freeman, GDC, pers comm).

102. The original underlying prime purpose of Mangatu Forest was to retire the land from pastoral use and revegetate it in forest as rapidly as possible (400 ha, 1000 acres/year) in order to control soil erosion, which at the time was considered to be some of the worst in the world. In 1960 the soil erosion problems in the Waipaoa catchment and its perceived effects on downstream flooding were considered by government to be a problem of "national importance" which resulted in government directing NZ Forest Service to acquire and plant the lands which now make up Mangatu Forest.

103. Subsequent changes in government policy and sale of the timber crop do not alter or remove the erosion hazard, or potential for further severe erosion to develop, on the crushed argillite country which underlies Mangatu Forest and other similar areas of steep hill country on the East Coast.

I note at this point that Waugh has missed an important aspect.

Appendix C to the licence, which requires the licensee to replant any areas where trees have been felled or removed within two years, only applies for the life of the licence, and while the Crown is the Licensor.

The water and soil covenant in Appendix A, is governed by section 18(1)(d) of the Crown Forest Assets Act 1989. It applies to the occupier of the land, not the licensee and continues to apply even if the licence has terminated. The covenant is separately registered against the land and can only be varied or cancelled in accordance with sections 21 or 23 of the Act, which requires public consultation under section 22 of the Act.

Consequently, the water and soil covenant in Appendix A is considerably stronger and has a longer term than the replanting requirement of Appendix C.

Government's East Coast Forestry Project

Following the disestablishment of the Forest Service, and after cyclone Bola, the government initiated the East Coast Forestry Project to continue the process of afforestation for erosion control. This project was subject to reviews in July 2005 and again in March 2014. I was involved in two submissions made by the NZ Institute of Forestry ("NZIF"), the first when I was Vice President, the second when I was President. The following is an extract from the March 2014 submission.

1. Thank you for the opportunity to submit on *East Coast Forestry Project: Proposed Changes to the Operation of the Scheme. MPI Discussion Paper 2014/05*. We would be happy to participate in further discussion or clarification as the opportunity arises.
2. A copy of the submission made by the New Zealand Institute of Forestry (NZIF) to the 2005 review of the East Coast Forestry Project (ECFP) is attached. Most of the issues raised in paragraph 3 of that submission are just as valid today as they were eight years ago, if not more so.
3. NZIF is also concerned that the Discussion Paper claims that the Gisborne District Council and the Ministry for Primary Industries have *made great progress with landowners, and around*

42,000 hectares have been treated to date through the ECFP[8]. Analysis of the data in the discussion document for the 2005 review and in the current Discussion Paper shows:

3.1. The original target set in 1993 was 200,000 ha in 29 years or 7,000 ha/year;

3.2. After eight years 26,000 ha had been treated, an average of 3,250 ha/year;

3.3. The targets were reduced to 60,000 ha at an average of 6,000ha/year in 1993;

3.4. In the next three years 4,096 ha were treated (1,365ha/year);

3.5. The Discussion Paper states that 42,000 hectares have now been treated (this suggests an additional 12,000 ha in the last ten 10 years or about 1,200 ha/year.)

4. In summary, over the last 21 years, the project has only averaged 2,000 ha/year against the original target of 7,000 ha/year. In each period between reviews, actual performance has decreased and targets set have been significantly underachieved. This can hardly be described as "great progress". If the 1993 target had been achieved through the 21 years, 150,000 hectares of eroding and erosion prone land would have been treated by now.

5. We are also very concerned at the findings in a recent report on the success of poplar and willow pole plantings on the East Coast[9]. Amongst the findings of the report are:

5.1. Analysis of poles planted across 36 suites since 2004 indicated 11% died before the year-one establishment inspection and 50-90% before the year-five inspection. This suggests the majority will perish less than 5 years after establishment;

5.2. Stock damage likely contributed directly to the loss of 9% of planted poplar within 24 months of planting and 12% 45 months after planting. Willow planting sustained marginally higher initial losses;

5.3. Poor pre-treatment of poles and poor planting techniques have likely contributed to early mortality within 24 months of planting;

5.4. It is anticipated that many more poles will succumb to continued browsing pressure and will also perish;

5.5. Due to the extremely poor survival rates of the ECFP plantings since 2004 and the lack of blanking (replacement), a significant reduction in erosion susceptibility at these sites is unlikely;

5.6. If the rates of pole loss reported here are typical, the financial implications should be of concern, and the suitability of these plantings to achieve effective erosion control on Land Overlay 3A terrain must be open to question;

5.7. The Ministry for Primary Industries should consider independent audit and sign-off of plantings;

5.8. Regional records of the success/failure of pole plantings are rare, incomplete and generally of less than 5 years duration.

6. NZIF was told during preparation of this submission that the definition of Gisborne District Council Land Overlay 3A land has recently been revised and amounts to around 13,000 hectares. This apparently means that this is the only land that must have an effective tree cover by 2021 under the Council's Combined Regional Land and District Plan. It is unclear whether

[8] Section 1.1, page 4 of the Discussion Paper.

[9] *Survival and Growth of Poplar and Willow Plantings on East Coast Hill Country: a Pilot Study*. Mike Marden & Chris Phillips. Landcare Research Contract Report LC 1622. August 2013.

this new definition of Land Overlay 3A land will affect the land that grants can be allocated to, but if this is the case, we suggest the ECFP should cease immediately.

7. Evidence from the establishment of Mangatu Forest by the NZ Forest Service starting in 1960 and from more recent scientific studies has shown that to control gully erosion it is necessary to start tree planting, not in the gullies, but on the more stable land above and adjacent to the gullies. As the trees grow they reduce the moisture content of the soil and the movement of sediment into the gully. Once trees are well established on the land away from the gully it is possible to establish further trees closer to the edges of the gullies and eventually to plant in the gully. Trying to plant only into the gullies will lead to significant loss of trees and no arresting of further erosion above and to the sides of the gullies.
8. If government is to providing funding to land owners with the objective of using afforestation to reduce erosion on eroding and erodible land, the grant conditions must require the operations to be based on the best available scientific and practical evidence for such work. NZIF submits information available about the ECFP shows this is not currently the case and that public money is effectively being wasted.
9. NZIF submits that the results reported represent a failed policy, questionable governance by officials in monitoring the effectiveness of public spending and a set-back to reducing erosion on the East Coast. We suggest that any government funding for willow and poplar planting should cease immediately.
10. Recent reports of the arrival and rapid spread of the giant willow aphid in New Zealand are also of concern, particularly where government funding is being used to assist the establishment of willow poles on eroding and erosion prone land. This is a further reason for suspending willow pole planting until more is known about the likely impact of this species.

Financing Considerations

It is worth thinking about the way projects of this nature are funded. Establishment of Mangatu involved the government (i.e. the taxpayer) purchasing the land and paying all the costs associated with establishing and managing the forest. The beneficiary of this expenditure was the taxpayer, through protection of downstream infrastructure and livelihoods.

Under the East Coast Forestry Project, the land remains in private ownership. The landowner has obligations for rates, management and protection of the forest and so forth. The project has made some grants to assist with establishment of the forest, but also has to accept a number of constraints on the land. The main beneficiaries of the forest and its erosion mitigation effects are still the taxpayer through protection of downstream infrastructure and livelihoods. The only income the land owner might achieve are from the potential to harvest the forest, likely under significant constraints, and since 2008, the potential to benefit from carbon sequestration credits (if this is not prevented under the conditions of the grants received for establishment). If, as has been occurring in recent years, climate change increases the severity and frequency of extreme weather events and this results in public pressure for further constraints to be placed on the land owner, there is likely to be much less enthusiasm from land owners to undertake afforestation.

What can we learn from the above?

Common themes of from the various reports quoted above (and other reports not mentioned above) is the importance of controlling erosion on the East Coast.

- The scale of erosion was massive and has been described as some of the worst in the world.
- Sediment and floods were causing significant downstream damage to infrastructure and were having a severe impact on agricultural production on the Poverty Bay flats.
- To control the erosion was a task beyond the resources of the local community and needed central government involvement and finance.

There is evidence (for example in the Allsop book) that sediment was a significantly greater problem when the Waipaoa catchment was in pasture. Following establishment of the forest, sediment in the Waipaoa catchment reduced and aggradation had, in some cases reversed to degradation and the river bed started to lower. There is also evidence (e.g. in Waugh quoted above) that the forest reduced runoff from rainfall by 25-35%, meaning less water in river channels.

Allsop mentions (page 23) Mangatu pa and meeting house, originally situated on low-lying land below the confluence of the Mangatu and Waipaoa rivers, that was so badly affected by aggradation and flooding that it had to be moved to higher ground. This would have been before Mangatu Forest was established.

We can conclude from this, that floods and deposition of sediment, along with the need for relocation of a settlement are not something new. We also know they are not something that has been exacerbated by the establishment of forest in catchments previously in pasture. It is those pre-afforestation events that led to conversion of some pastoral land use in the Waipaoa catchment to forest, and that this resulted in a lowering of the impact of extreme weather events.

Primary Objective for reforestation

The primary objective for reforestation on the East Coast by the Forest Service from 1960 to 1986 was to help control erosion. While the possibility of production from the forest is featured, it is always a subsidiary objective, permitted so long as the primary objective is not threatened.

So long as the government was implementing the process, through the Forest Service, observance of the primary purpose could be controlled, at least on the former State forest land. After the Forest Service was disestablished, that control could still be exercised through the protective covenant for soil and water conservation created in the Crown forestry licences.

This is the wording in the covenant:

4. Trees to be Replanted

4.1 Unless the Crown approves otherwise, the Occupier shall replant any stand of trees which it fells in whole or in part on the Covenant Area. Such replanting shall:

4.1.1 Be undertaken during the planting season immediately following the felling;

4.1.2 Be in a manner which will minimise soil erosion;

4.1.3 Be in Pinus radiata.

4.2 The Crown may only give approval under Clause 4.1 to a delay in replanting or to some alternative use of the area so felled or to the replanting of a species other than Pinus radiata if it is satisfied that such delay or alternative use or replanting of a species other than Pinus radiata will not lead to increased soil erosion on the Covenant Area provided that such approval shall be deemed to have been given on the delivery to the Crown by the Occupier of a certificate from the Regional Council stating that such delay or alternative land use or replanting in a species other than Pinus radiata will not lead to increased soil erosion on the Covenant Area. As a condition of such approval the Occupier shall comply with any conditions which the Regional Council may include in its certificate where such conditions relate specifically to the prevention of soil erosion on the Covenant Area.

1 Management Plan Required

The Occupier shall after consultation with the Regional Council prepare general work programmes covering the management of the Covenant Area with specific emphasis on the impact of such programmes on the prevention of soil erosion. The period covered by such programmes shall be as agreed with the Regional Council but shall be no greater than ten years. The Occupier shall revise such programmes before the expiry of the period which they cover and at shorter intervals as may be made necessary by changed circumstances. The Occupier shall provide such work programmes to the Crown upon demand.

2	Prior Approval Required for Roading and Harvesting The Occupier shall prior to the felling of any stand of trees or the construction of any road on the Covenant Area, obtain the approval of the Crown for such felling or construction provided that such approval shall be deemed to have been given on the delivery to the Crown by the Occupier of a certificate from the Regional Council stating that the granting of the approval will not lead to increased soil erosion on the Covenant Area. As a condition of the giving of such approval the Occupier shall comply with any conditions which the Regional Council may include in its certificate where such conditions relate specifically to the prevention of soil erosion on the Covenant Area.
3	Compliance with Statutory Requirements The Occupier shall, in addition to the other terms and conditions of this covenant, comply with any requirements of the Regional Council imposed under any legislation, regulation or bylaw relating to soil and water conservation.

I have no knowledge how well the covenant has worked. There are three parties involved, each with their own responsibilities, the occupier of the land, the Gisborne District Council and the Crown. I would expect the occupier to obtain all the necessary approvals before starting any operations.

I would expect the Council to engage with the occupier if the occupier seeks agreement from the Council and to also monitor operations conducted by the occupier.

I would expect the Crown to ensure it was being asked for necessary approvals, or to receive Council generated certificates where this is an option. I would also expect the Crown to monitor the occupier's operations to ensure the occupier was observing the conditions of the covenant.

Given the over-riding objective of the forest to help control erosion, I would expect action to be taken by the Crown and/or the District Council, in any case where the covenant was not being complied with.

Associated with being clear about the primary objective for any forest are some other considerations:

- It is best to consider management on a catchment basis, rather than following non-natural boundaries such as tenure.
- Geology and topography will have an impact. For example, at Mangatu, earthflows and slumps were common, but I understand further north there are skeletal soils with layers below that impede the depth of rooting. On the skeletal soils, when they are very wet, can just slide down hill taking standing trees and other vegetation with them. It is wise to avoid having too many large trees on such slopes as it adds to the weight and severity of erosion.
- In many situations, radiata has proved ideal for getting an early reduction in erosion. This is because it is fast growing and uses a lot of water. This helps dry out the soil and create a root mass more quickly.
- How will establishment and management of the forest be funded? What income from the forest can be anticipated and what conditions on harvesting and management are likely to be imposed? Can the landowner expect those conditions to continue as climate change brings more severe and more frequent extreme weather events? It is likely that successful and large-scale establishment of forest is going to require significant funding and there will also be an increase in financial risk as severe weather events become more common and more extreme. Apart from damage to forest, local and central government are likely to increase restrictions on forest operations, further increasing the investment risk.

Who is at fault?

There has been a lot of comment in the media about "forestry slash". In forestry circles there has also been discussion about the sort of damage that comes from pastoral land use (particularly severity of rainfall and sedimentation from erosion). There is also comment about homes and other buildings on

flood plains. I am not in a position to attribute any "blame" in this regard, and for me to do so would likely be a breach of the NZIF Code of Ethics.

But what I would say is that if forest operations have been contrary to the conditions laid down in resource consents or other regulations, then those responsible for the breach should be liable in some manner. But I would also expect that operations approved by a government agency would be monitored to ensure compliance. If the authorities have not been monitoring operations, then they are also liable for some of the problems. In this I would include the covenants created by Crown forestry licences over the former State forests. Have the occupiers of the land observed the conditions? Have they obtained approvals from the Gisborne District Council and the Crown? Have the Council and the Crown taken steps to ensure the occupiers have been obtaining approvals as required? If the Crown and the Council have not fulfilled their responsibilities, then they must share some of the blame.

If the operations undertaken by forest owners have been entirely within the conditions set by legislation or regulation, then those who set the legislation and regulation must accept liability. In a similar manner, the same principles must apply to any other land owner/occupier and the authorities that govern such use.

Native forest v pine trees

Where the prime objective is reduction in erosion, it is becoming more common to suggest reversion of the land to native vegetation (and is something I favour). However, for large establishment programmes and particularly where there is a need for rapid action, the slower growth of native species and the costs are likely to be an issue. Some considerations for establishment are likely to be:

- Slower growth (so taking longer to develop good root structure, slower accumulation of carbon credits – if available).
- Higher cost of establishment.
- The need to control browsing animals. I understand there are significant populations of deer, goats and other browsers on the East Coast. Without very significant reduction in numbers of these animals, there are likely to be heavy losses of natural regeneration and/or planted stock.
- One possibility is to start with establishing radiata and then manage that to transition to native vegetation. Native vegetation needs light (so frequent reduction in competition from the pine trees is going to be needed), nearby seed sources (so protect any regeneration, and consider planting native species when there is no nearby seed source), protection from browsing animals. While I believe that transition is entirely feasible if actively managed, there is a lot of scepticism from others.
- More risk and lower returns to the land owner, making a much less attractive land use option.

The case for managed retreat of land uses

There has been a lot of comment after Cyclone Gabrielle of the need for New Zealand to start taking managed retreat more seriously. I am fully supportive of that need. But I also suggest we should be looking at managed retreat of land use.

In the case of the East Coast, the creation of the State forests starting with Mangatu in 1960, was a form of managed retreat. This involved the government purchasing severely eroding pastoral land, occupying most of the upper catchment of the Waipaoa River and establishing Mangatu Forest. In doing so, the government "compensated" the then occupiers through the purchase. The government funded the establishment and management of the forest. The beneficiaries were the down stream infrastructure and land occupiers. Effectively it was a circular situation where the taxpayer funded the forest and the taxpayer received the downstream benefits.

At the same time, the Taylor report (see earlier) had recommended that over 200,000 acres (81,000 ha) of the "critical headwaters" should be converted to forest.

This circle was broken by the mid-1980s decision of government to privatise the State forests. Following that, private owners were being encouraged to embark on afforestation of their property.

While there was some funding assistance for this, the owners were not receiving a direct benefit from their investment. It became a more risky investment, and recent events have further increased the risk of being a forest owner.

A managed retreat of land uses would probably see establishment of more native forest, transitioning of some exotic forest to native forest, but also use of exotic forest in particularly critical areas in order to benefit from the rapid growth and water use of such forest to hasten erosion reduction, establishment of more production forest, but probably with some more constraints, and retirement of pastoral farming on erosion prone country. It would probably require some zoning of land based on soils, geology, topography, etc., into what land uses might be permissible in each zone. It would also accompany managed retreat processes for infrastructure, buildings, etc., in catchments included in such a scheme.

But it would also need to be properly funded. Affected land owners will need to be compensated for loss of value.

This is not an easy project, it is complicated, but it is also highly desirable if we are not to have more repeats of the flooding and erosion in the Waipaoa catchment pre-1960, the damage from cyclone Bola in 1988, and the more recent damage from Cyclone Gabrielle.

BACKGROUND AND EXPERIENCE OF SUBMITTER

I graduated with a BSc in botany from Victoria University of Wellington in 1966, a Bachelor in Forestry Science from Aberdeen University (Scotland) in 1968 and a PhD in forestry from Canterbury University in Christchurch in 1976.

Membership of professional and related organisations includes:

- A student and then associate member of the New Zealand Institute of Forestry Inc (NZIF) from 1966, a full member from May 1972 and a registered member since March 2000. I was elected a Fellow of the Institute in 2008, was a member of the NZIF Council from 2003 to 2004, Vice President from 2004 to 2008 and President from 2008 to 2014. I chaired the NZIF Foundation from 2011 to 2022 and have been an elected member of the NZIF Registration Board since 2016.
- A member of the National Exotic Forest Description Steering Committee, as a representative of the New Zealand Forest Owner's Association, from 1988 to 1997 and Chairman of the committee for most of that time.
- A member of the NZ Ecological Society.
- A trustee of Tane's Tree Trust from July 2007 till 2012 and joint patron (with my wife) since early 2022.

Awards and honours

- NZ Institute of Forestry "Forester of the Year" 2005.
- NZIF Fellow, 2008.
- NZIF Kirk Horn Award 2014.
- Appointed Officer of the NZ Order of Merit (ONZM) for services to NZ forestry, New Year Honours 2016.

I was employed by the New Zealand Forest Service from January 1962 until the disestablishment of the department on 31 March 1987. During that time I held the following positions:

- Forester trainee between January 1962 and July 1968.
- Forester in the Southland Conservancy Office in Invercargill from July 1968 until December 1970.
- Scientist in the forest mensuration research field with the Forest Research Institute in Rotorua from January 1971 until January 1982. I was leader of the research field from May 1980 until January 1982.
- Director EDP for the Department, based in the Head Office in Wellington from January 1982 until March 1987.

- Between September 1985 and February 1986 I was seconded to the "Environmental Administration Reorganisation Secretariat" within the State Services Commission.
- In July 1986 I was seconded to the Establishment Unit of New Zealand Forestry Corporation.

From 1 April 1987 until 30 September 1999 I was employed by New Zealand Forestry Corporation Limited, later called Crown Forestry Management Limited. My positions with that company were:

- Corporate Planning Manager, April 1987 to December 1988. During this time I was actively involved in negotiations with The Treasury on the value of the former State forests that were scheduled to transfer to the Corporation.
- Manager, Legal & Policy, Asset Sales Group from December 1988 to November 1990. I covered the full range of activities associated with the sale of State forests including negotiation with Māori leading to the Agreement between Crown and Māori in July 1989, the drafting of the Crown Forest Assets Act 1989, drafting of the standard form of the Crown forestry licence and negotiation with Māori over this document, drafting other sale related documentation, preparation of due diligence data and preparation of actual sales agreements with successful purchasers of Crown forests including individual Crown forestry licences.
- General Manager Asset Sales from December 1990 to September 1996. Activity included preparing forests for the sale to Rayonier in May 1992 including due diligence data, sale documentation etc. Arranging completion of actions from 1990 forest sales including registration of Crown forestry licences.
- General Manager, Operations from October 1996 to September 1999. Activities include supervision of forest management, completion of outstanding matters for forests sold in 1990 and 1992, preparing assets for sale and negotiating sales, advising other government departments (Office of Treaty Settlements, Treasury, Land Information New Zealand, Crown Law Office) on various matters relating to Crown forest land, a member of Crown teams negotiating the forestry part of the Ngai Tahu and Ngāti Awa settlements and project manager for implementation of the forestry section of the Ngai Tahu Deed of Settlement.

From October 1999 I was a private forestry consultant. I continued with work for the Office of Treaty Settlements on the implementation of the forestry section of the Ngai Tahu settlement and was involved in a number of other Treaty of Waitangi claims affecting Crown forests. I have been engaged by a number of Crown entities for advice and assistance with Crown forestry issues including the Ministry of Agriculture and Forestry, Land Information New Zealand, The Treasury, Crown Forestry Management and the Crown Law Office.

I am now retired from seeking paid work but continue to be actively involved in forestry activities on a voluntary basis, through NZIF and Tane's Tree Trust.

In summary my relevant experience includes:

- Knowledge of forestry at a professional level.
- Long term employment in the former New Zealand Forest Service.
- Detailed knowledge of the corporatisation and privatisation of the former State forests.
- Knowledge of the Treaty of Waitangi claim process and of a number of settlements involving forestry assets.
- Active participation in the NZ Institute of Forestry.

Photopoints

Photopoint name:

A-ppt01

Location:

Yellow tag on tree trunk, pink tag on centre of frame, walk into bush on RHS from clearing.

Date:
2011-06-16

Date:
2023-03-27

Photopoint name:

A-ppt02

Location:
Yellow tag on old cabbage tree, On fence side of tree.

Date:
2011-06-16

Date:
2023-03-27

Photopoint name:

A-ppt03

Location:
Yellow tag on cabbage tree, same as ppt02

Date:
2011-06-16

Date:
2023-03-27

Photopoint name:

A-ppt04

Location:
No tag, stand on hillock on left of approach to covenant in front of water tanks, looking towards stile.

Date:
2013-09-01

Date:
2023-03-27

Photopoint name:

A-ppt05

Location:

Walk towards north fence slightly NE direction, Use GPS to find point at 3 large pukatea. Stand 4m from most northerly one on SW side

Date:
2013-09-01

Date:
2023-03-27

2011

2013

2015

2017

2019

2021

2022

2023

Background

Pan Pac Forest Products Limited (Pan Pac) has been growing sustainable forest products for more than 50 years in Hawke's Bay. Pan Pac provides an excellent template for integrated forestry operations, demonstrating the benefit of domestic processing of forest products. The company manages forests in the Hawke's Bay region (including Wairoa) and operates a sawmill and pulp mill facility at Whirinaki, north of Napier. Pan Pac also operates a sawmill facility in Milburn, Otago.

Integrated forestry companies like Pan Pac can contribute significantly to the economic, social, environmental, and cultural wellbeing of a region. A report by BERL (2021) found that Pan Pac contributed 6% to Hawke's Bay's GDP. Its estimated labour productivity (GDP per FTE) is almost $265,000. By comparison, GDP per FTE in the Hawke's Bay economy as a whole was approximately $109,000.

Wairoa District

Relevant to this enquiry is the 16,000+ hectares of forest that Pan Pac manages in the Wairoa District. Most of this area is on land owned by Ngāti Pāhauwera, which is ex Crown Forest License planted in the 1960s. Much of the forest area is in second or third crop rotation. Pan Pac contributes significantly to the Wairoa economy, both through its forestry activities and as a major ratepayer. Pan Pac's rating contribution in the Wairoa district is approximately $550,000 (annually). Since 2021, Pan Pac has received an 86% increase in rates through the Wairoa District Council, which has targeted forestry as a land use to provide a significant share of the district's rating income.

Sustainable forest industry

With support from central government, there is an opportunity to develop a more sustainable forest industry in Tairāwhiti and move away from an export-dependent model with little opportunity for value add within the region.

In addition to domestic processing, a sustainable forest industry could utilise woody debris to the benefit of the community.

Pan Pac's manufacturing site in Whirinaki incorporates a thermal mechanical pulpmill and two biomass boilers that combined use over 600,00 tonnes of woody biomass in the form of pulplogs and binwood for pulping; and forest offcuts, bark, sawdust and community woody waste streams for boiler fuel annually.

Pan Pac's pulp and binwood specifications do not require logs to be cut to length reducing forest offcuts and also require a significant portion of forest residues to be extracted from the cutover and off the landings (on the cutover any log greater than 2.6m length and SED greater than 10 cm is required to be extracted; from the landing any log greater than 0.8 of a metre is required to be loaded out). Pan Pac also runs a long stem operation for parts of its logging operations meaning trees are only partially processed in the forest, this allowing for slovens and other offcuts to be removed at its Whirinaki site.

Post-operations assessment includes Wagner waste assessment, an industry standard assessment for assessing residue waste on cutovers.

Additionally, treated timber trials are being investigated with support from the Waste Minimisation Fund to explore opportunities to reduce waste to landfill in the region.

Pan Pac requests the opportunity to be interviewed to discuss this submission in further detail.

Section 1: Impacts and Experiences

There is **one** question that can be answered within section one.

In this section we are seeking to understand how you have been affected during severe weather events.

This could include personal effects (such as on your home, your ability to access services, and disruption to your life), or could include effects on the organisation you represent (such as a business, trust, Infrastructure provider, or charity)

1. Tell us about your experience during Cyclones Hale and Gabrielle? What effects have you experienced?

The Pan Pac site at Whirinaki, which includes a lumber mill and a pulp mill, was inundated with water during Cyclone Gabrielle. This resulted in severe property damage, with the site covered in 0.5 metres of silt in most places. However, no staff were injured onsite. Pan Pac is a 24/7 operation, and the Executive team made the decision to cancel the night shift on Monday 13 February due to the impending cyclone. Thankfully, only a skeleton crew of around 8 people had to spend the night onsite, these staff remaining on site were safely evacuated immediately following the cyclone.

Figure 1. Pan Pac Whirinaki Mill site photographed on 24/02/2023

Tree Crop

In the Wairoa district, from our initial assessment Pan Pac has potentially lost over 1,050ha (7.6%) of productive area. This is made of approximately 55% slips and 45% windthrow with the majority being in 9 to 14 year old trees. Some of these trees that have been mobilised by slips and have ended up beyond the forest boundary.

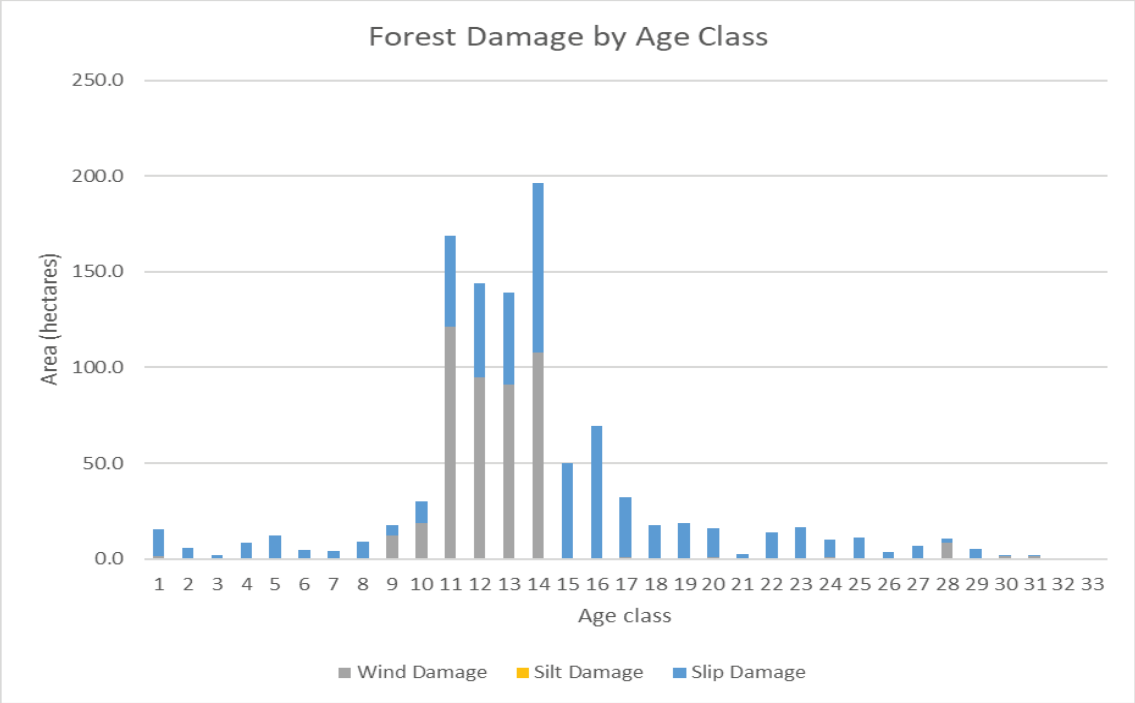

Figure 2. Forest Damage by Age Class in Net Stocked Area

Figure 3. Slip damage in a 14 year old stand

Figure 4. Windthrow damage in an 11 year old stand

Generally, our older age classes have experienced less damage from Cyclone Gabrielle.

Figure 5. Northern end of Anaura Block – mature 24 year old stand

Roading Infrastructure

As most of the forests are second or third rotation, the roading infrastructure has been established for harvesting operation for a long time. Overall, it has stood up well to storms and cyclones over the decades. However, this has not been the case with Cyclone Gabrielle, which has caused significant damage due to the sheer volume of water overwhelming the land, roads, bridges and culverts resulting in slips, dropouts and large culverts washed away. Generally, forest landings have been in reasonable condition.

Section 2: Causes

There are **three** questions that can be answered within section two.

In this section, we are seeking your views on how land use has contributed to the size and scale of the impacts of severe weather.

2. What is it about the way we use land, and how land use has changed over time that led to the effects being so severe?

Urban and rural intensification and inappropriate spatial planning in Wairoa has resulted in poor land use decisions made without sufficient forethought and advice. This issue has exacerbated the impact of the cyclone event, with communities being displaced due to a lack of resilience.

In terms of river management, many rivers have been redirected and their natural riparian zones have been lost, which, coupled with the influence of climate change, has resulted in inadequate flood control measures. Existing infrastructure (including lifeline infrastructure) has been engineered to a design standard that was exceeded by Cyclone Gabrielle. Further, the design and associated return period has often ignored the impact of climate change on the scale and intensity of weather events like Cyclone Gabrielle.

Post-Cyclone Bola, extensive afforestation was conducted to reduce the amount of future erosion in a planned and considered land management approach based on the available information at the time. However, the mass planting of trees in steep erodible country has created a challenge for forest management and the forest industry. Woody debris being carried off the slopes during extreme weather events has been a common occurrence in New Zealand's history and this impact is not specific to plantation forestry.

Afforestation of land in response to soil conservation issues and to manage sediment loss from steep erodible land is still considered best practice. Unfortunately, for Tairāwhiti this challenge is a significant issue with such a large portion of land in the region being steep and highly erodible.

3. Are there specific practices or ways in which we use the land that have caused more harm than others? Which of these practices are most important? Why?

The use of land in Tairāwhiti includes a significant portion of production forestry, which as discussed earlier is due to the response to Cyclone Bola and soil conservation issues at that time. The inquiry will need to ensure that woody debris is effectively categorised to ensure that there is a good understanding of its origin. Woody debris that has impacted the community as a result of production forestry harvest activities and poor practice will require a different response compared to woody debris that has been mobilised as a result of mid rotation slope failure. There is a trade-off that must be acknowledged when the impact of woody debris is considered vs. the impact of soil erosion from land without tree cover and the associated deposition of silt.

4. Is there anything else we should know about that has contributed to the damage from severe weather?

Hawke's Bay Regional Council (HBRC) rainfall figures show this was one of the most significant weather events on record. Cyclone Gabrielle delivered 281.2mm of rain to the Kotemaori site over the 13th and 14th of February. While this shows how significant the intensity of Cyclone Gabrielle was, the previous month also had heavy rainfall with Cyclone Hale. The Kotemaori site has had 921.8mm of rain for the first two months of the year – this is over 50% of last year's rainfall at the site already. Following on from a wet winter and a wet summer, saturated soils gave way.

Section 3: Policy framework, including Legislation, Market settings and Regulations

There are **two** questions that can be answered within section three.

In this section we are seeking your views on the laws, policies and rules that influence the way our land is used.

5. How do the current laws, policies and rules influence the way we use our land? What works well? What is unhelpful? Think about the current legislation, market drivers and conditions, regulations, rules, and the way in which requirements are enforced.

For a long rotation crop such as forests, the effects of 'new' regulations in the National Environmental Standard for Plantation Forestry (2017) (NES-PF) may not be visible in the short term. Some changes will take a long time to flow through, as blocks planted pre-NES-PF are harvested and re-planting is conducted in accordance with the requirements of the NES-PF and current best practices.

Added administration can sometimes be unhelpful and result in a 'tick-box' exercise when the primary focus is on meeting regulatory requirements rather than achieving genuine environmental benefits. This can result in minimal gains for the environment and can even lead to unintended negative consequences, such as increased bureaucracy and costs.

To effectively implement and enforce the NES-PF and the Resource Management Act (RMA) requirements for forestry, there is a need for greater levels of support to be provided to the councils. While industry, local councils, and central government invested significant effort in developing the NES-PF, the same level of effort and resourcing was not applied to its implementation.

Market drivers, such as the cost of cartage for binwood also plays a crucial role in removing more woody material from the cutover. A local market for extra fibre (binwood and forest residues) in Tairāwhiti is essential to reduce the future risk from woody debris. Government support is likely necessary to support the development and implementation of a local market for forest residues in Tairāwhiti.

6. Anything else you would like to say about the current policy framework?

A comprehensive review has recently been conducted pertaining to the NES-PF. The changes resulting from this review are yet to become operative. Any future review as a result of this inquiry should consider the amendments already proposed to the NES-PF prior to the severe weather events that impacted Tairāwhiti.

When considering the obstacles to developing a sawmill, pulp mill, or processing facility in Tairāwhiti, a significant factor is that the RMA is not conducive to large-scale industrial development. Therefore, the Government may need to override the RMA to facilitate the utilisation of woody biomass and fibre in Tairāwhiti. Currently, the RMA and the uncertainty it creates for investors represents a significant barrier to the large-scale development of a forest products or processing facility in Tairāwhiti.

Section 4: Solutions

There are **four** questions that can be answered within section four.

In this section, we are seeking your vision for the future about the way we use our land in Tairāwhiti, Tūranganui-a-Kiwa, and Te Wairoa.

7. What is your vision for the future of land use in the region?

As the community recovers from the impact of the Cyclone, it is essential that efforts are directed towards enhancing regional resilience, by taking into account lessons learned and using them to inform improvements.

For example, it is important to acknowledge that when a catchment area is predominantly covered by forest, whether it is native or exotic, during major storm events such as Cyclone Gabrielle there will be mid-slope failures again, no matter what controls are put in place. Bridge construction must be designed according to surrounding land use. River management will become increasingly important as climate change persists, with stopbanks designed for more severe weather events and constant clearing of river beds and river mouths key requirements across the region.

An opportunity for positive investment in future proofing infrastructure and enhancing connectivity is the State Highway 2 Waikare Gorge realignment project. The project already has two alternate routes planned that aim to minimise hazards on the road and now is the time for fast tracking the project timeline.

Sustainable forestry benefits the community, industry and environment. Wairoa is a district that needs investment, large-scale native plantings and a biofuel hub to diversify and benefit the local economy.

8. What do we need to do to achieve this vision?

Please think about:

-
    - Immediately? (in the next 12 months)
    - In the short term? (next 1- 2 years)
    - In the medium term? (3-5 years)
    - In the long term? (10+ years)
    - Far into the future? (30 - 100 years)

Immediately

- Retire high-risk areas. This will carry on into the short, medium and long term as areas to be retired are in different stages of the rotation. Flexibility is important here.
- A Government taskforce into recovery and long-term sustainability for the area would be highly beneficial.

Short term

- A local fibre solution is a key step in the recovery and will significantly reduce residues left in the forest. This will involve collaboration between industry and Government (i.e., access to the Waste Minimisation Fund). Establishing a residue solution will also benefit the community through providing employment.

Far into the future

- Transition unsuitable areas to native where practicable. Extensive research is needed on this topic to ensure success in a range of sites. There is no evidence yet to suggest a transition would be suitable on marginal sites that could be retired. Pan Pac supports the need for more research in

this area, with a Pan Pac employee currently completing a PhD on transitional forestry management. Designing compensation for the retiring of land would also be beneficial, as this land often has Old Man Pines that are difficult, dangerous and costly to remove.

9. Is there anything that shouldn't be changed, for example, things that if changed would make it worse?

Drastic land use change away from forestry would have perverse outcomes. New Zealand needs to think long term and manage land use in a sustainable manner to avoid repeating the past mistakes made following Cyclone Bola.

10. In your view, which groups need to be involved in developing solutions and what is the best way for these groups to be involved?

Central government support and resource are required to support the design and building of more resilient communities. Significant and long-term underinvestment in regional infrastructure has exacerbated the impacts of Cyclone Gabrielle. In some cases, bridges and civil infrastructure that failed had been in service for 100+ years. These assets were designed based on the standard at that time. Design standards must be set more appropriately to account for these extreme weather events and the added intensity that comes with them due to climate change.

Pan Pac supports the submissions from New Zealand Forest Owners Association (NZFOA) and Hawke's Bay Forestry Group (HBFG). These groups should be heavily involved in developing solutions, as they both have the industry expertise and experience that is required. Iwi landowners own much of the land under forests, so their involvement is key in developing these solutions.

In addition, Scion, MBIE, MPI, and MFE should be involved in creating a biofuel and forest residues market in Tairāwhiti.

Hello Hekia, Bill & Matthew.

Thank you for this opportunity to voice our concerns.

We have been battling our local council, Mayor and C.E.O. for nearly ten years in an effort to expose how easy it was for a ex Council senior staff member in Policy & Planning to manipulate the District Plans Objectives and principles and distort the RMA rules around Land use in Tairawhiti.

At a time when La Nina and El Nino extreme weather events are a becoming more regular and with intensity like Cyclone Gabrielle.

We are focusing upon a particular ex Staff member being granted consent upon their remaining Rural Residential land within their new subdivision to fell native bush thus clearing the way for them to establish a commercial pine forest (on land designated for future Urban development). Which currently has been left unattended assuming now it is for carbon credits alone. Not registered on the NES-PF.

Thus breaching the Principles and Objectives of the District Plan notwithstanding the R.M.A sec 95 process for Change of Landuse where a permitted activity can be challenged.

All contrary to how they promoted their rural lifestyles subdivision. In our instance, we now have this forest a mere thirty meters from our doorstep instead of native bush promised to be left in legacy for future generations on their marketing material.
El Nino extreme weather events further exposes us to firestorms and notwithstanding trees falling onto homes (as in the Taupo with Cyclone Gabrielle).

We are also testing the Councils protocols and processes when staff apply for such consents, Staffs ethics and integrity.
It outwardly appears that staff have been able to circumvent this normaly robust process. Staff benefitting staff to the detriment of it's citizens. These individuals would have been very aware of the negative consequences that would ensue though choose not to enact due diligence and best practice. As these repercussions continue to compromise this once beautiful neighbourhood.

At present it would be nigh impossible to attain a fair market value given the proximity due to the associated fire risks, as pensioners a retirement village had been the aim, though this has impacted us tremendously our financial situation now calls for a difference strategy.

These senior staff members have erred and as a consequence placed a number of established properties at a far greater risk of fire.

Original documentation from G.D.C states this land was to remain in grazing, an assurance to all prospective purchasers that this would remain in situ.

This was despite numerous landowners within the development vehemently opposing the change to Senior Council Staff prior to consent being granted.
These staff members effectively eroded our right of appeal and a voice to contest this most unusual U turn in councils ethos.

NO Assessment of Environmental Effects was undertaken (attached).

We again face off with a Council willing to place its citizens in an unenviable predicament that has the potential to claim lives, especially in light of the increasing fire storms being encountered in New Zealand with extreme weather events.
We are grappling with how G.D.C is comfortable gambling with our lives especially in light of how Mayor Stoltz promoted heavily in her reelection campaign , the values of Accountibility and Transparency. This certainly rubs salt into all of these wounds.

All the relevant documentation is available should it be released though as we suspect it would be particulary damning in respect to how we arrived at such a precarious situation.These people are doing their utmost to conceal the bookwork or lack of.
We should be able to entrust these officials to act accordingly regardless of how breaches and wrongdoing emanates. A duty of care beyond staff misappropriation. This Council is acting as a Law unto themselves.

We were, like many others attracted to this subdivision due to the environmental preseravation attitudes exposed by the Developers. Bush like surroundings, wonderful views. All of these inducements resonated and no doubt helped convince Council to approve such a subdivision. The Gisborne Herald also ran an item focusing on how both Wihtheld and Partner With aspirations to develop the wildlife ,natural heritage based subdivision.

We over time have developed our entire section with complimentary plantings similar to how this was publicised. So to learn of the developers intent to convert to a commercial pine plantation left us all in disbelief and facing a undetermined future.

Further insult came by way of the developers, should we wish to retain these views we would need to present an offer to purchase their remaining land . As it so happened they suggested a starting figure currently at 500% above the G.V. (paperwork available if required).

Councils decision to grant consent to these people actually gave strength to their extortionate demands!! The reason we are all in this situation is that we would never succumb to such a level.

We approached the local fire chief Withheld at F.E.N.Z and were fortunate to have him come on-site to witness firsthand our dilemma. Consequently, he organized a regional case scenario on our property to best illustrate how to evacuate the subdivision since being on a no-exit road, poor cellphone cover, high wind zone, hilly topography, no street lights, and the potential to be completely surrounded by forestry if this current trend continues.

F.E.N.Z being of a non-political stance was still alarmed at the circumstances we are having to face in case a firestorm erupts.

We were also fortunate to have Kiritapu Allan and Withheld visit in September. Both concerned by the proximity of the forest to our home for all the obvious reasons.
The topic of wellbeing and physiological health was also raised, without doubt this is impacting our lives though no-one is listening.
Consequently Kiri has forwarded our situation onto Keiran McAnulty for further assessment since the Cyclone Gabrielle storm.

Sadly the situation now being experience on the East Coast is very serious and frankly beyond the capabilities of the current administration of G.D.C and personally I feel to engage highly skilled individuals like they have in Tauranga with a Commissioner would be a very prudent option to exercise.

The current attention being cast upon the Tariawhiti district also exemplifies just how life-threatening situations can be overlooked until lives are lost.
This Council is sitting on their hands as they gamble with our lives. We are in a deadlock situation with people in prime positions to act accordingly and offer up a pragmatic and amicable resolution.

Especially in light of the Council's recent news item where they are unable to address the critical shortage of suitable land for housing development in a time of Climate Retreat. We sit in a Rural Resdiential zone to be retained for quality urban development according to Policy in the District Plan.

We would be honored to host you Hekia , Bill and Matthew on site as this would best illustrate exactly our plight, as we are living with this issue twenty four seven.
Without question like so many affected people in the Tariawhiti region have been battling an unwilling authority for Justice to prevail.
Withheld have captured attention of the New Zealand public as we desperately need help in our region. We too are angry as this is certainly affecting our safety and wellbeing.
We would very much like to see a more holistic approach to mitigating the anomalies that presently exist with this property. The removal of the pine forest and replaced with natives where applicable.
The land previously was suitable grazing so a combination that best reflects its ability long term.

Ultimately we wish to see this forest go and covenants befitting the surroundings be implemented as it was marketed. Only then do we get our lives back.

9year old pines

PROPERTY INFORMATION

"Kauri Park", Gaddums Hill Road, BAYLEYS

INTRODUCTION

Work has begun on "Kauri Park" at the top of Gaddums Hill Road. The sub-division features 10 lifestyle blocks set in park like surrounds with breath taking views. Developer Withheld says that while there aren't any Kauri trees on the property at present he wants to establish 100 Kauri trees over the next two years. "It's about complementing the native bush that is already there and leaving a legacy for future generations"

Each of the one hectare sites has views across the Manuka covered valley and out to the ranges. Five of the sites feature sea views looking out over Wainui with two sites also looking back over Poverty Bay. "All this and only five minutes to town – it's pretty much country living in town"

The Developer who owns the a further 50 hectares of land beside the sub-division wants purchasers to fully enjoy the park-like lifestyle. On this basis he is granting access for purchasers to walk the farm track which meanders through the Manuka and a new forestry planting of Redwoods, Kauri and Macrocarpas. The track finishes at the popular 'hole in the wall' swimming spot. "The farm track is a pleasant walk that will allow purchasers to further enjoy the property"

PROPERTY DESCRIPTION CONTINUED

Services: Power and telephone will be supplied to each title. The owner is happy to work with purchasers to help minimize cost of services to each site using his project suppliers.

Building Sites: Will be established on each title on sites that have proven Geotechnical capability. The purchaser shall be responsible for final Geotechnical and other building consents once home positioning and design has been finalised.

Land Covenants: The vendor will establish a modern and well designed subdivision and having a tidy and attractive presentation. On this basis he has created sensible covenants to protect the ongoing value of Kauri Park as a whole and the individual value of your property. Talk to me to discuss these.

General: The remaining 50 hectares is being developed as an attractive rural setting with the development of Kauri Trees and Redwood forests to augment the many native plantings already on the property.

The vendor encourages the enjoyment of this area by title owners. Walk the farm tracks through these areas to the Waimata River on the bottom boundary.

RCAPP

GISBORNE DISTRICT COUNCIL

Resource Consent

Application Form

Pursuant To Section 88 of the Resource Management Act 1991

Rec'd GDC	/ /20	
Rec'd SO	/ /20	
Rec'd ADM	/ /20	
Deposit Paid	$	/ /20
Category		Scan, Edms No. 298802
Officer		

Application Number(s): RC-105783

DEPOSIT CHARGES - Deposit amount to be paid before consent lodged. A deposit is not required for regional consents.			
Landuse	**Non notified $600.00**	**Notified $3000.00**	**Balance to be charged or refunded on a time and material basis**
Subdivision	**Non notified $900.00**	**Notified $3000.00**	

Completing this form

This form provides us with your contact details, and details about your proposed activity and its actual and potential effects on the environment. Note that all the information provided in your application is available to the public. We recommend that you talk your proposal through with Council staff **before** you fill in this form. You should contact us if you are not sure which form to use, or if you need help filling this in. **It is important that you answer all questions fully.**

Contact details (Applicant(s) name and address)

Surname: 9(2)(a) First name: 9(2)(a)

Second name: 9(2)(a)

Address: 9(2)(a)

Email: 9(2)(a) Fax:

Service name and address for contact during the application process (if different from above)

Surname: First name:

Second name: Daytime phone:

Address:

Email: Fax:

Daytime telephone number: Email address:

Billing name and address for invoices and annual charges (if different from above)

Surname: First name:

Second name: Daytime phone:

Address:

Email: Fax:

Property owner's name and address (if different from above)

Surname: First name:

Second name: Daytime phone:

Address:

Email: Fax:

Location of the activity

Property address (*rapid number and road name*): Goddams Hill Rd

Map Reference NZMS 260: Property Valuation Number:

Legal Description:

Describe the location as fully as possible: Refer attached map.

Fitzherbert Street PO Box 747, Gisborne 4040 • PHONE (06) 867-2049 • FAX (06) 867-8076 • EMAIL: service@gdc.govt.nz • www.gdc.govt.nz

Detailed description of the activity or works proposed

I/we apply for resource consent for the following activity/development:

Fell scrub which is mainly manuka, barberry, and blackberry for commercial forestry planting of Pinus radiata, Juglus Jemprivirens, Cupressus lusitanica. This is in accordance with planting of 3A overlay land. Land area is highlighted on attached map. (Continue on separate sheet if necessary)
Planting will occur the winter after each area is felled.

Type(s) of resource consent(s) required for this proposal

What type(s) of resource consent(s) are sought? Landuse Consent ☑

Coastal Permit ☐ Water Permit ☐ Discharge Permit ☐ Subdivision Consent ☐

Do you require any other resource consents in relation to this proposal? Yes ☐ No ☐

If yes, please indicate the type and whether these have been applied for and/or determined:

Please note: If you require more than one type of consent, it is possible to apply for all of your consents in one application. Please discuss this possibility with the relevant Council officers.

Consultation

Have you consulted with Iwi? Yes ☐ No ☑

If yes, who have you consulted?

Who else have you consulted?

Did they have any concerns?

How have you addressed these concerns?

Approval of potentially affected parties

I/we have obtained written approval of all parties deemed to be potentially affected by the proposal. The completed approval forms and copies of the plans signed by the potentially affected parties are attached to this application. Yes ☐ No ☐

Please Note: *Council ultimately determines which parties are potentially affected by your proposal. Please discuss with Council Planning staff the approval(s) that are required.*

Notification

I/we request that this application for resource consent be considered on a **~~notified~~/non-notified** *(delete one)* basis. *Please discuss the implications of notification with Council planning staff if necessary.*

Fitzherbert Street PO Box 747, Gisborne 4040 • PHONE: (06) 867-2049 • FAX (06) 867-8076 • EMAIL: service@gdc.govt.nz • www.gdc.govt.nz

Assessment of environmental effects (AEE)

(Please see the checklist for applicants on page 4 for guidelines on how to prepare an AEE)

- Visual amenity - only temporary until trees grow.
- Soil resource - this will be left for the land as will provide greater land stability and stock will be excluded for several years.

No land is also scattered in manuka which has open gaps not requiring planting per the bylaw of 3A overlay land.

(Continue on a separate sheet if necessary)

Signature

I hereby certify that, to the best of my knowledge and belief, the information given in this application is true and correct. I undertake to pay all actual and reasonable application costs* incurred by the Gisborne District Council.

Signature of the Applicant: _____ Date: 29 - April, 2013

(Or agent authorised to sign on behalf of the applicant)

* Unless otherwise stated in any District or Regional Plan:

- The Gisborne District Council charges for the determination of Resource Consent applications. **Deposit amount to be paid before consent lodged.**
- Charges are calculated on a full recovery basis including disbursements, based on the standard hourly charge-out rate as specified in the current Fees and Charges.
- Balance to be refunded or charges are invoiced following the determination of the application.

Fitzherbert Street, PO Box 747, Gisborne 4040 ▸ T: (06) 867-2049 ▸ F: (06) 867-8076 ▸ E: service@gdc.govt.nz ▸ www.gdc.govt.nz

Conservation Section

Contains Crown Copyright Data - Sourced from Land Information NZ
Orthophotography - Terralink International 2005 Ltd.

Scale 1:4,000

proposed area for planting in trees

Highlighted not filled in by applicant:

Checklist for applicants

You need to provide the following information with your application for resource consent?
If any of the items are not included in your application, Gisborne District Council may determine that the application is incomplete and return it to you, or your application may be put on hold until the necessary information is provided.

Incomplete
(Office use only)

- ☐ **Certificate(s) of Title for the subject site.** (Less than one month old) ☐
- ☐ **Statement of proposal.** (Provide full details of the nature and scale of the activity or development) ☐
- ☐ **Location plan (scale 1:500) or aerial photograph (scale 1:500).** ☐
  (Showing the physical location of the subject site in relation to adjoining streets/roads and sites.)
- ☐ **Site Plan including** (if applicable to your proposal): ☐
  - ☐ North point
  - ☐ Title or reference number
  - ☐ Date the plans were drawn
  - ☐ Topographical information
  - ☐ Buildings on adjacent sites
  - ☐ Road frontages
  - ☐ Natural features, including significant trees indigenous vegetation and watercourses
  - ☐ Earthworks design and contours
  - ☐ Existing and proposed landscaping
  - ☐ Existing and proposed carparking areas
  - ☐ Site coverage calculation
  - ☐ Certificate of Title boundaries
  - ☐ Details of any signage (sign design, dimensions and location on building(s)
  - ☐ Location of existing and proposed buildings and/or proposed building alterations
- ☐ **Elevation plans and floor plans (scale 1:50/1:100) of all structures to be constructed or altered, showing relationship of proposed buildings, including:** ☐
  - ☐ The natural ground level;
  - ☐ Existing and finished ground levels;
  - ☐ Maximum building height and relevant height plane angle(s).
- ☐ **Assessment of Environmental Effects (AEE)** ☐

  An AEE is an essential part of the application and must be made in accordance with the 4th schedule of the Resource Management Act 1991. If no AEE is provided Council cannot assess the application. The AEE should discuss **all** the actual and potential effects of your proposed activity or structure on the environment. You may need to consider the following matters in your AEE:

  - Visual amenity
  - Noise/dust/odour/glare
  - Natural heritage including ecological values
  - Traffic/pedestrian safety
  - Natural hazards
  - Soil resource
  - Cultural heritage including heritage buildings, archaeological sites and waahi tapu areas
  - Character/amenity of the area
  - Privacy/peacefulness
  - Traffic movements
  - Other activities in the area
  - Landforms

  The amount of detail provided must reflect the scale and nature of the effects. For example, if there are major effects arising from the proposal, a detailed analysis and discussion of these effects should be included in the AEE. It may require the provision of information from specific experts such as a traffic engineer. If the effects of the proposal are very minor, then a less detailed AEE can be submitted. Council has information available to assist you prepare the AEE – please contact us if you have any questions.
- ☐ **Written approval from all affected persons** ☐
  - ☐ Signed plans and affected persons approval forms are attached to the application.
- ☐ **Preliminary plan (subdivision consents only), including:** ☐
  - ☐ The position of all new boundaries
  - ☐ The areas of all new allotments
  - ☐ The locations and areas of all new reserves to be created, including any esplanade reserves and esplanade strips and the locations and areas of any existing esplanade reserves, esplanade strips or access strips
  - ☐ The locations and areas of land to be set aside as new road
  - ☐ The location and widths of accessways giving legal and physical access to the allotments
  - ☐ All existing and proposed easements
  - ☐ If the subdivision is to be staged, define the stages
  - ☐ The locations and areas of lands below mean high water springs of the sea or any part of the bed of a lake or river to vested in the Crown or local authority under section 237A of the Resource Management Act 1991

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A2669058

15 September 2022

9(2)(a)

Email: 9(2)(a)

Cc: Mayor@gdc.govt.nz

Tēnā koe 9(2)(a)

I have raised with my senior staff the concerns you've outlined in your correspondence to the Mayor on 17 August and understand that this issue has been a significant source of distress for you both over a number of years.

Rules controlling the establishment of plantation forestry have changed since the forest on the land adjacent to your property was planted. However, it remains that the establishment of the trees is a permitted activity under the Rules of the Tairāwhiti Resource Management Plan.

Regarding your point about the description within the Subdivision consent, that the remainder of the block was to continue to be grazing land. This statement is not a condition of that consent, and the landowner may thereafter undertake permitted activities on their land.

Activity in relation to vegetation clearance and replanting for mitigation of soil erosion, did require a Land Use Consent, granted in 2013. The letter addressed to you (dated 2015) from the previous Chief Executive, provides this detail.

Council monitored the clearance of vegetation and replanting in relation to the conditions of that consent and has previously undertaken action against the consent holder to ensure compliance. This included working with you and the landowner in 2017 and required the landowner to remove trees and create a setback margin from the boundary between your properties.

I have instructed staff to visit the property within the next week to undertake a further inspection and assess whether there are any further compliance issues. I can commit to advising you of the outcome of that inspection.

Council is currently undertaking a review of our Tairāwhiti Resource Management rules in line with new national Policy which will take into account where rules have caused issues in the past and considerations for future development needs like housing.

The review of rules or introduction of new policies, however, is not able to offer much assistance to your situation and does not provide the opportunity to retrospectively redress activities that have been permitted activities.

FENZ are the relevant regulator in terms of fire risk, they have the powers under section 65 of the FENZ Act 2017 that may use to require the owner to remove vegetation assessed as a fire hazard risk. I note you have been in contact with FENZ staff and the advice is to contact them or submit a fire hazard assessment request via their website: https://fireandemergency.nz/home-and-community-fire-safety/fire-hazards-in-your-community/

With regard to your comments about the misconduct of staff. Withheld finished her employment with Council in 2010 and was not a member of staff at the time the Land Use Consent was lodged in 2013. Staff are subject to a high standard of professional conduct and are unable to directly influence the process of consent decisions, in addition Planners are required to maintain a clear separation of real or perceived conflicts of interest.

We have responded to enquiries made by the Ombudsman earlier this year, in relation to your complaint to them. The Ombudsman advised on 7 June of their decision not to investigate or take any further action. We understand you have discretion to contact the Ombudsman again in the future, and your complaint will be assessed on a case-by-case basis.

Further to this, Section 240 of the Crimes Act relating to obtaining by deception, any criminal investigation would be a matter for the Police to pursue rather than the Council.

I understand you feel you have been treated unfairly and that resolving the issue directly with the neighbouring landowner is unlikely. Council is only able to use the tools available to it under current legislation and so I reiterate that my staff will make a further assessment and I will contact you with the outcome of that investigation.

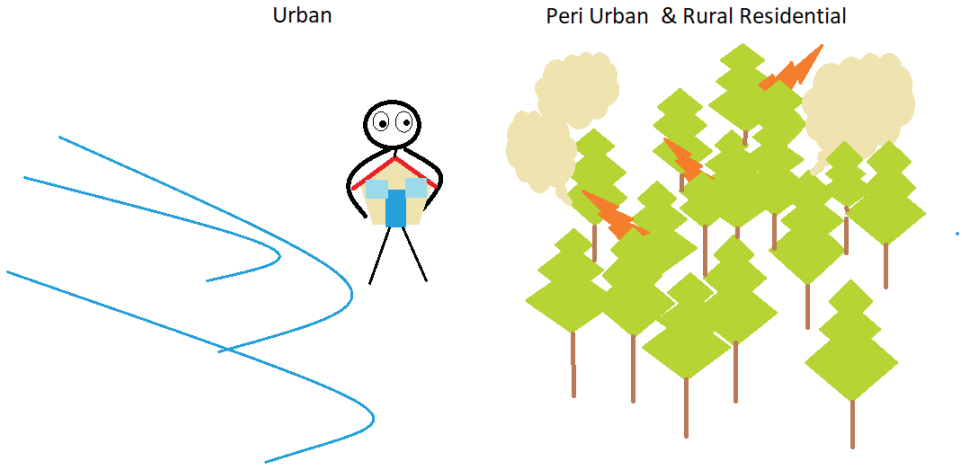
Ngā mihinui

Nedine Thatcher Swann

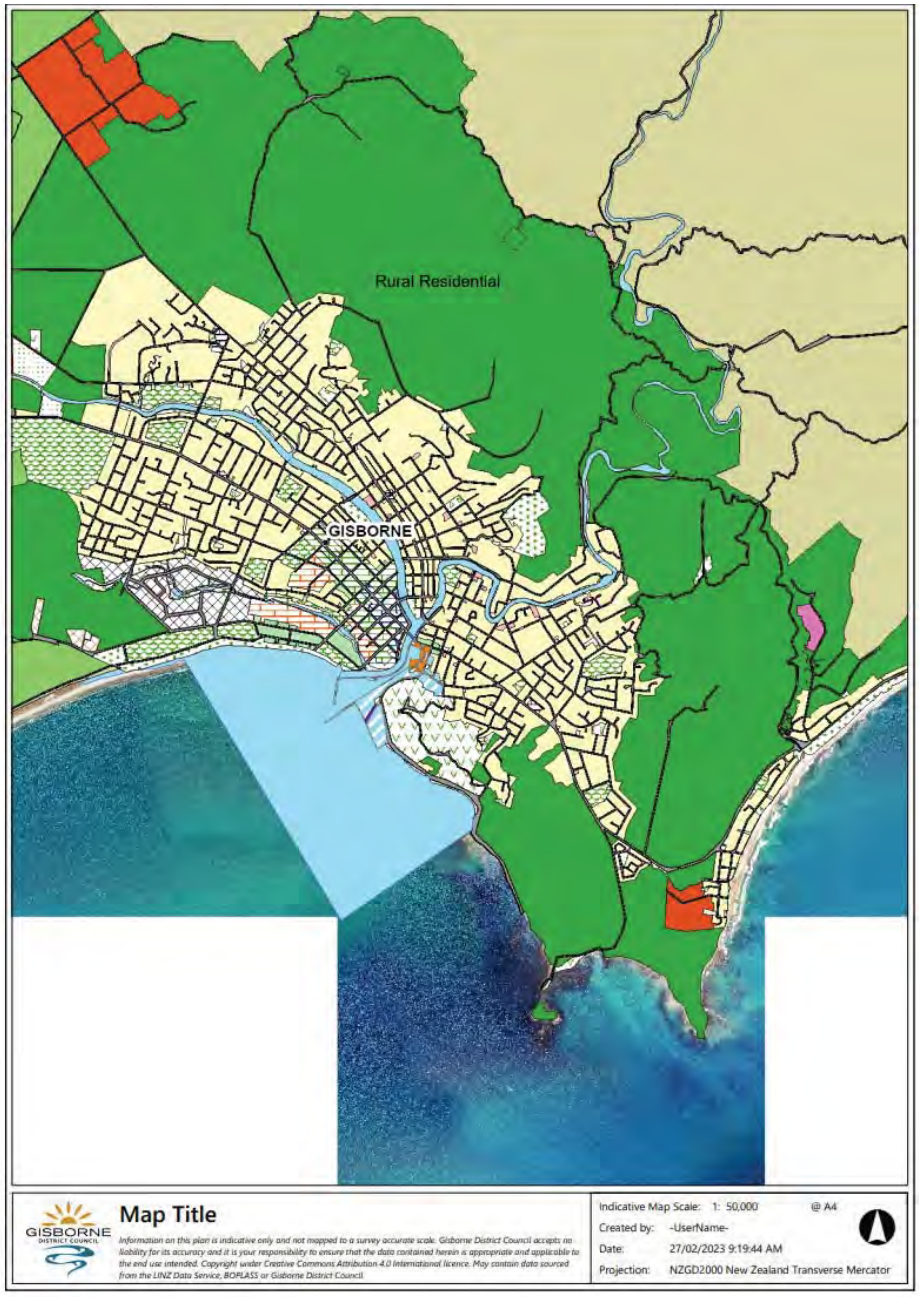
Chief Executive
Gisborne District Council

Climate Change Removable Hazards

We must look to protect our Environment for future generations and in particular the existing generation from La Nina/El Nino extreme weather events which continue to gain momentum and undermine our Land Use, environment, homes, livelihoods, mana. Forestry planting location has a very long-term change in land use. Future land use beyond the natural life of the trees is uncertain and there is a risk of abandonment once carbon revenue is exhausted. The future for housing is thus abandoned as the room for urban spread becomes constricted if forestry is planted in designated zones for future urban development (eg. Rural Residential - currently permitted) with widespread Impacts on the Social Investment structure of Urban Development. Where we can *permanently* reduce the Climate Change risks should be investigated thoroughly to remove ongoing costs for future generations. The Climate Coastal Retreat Plan will put more pressure on the demand for Rural Residential Land Use for Urban Spread. Forestry Activity would be ideally suited away from Residential or future Residential zones to protect these areas from Firestorms currently rampant with Climate Change. Plantation Pine Fire Hazard Risks are a Removable hazard unlike the Natural Coastal Hazards.



A Housing Crisis in the Making


Rural Residential
GISBORNE
Map Title
Information on this plan is indicative only and not mapped to a survey accurate scale. Gisborne District Council accepts no liability for its accuracy and it is your responsibility to ensure that the data contained herein is appropriate and applicable to the end use intended. Copyright under Creative Commons Attribution 4.0 International licence. May contain data sourced from the LINZ Data Service, BOPLASS or Gisborne District Council.
Indicative Map Scale: 1: 50,000 @ A4
Created by: -UserName-
Date: 27/02/2023 9:19:44 AM
Projection: NZGD2000 New Zealand Transverse Mercator

Gisborne 25/09/2022 Rural Urban Interface (Rural Residential)

21 existing homes. 2 unbuilt sections. 1 public reserve. No exit road. High Wind Zone. Hilly topography. Drought Prone. Low/No Mobile coverage. Status Quo potential - entirely surrounded by Forestry. Limited Firefighter Access. No escape Route. This settlement is next to the Kopakiraho Stream that feeds directly into the Waimata River (a significant river source into Poverty Bay).

Rural Urban Interface - Fire Hazard. A real life example: All surrounding Land adjoining Gaddums Hill Road in Tairawhiti is designated Rural Residential under the Local District Plan. ***(Objectives & Principles - page 10, 11, 12)***. As the status quo stands the District Council allows the potential for more plantation forestry as a Permitted Activity contrary to the Objectives and Principles of its Tairawhiti Resource Management Plan (TRMP), 'to be retained for future quality Urban development.'
Tairawhiti region is on the East Coast and is well known to be Drought Prone. Hilly Topography. And Experiences extreme prevailing North West Winds and High Temperatures.

We are anxious with the recent forestry development in this zone and the precedent it has set to escalate more planting and create a larger fire hazard. Eventually being totally blocked in by forestry. One escape route only through the anticipated forestry for 22 property owners and their visitors who are not familiar with the area. Oahu fires are still very fresh in our minds.

Home owners are limited to what they can do to mitigate these fire hazards.
The size of the plots are at least 1 Ha. Therefore to introduce a vegetation-free fire barrier upon them would limit the area of use for rural residential activities on these small plots to virtually zero. One mitigation measure on its own is unlikely to work according to FENZ. With the existing Plantation Forestry in this zone there is an Increased Ignition Risk.

Plantation Forests, especially those that are not Registered under the NES-PF, are likely to be unmonitored or difficult to monitor and therefore create a Higher Fire Hazard Risk. Plantation Forest Activity operating under these circumstances would be well suited away from Urban/Residential Environment. The FENZ investigation of the Ohau Fires found Vegetation, terrain, high temperatures, and severe winds contributed to the rapid spread of fire towards the Lake Ohau Village and surrounding countryside. Typical of the East Coast today in our momentous Climate Change.

Our Community on Gaddums Hill Road and the Local Authority.
On a number of occasions throughout the past nine years we have approached our District Council with our concerns. They are now retrospectively concerned by their decision in allowing forestry as a permitted activity in this location as Climate Change progresses. They do not have the tools or legislation to change the current situation. We recently contacted them again asking to look into our plight through the Climate Change Risk Assessment. They feel again this does not give them the tools to mitigate the adverse effects placed on this subdivision. Also we wished them to investigate any compromised staff issues if this was a cause in their initial decision. Should this have been the case then Councils need to be better equipped to prevent such situations that cannot be reversed.
We have now arrived at having to answer the Insurance Underwriters questions. ***(AMI letter - page 13)***

Overlooked and ignored through current channels available.
We feel this is a Case Scenario that fits into the Climate Change Risk Assessment Group. We explored avenues through the Council decision to allow forestry in the first place without the placing of protections or provisions. Climate Change was already an issue. The avenue for voicing the negative effects was not open to us when we met with Senior staff before planting occurred to air our 'more than minor' concerns.
to fire risk and threat to our lives, 'more than minor'.
to the devaluation of our properties, 'more than minor'.
to amenity values, section 7 c RMA 'more than minor'.

to the objectives and principles of the District Plan, 'more than minor'.
to the right to voice concern through proper process, affected parties section 95 A-E RMA 'more than minor'.
to the duty of the Local Council to mitigate adverse effects, section 17 RMA 'more than minor'. ***(page 14)***

Post haste guarantee to our health and safety.
CDEM held a national scenario on site on Gaddums Hill Road due to their fire risk concerns to property owners.

Telephone is moving to Mobile Coverage - which is Low/non-existent in parts of this community.
60ha Forestry & the potential for the entire Rural Residential zone to be planted in Forestry.
21 existing homes & 2 unbuilt sections.
1 public reserve
No exit road.
High Wind Zone.
Hilly topography.
Drought Prone.
High Temperatures.
Limited Firefighter Access.
No escape Route
Full time Residents
Visitors
Walkers/cyclists
Unmonitored /unregistered forestry - not on NES-PF database.

We are concerned about insurance cover. (*AMI letter - page 13*)
A life threatening situation has been created for the 23 properties & their users (predominantly work from home small farm activities and retirees), Visitors, Public Reserve users, Walkers & Cyclists.
If the current tools are not able to be used by our Local Authority to prevent this situation then there needs to be an avenue of accountability and liability for any Accident that could have and knowingly been prevented. As we say this is a Removable Hazard.

Our suggestion is by using the Climate Change Risk Assessment:

New protection standards could be placed on existing forestry activities at any time in line with the recent Earthquake Standards put on Commercial Buildings. In some cases removal of forestry. Especially where those forests are not registered under the NES-PF and exist purely to gain from the Emissions Trading Scheme. People work, live and sleep in this zone and are therefore at more risk than they are should they enter a Commercial building. Plus their valued assets are at risk.

- The Rural Residential areas that are already planted in Forestry, to have a set back distance of at least 500 metres from Residential Boundaries and public roads.
- Forestry activity to be designated to Rural Land zone only with a buffer zone of 500 metres to Urban and Peri Urban - Rural Residential zones and Rivers..
- Removal of the ability for future plantation forestry in any Residential zone.

A real issue is that everyone expects their Council to act by their code of conduct and laws entrusted to them. However this is not always the case as we see a surge in pressure on the Environment Court.

- Where a life threatening situation arises as a result then an avenue for redress needs to be available for those who don't have the means to access litigation.
- Maintain Amenity Values. The devaluation of these properties has severely compromised the ability to attain a fair market value. For those of us who are Retirees the prospect of relocating to a retirement village has become more difficult to accomplish. The Forestry has destroyed any future of this Residential area.

Extreme Weather Event Discussions and Inquiries around Climate Change and the Forestry need to take in the whole picture of the effects of Forestry and its Activities in unison.

Thank you for the opportunity to share our real concerns under the current Climate Change situation.

Karen Eddy

Rural Residential Zone 60ha Pine Plantation & growing - 6yr old trees and 9yr old trees

Young Pine 30 metres from Residential Buildings

NZ Fires


Forestry 2022
Legend
292 Gaddums Hill Road
Kopakirano Stream
292 Gaddums Hill Road
Google Earth
Image © 2022 Airbus
200 m
N

DD4.3 Objectives

DD4.3.1 All Rural zone Objectives

1. Enable subdivision, use and development in all rural zones provided that adverse environmental effects can be avoided, remedied or mitigated.
2. Maintain rural amenity values.
3. Sustainable management of the life supporting capacity of the soils on the Poverty Bay Flats.
4. Enable peri-urban living in appropriate areas, and at densities where the adverse effects of this activity can be avoided, remedied or mitigated.
5. Locate structures and plant trees in such a manner as not to cause adverse environmental effects across property boundaries.

DD4.3.2 Rural Residential Objectives

1. To provide for peri-urban development on the fringes of the Gisborne Urban Area and the fringes of the rural townships, where the adverse effects of this activity can be avoided, remedied or mitigated.
2. To preserve areas on the fringes of the Gisborne Urban Area where sustainable quality future residential development may be appropriate.

DD4.3.3 Rural Lifestyle Objectives

1. To provide for a variety of scales of rural living, whilst sustainably managing the physical constraints within the peri-urban environment.
2. To provide for quality peri-urban development in areas where sites are already generally below one hectare as at 25 March 2000.

Principal reasons:

- ***All rural zones 1:*** *This is a requirement of section 5 of the Act.*

- ***All rural zones 2:*** *The rural environment has a high degree of amenity value. Its maintenance is a requirement of section 7(c) of the Act.*
- ***All rural zones 3:*** *Highly productive and versatile soils play a major role in the economy of the region. The great majority of this activity takes place on the Poverty Bay flats. These soils are among the most fertile and productive in the country, but are a very finite resource representing only 5% of the region. The life supporting capacity of this resource, unless maintained, could be adversely affected by inappropriate subdivision and land use.*
- ***All rural zones 4:*** *A rural residential and rural lifestyle zone surrounds the Gisborne Urban Area and has been in place for some time.*

  There may be other areas in the district where this land use is appropriate but potential reverse sensitivity effects need to be considered.
- ***All rural zones 5:*** *Trees and structures, in particular circumstances, can cause adverse effects. Ideally trees and structures should be located so that the adverse effects are avoided or mitigated and not transferred off-site.*
- ***Rural residential 1:*** *Dense peri-urban development has the potential to fragment rural land, plus constrain growers and their small scale farming activities through the sensitivity of those seeking a rural character on a management property ("reverse sensitivity"). The intent of the Rural Residential zone is to meet this demand in areas where peri-urban development can occur with limited adverse effects on the environment.*
- ***Rural residential 2:*** *The Council believes there could be areas on the fringes of the Gisborne Urban Area that may be suitable for future residential development. These areas should be retained to preserve the potential for a quality urban environment.*
- ***Rural lifestyle 1:*** *Demand for peri-urban development could threaten the district's productive soil resource if it is not limited to the appropriate areas.*

  The provisions of the zone are flexible to provide for those who wish to undertake small scale farming activities as well as those who seek to live in an environment where there is a rural character but where the size of properties is manageable. It will mostly relate to areas that are affected by known physical constraints, such as land instability, poor drainage soils and high water tables, and subsequently not as productive.
- ***Rural lifestyle 2:*** *A function of the Rural Lifestyle zone is to provide for peri-urban living, specifically in areas where sites are already below one hectare.*

DD4.4 Policies

DD4.4.1 All Rural Zones Policies

1. When preparing plans or considering applications for plan changes, resource consents or designations in all rural zones regard shall be given to the following general policy as well as any specific policy relating to the zone:
    a) effect of the activity on the natural landform characteristics;
    b) effect on significant indigenous vegetation and significant habitats of indigenous fauna with particular references to C9 – Natural Heritage;
    c) effect on biodiversity, water quality, land stability and erosion with reference to C9 – Natural Heritage and C7 – Land Management;
    d) the location, scale and nature of the proposed activity and its effect on the balance of the land and on adjoining properties;
    e) alternative methods and locations available to carry out the works or activities;
    f) physical constraints to the site such as separation by rivers or roads, site configuration and layout;
    g) any adverse effect that the activity may have on existing rural activities;

GO

Policy [redacted] Inquiry

1 message

AMI PIC [redacted] Tue, 13 Sep 2022 at 17:47
To: [redacted]

Hi Brian,

Good day.

Thank you for getting in touch with us.
Regarding your query, I spoke with our Senior Underwriter and was advised that your property is covered for any sudden physical or accidental loss up to the sum insured written on your policy schedule.
They also advised to inquire with the council and your neighbour to have a decision on what should be done to the pine trees near your property to avoid any accidents.
And in accordance with our Senior Underwriter if your neighbour has an insurance, any damages to your property arising from the Pine Trees must be covered by their insurance for legal liability.
I hope this will suffice your question and if you have any other queries or concern, feel free to email us or call us.
Thank you.

Kind regards,

[redacted]

WNS - AMI Personal Insurance Consultant

ami
We're right here

PARLIAMENTARY COUNSEL OFFICE
TE TARI TOHUTOHU PĀREMATA

New Zealand Legislation

Resource Management Act 1991

If you need more information about this Act, please contact the administering agency: **Ministry for the Environment**

- Warning: Some amendments have not yet been incorporated

Adverse effects

17 Duty to avoid, remedy, or mitigate adverse effects

(1) Every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of the person, whether or not the activity is carried on in accordance with—

(a) any of sections 10, 10A, 10B, and 20A; or

(b) a national environmental standard, a rule, a resource consent, or a designation.

(2) The duty referred to in subsection (1) is not of itself enforceable against any person, and no person is liable to any other person for a breach of that duty.

(3) Notwithstanding subsection (2), an enforcement order or abatement notice may be made or served under Part 12 to—

(a) require a person to cease, or prohibit a person from commencing, anything that, in the opinion of the Environment Court or an enforcement officer, is or is likely to be noxious, dangerous, offensive, or objectionable to such an extent that it has or is likely to have an adverse effect on the environment; or

(b) require a person to do something that, in the opinion of the Environment Court or an enforcement officer, is necessary in order to avoid, remedy, or mitigate any actual or likely adverse effect on the environment caused by, or on behalf of, that person.

(4) Subsection (3) is subject to section 319(2) (which specifies when an Environment Court shall not make an enforcement order).

Section 17(1): replaced, on 1 October 2009, by section 17 of the Resource Management (Simplifying and Streamlining) Amendment Act 2009 (2009 No 31).

Section 17(3)(a): amended, on 2 September 1996, pursuant to section 6(2)(a) of the Resource Management Amendment Act 1996 (1996 No 160).

Degraded land, East coast, after ‘Gabriel’

REMOTEHQ
SUSTAINABLE FORESTRY

20 January 2023

RemoteHQ Forestry Monitoring Training

Audience:
Forestry Compliance, Monitoring and Enforcement Officers within Regional and Unitary Councils, Land Management Officers, and Forestry Industry Professionals.

Purpose:
This pragmatic training course will provide an understanding of how to conduct comprehensive forestry monitoring, utilise modern tools to monitor a forestry block and identify, assess and differentiate best practice from sub standard practice in a manner that can be consistently applied across New Zealand's regionally variable landscapes.

Brought to you by
GeoInsight

REMOTEHQ
SUSTAINABLE FORESTRY

20 January 2023

Course Agenda

Day 1

8:00am - 10:00am
Forestry 101 - The Basics

10:00am - 10:15am
Break

10:15am - 12:30pm
Planning a Forest Inspection

12:30pm - 1:00pm
Lunch

1:00pm - 5:00pm
Forest Inspection 1
Undertaking a Forest Inspection
Trainer led/guided inspection

Day 2

8:00am - 12:30pm
Forest Inspection 2
Undertaking a Forest Inspection
Trainee led inspection

12:30pm - 1:00pm
Lunch

1:00pm - 3:00pm
Reporting on a Forest Inspection

3:00pm - 3:15pm
Break

3:15pm - 5:00pm
Report Assessment

REMOTEHQ
SUSTAINABLE FORESTRY

20 January 2023

Course Agenda

Forestry 101 - The Basics

- **Who are GeoInsight**

  Brief introduction of GeoInsight, Mark Spencer & Rob Besaans (trainers) and our forestry monitoring history.

- **History of Plantation Forestry in New Zealand**

  Broad history of the last 60 years of plantation Forestry in New Zealand. Why we are where we are now.

- **Common forest terminology**

  A walk through of common forestry terms to help you speak with others about forestry matters.

- **Regional soil types in New Zealand**

  The types of soils and characteristics of those soils found in regionally in New Zealand. The tools and data available to help decision making.

- **Environmental legislation that governs plantation forestry**

  Common resource consent conditions, the recently gazetted national standard through to environment court proceedings that relate to forestry.

- **How trees are harvested**

  A look at historic and current methods of removing trees from forestry blocks.

- **Compliance, monitoring and enforcement**

  How regulation is applied to forestry activities in New Zealand.

- **Guidelines and relevant resources available**

  An overview of best practice guidelines and content available to increase your knowledge base.

- **When to inspect a forestry block**

  The most effective and efficient times to inspect a forestry block.

- **The window of vulnerability**

  Explaining the period of time during which forest blocks are at their most venerable.

- **RemoteHQ and the training module**

  A walk through of the platform and training component of RemoteHQ.

8:00am - 10:00am

REMOTEHQ
SUSTAINABLE FORESTRY

20 January 2023

Course Agenda

Planning a Forest Inspection

- **Risk based vs scheduled monitoring**

  How councils can take a risk-based approach to monitor forestry activities.

- **Permissions, powers of entry and regulations around monitoring and gathering evidence**

  The "must-dos" when it comes to monitoring forestry activities.

- **Weather considerations**

  Ways in which to avoid failed access to blocks and weather patterns in and around New Zealand.

- **UAV regulations, planning and loading a flight**

  The legalities around using UAVs and utilising a very powerful tool.

- **Tools and equipment required for an inspection**

  A gear list of the modern tool box required when inspecting a forestry block.

- **Understanding a harvest plan, NES Standards and consent conditions**

  What to read before monitoring a block and the information commonly depicted in forestry block documentation.

- **Health and Safety**

  How to return home safely from a forestry visit.

- **UAV Best Practice, troubleshooting hacks, tricks and tips**

  The unwritten ways to help keep your UAV in the air.

- **Mobile app explained**

  How to use the RemoteHQ mobile app to quickly gather evidence during an inspection.

- **Systematic approach to an inspection**

  The method used to monitor a forestry block in its entirity in an efficient manner.

- **Standardised list of Areas of Excellence, Concern, and Failure.**

  An explanation of the pick lists that have been developed after 15 years of forestry monitoring to identify excellence and issues.

10:15am - 12:30

REMOTEHQ
SUSTAINABLE FORESTRY

20 January 2023

Course Agenda

Reporting on a Forest Inspection

- **Post processing of UAV orthomosaic imagery and 360° panoramas**

  The methods to process UAV imagery captured during a forest inspection.

- **Compliance stages and the traffic light system**

  An explanation of compliance categories and approach to bringing a block into a compliant state.

- **Creating a monitoring report**

  The RemoteHQ reporting module and process explained.

- **How to prescribe effective remedial works**

  Analysing and deciding on the best ways to remedy the areas of concern identified during a monitoring inspection.

- **Ongoing support, guidance and resources**

  Bringing unity, collaboration and help to those in a regulatory role throughout the country who are keen to continuously learn.

1:00pm - 3:00pm

Regional Council Officers

You're not alone.

Forestry Monitoring Consultants

You're not alone.

REMOTEHQ
SUSTAINABLE FORESTRY

GeoInsight

GeoInsight are a software development consultancy and the developers of RemoteHQ. They provide forestry and other environmental monitoring services with over 15 years experience in the forestry monitoring space.
Visit www.geoinsight.co.nz

REMOTEHQ
SUSTAINABLE FORESTRY

RemoteHQ, is a web and mobile software solution designed to streamline the administration of forestry monitoring and in field data capture. RemoteHQ has a dedicated training module to assist Officers to monitor against a consistent, fact based, evidence driven framework enabling a nationally consistent standard of forestry monitoring.
Visit www.remotehq.co.nz

New Zealand's climate change plan is relying on planting more land into trees to sequester carbon while we delay tackling our vehicle use. This plan has social, environmental and economic disadvantages whenever the model is scaled up beyond small targeted areas on existing farms.

The problems of erosion and slash blocking waterways after harvest combined with a high carbon price mean that we are increasingly investing in forests that will never be logged. As long as these trees remain alive and healthy, the carbon remains locked up and not contributing to global warming. The owners will earn income by selling carbon credits to industries that produce carbon dioxide.

In New Zealand we have an ideal climate for growing trees; we also have a species (Pinus radiata) able to sequester carbon at a very fast rate. Unfortunately, it is a short-lived species. After it reaches 60-80 years old it can sequester no more carbon, and stops earning income for the owners of the carbon forest. To prevent global warming however a carbon forest must be maintained in a healthy state forever, otherwise it will re-emit the carbon it has sequestered. It must be protected from fire, wind, insect pests, disease and old age.

Carbon farming is actually an extractive industry; after 60-80 years the sequestration productivity of the pine forest is exhausted, while the land is unable to be used for any other purpose if the sequestered carbon is to be maintained. Why would the owners finance protection of this forest and continue to pay rates when they are no longer earning any income?

Native forests are much slower growing. It is thought that they would continue to sequester carbon for 250 years or more before they reached a state where old trees are dying and releasing carbon as fast as new ones are growing. A native forest has a wide range of species so is more resilient to disease than a monoculture of pines. It is harder to burn and we consider it to have an amenity value that we don't ascribe to pines.

Many people in New Zealand don't want to see vast areas of our hill country covered in pines. Companies such as NZ Carbon Farming (NZCF) want the fast economic return achieved from planting pines, and are seeking ways to make this process more acceptable to the public. In their marketing they describe using radiata as a nurse crop for native forests as though it were a well-established system[i]. However, forest ecologist, Adam Forbes, who has done research in this field has this to say:

"I have told NZCF directly that as a leading expert I do not support their approach and I have pointed out that they are selectively citing my research to support their cause. Pines as a nurse has potential but the stands need to be in locations/climates which are amendable to native regeneration. Stands will require adaptive management on an ongoing basis which when implemented at scales of tens of thousands of hectares across the country becomes a massive responsibility for one organisation to take on."

There are some serious problems with the idea that pine plantations will morph into native forests. Research has been done based on existing radiata stands in Kinleith Forest [ii]. Most of these forests already had a bank of native seeds from the understory of natives grown under a previous rotation of Radiata. In contrast NZCF are focussing on farmland with little existing seed bank. Forests planted on farmland in the 1990s have very low levels of native growth in

their understory. Even in the Kinleith situation the authors stressed that remnant native forests must exist in close proximity to the radiata for the process to occur. Native plants did establish under radiata stands, however in no one site, even in 80-year old stands, had more than eight species established. A range of 25 species were found over the nine sites surveyed. Only two of these species were capable of growing to even half the height of the radiata. No big forest trees, no rimu, totara, miro or matai were found, despite these species being present in the adjacent remnant native stands. What is actually growing is little more than an understory of native shrubs and tree ferns with a limited potential to sequester carbon[iii].

Despite rhetoric about active management to promote the native understory, NZCF makes it clear in its publications[iv] that the timing of this intervention is not actually critical. "With older forests on the NZCF estate that have been previously managed under various timberland regimes (or not managed at all), the window to intervene to facilitate the forest transition is typically larger and less time sensitive." This leaves the way open for the company to delay the costly work of thinning out the radiata and the associated reduction of income from carbon sequestration that results from this work. It is possible that they have a level of idealism today, but how long will that last when there are very strong economic incentives to delay or even abandon the work needed to speed the transition to natives?

Ministry of Primary Industry (MPI) look-up tables[v] say natives grow at about one third of the rate of radiata. Even if carbon farmers manage to establish a range of native trees under their pines which are capable of growing to become canopy species, there is an economic problem with the nurse model.

At year 50 owners will have sold carbon credits worth up to $50,000 per hectare (at today's prices). It will take at least another 160 years for the native species to sequester this much carbon. In that time the forest will cease to earn carbon credits, as a time comes when the original Radiata trees are dying(releasing carbon dioxide) faster than the native understory is growing(sequestering carbon dioxide).

New Zealand is left with the same problem that it encounters with mining companies- a site to maintain at great expense and no income once all the minerals have been extracted. How can society ensure the forest company continues to manage the site when no further income is being generated? It is very easy and not uncommon in our legal system to set up a new company, transfer any assets with value then allow the old company to go bankrupt and take the liabilities with it. Who will be responsible for the site then?

NZCF maintain that: "Over 95% of NZCF's 66.7 million trees are planted on marginal land (grade 6 and above)". It is not true that Land Use Capability Class VI land is marginal. This is the heartland of New Zealand's grass-fed sheep and beef sector that leads the world in sustainable production of high quality protein. Marginal land is primarily a product of poor management, indebtedness or lack of scale. The average farm on hard East Coast hill country (a mix of Class VI & VII land) actually shows double the rate of return of farms on easier land[vi]. In the past energetic young farmers got their start on rundown properties; now these are unaffordable due to bidding pressure from NZCF and other forestry interests.

It is not just farmers who are being displaced by forestry. In rural areas such as Wairoa farming creates direct employment for ten local people for every 1000ha under pasture[vii]. Production forestry creates three local jobs for every 1000ha in trees. It is estimated that carbon farming will create less than one job per 1000ha[viii].

The NZ public should not be fooled by the greenwash. Planting pines as a nurse crop for natives on whole farms will have three outcomes . Firstly it will reduce food production and employment. Secondly, it will produce a landscape of pines with associated environmental risks. The natives will not be dominant for many decades, and probably well over a century. Thirdly there will be a hole in the cashflow with a large risk to the taxpayer. These social, environmental and economic disadvantages should give us cause to be wary of this plan.

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[i] https://nzcarbonfarming.co nz/regeneration/ accessed 26/5/21

[ii] Forbes AS, Norton DA, Carswell FE. 2019.

Opportunities and limitations of exotic Pinus radiata as a facilitative nurse for New Zealand indigenous forest restoration

New Zealand Journal of Forestry Science

http://nzjforestryscience nz/index.php/nzjfs/article/view/45/11 accessed 26/5/21

[iii] Kimberley M, Bergin D, Beets P
Carbon sequestration by planted native trees and shrubs
Technical Hand Book Article No. 10.5. Tane's Tree Trust

[iv] Peter Casey, Bryan McKinlay and James Kerr
New Zealand Carbon Farming – regenerating native forests at scale using an exotic plantation nurse crop

[v] MPI 2017 Carbon Look-up Tables for the Emissions Trading Scheme

[vi] Beef + lamb Economic Service Class Quintile Analyses : contrast class 3 with class 4 or 5
https://beeflambnz.com/sites/default/files/data/files/2019%20NNI.pdf

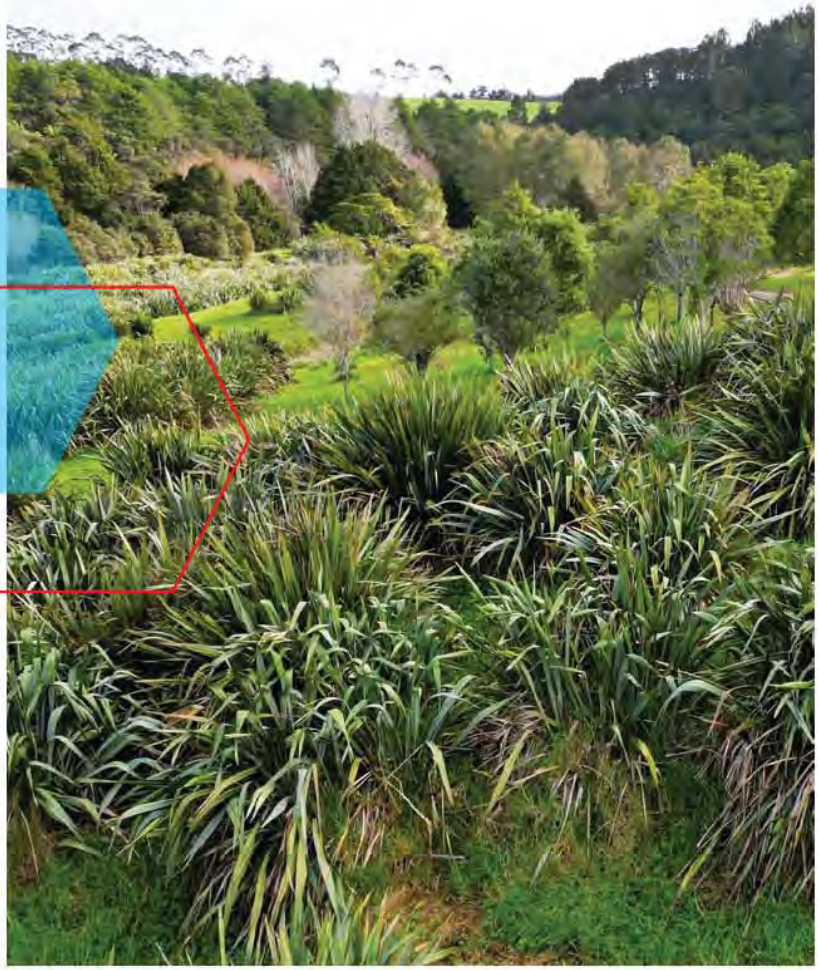
[vii] Stats nz: Linked Employer - Employee Data (LEED) JOB-10330
Results available on request from: Dave Read bogaardread@outlook.com

[viii] Te Uru Rakau 2020 Economic Impacts of Forestry in New Zealand (PwC)

HARAKEKE ALLIANCE

NEWSLETTER 0323

NGĀTI RUAPANI
KI UTA | KI TAI



INSIDE

PITOPITO KŌRERO

NOTEWORTHY NEWS TO OUR ALLIANCE

Tēnā koutou ngā mema o te hononga,

Greetings to our Harakeke Industry Alliance – **He Hononga Ahumahi Harakeke** members. Firstly, on behalf of the directors of the Ngāti Ruapani ki Uta ki Tai Co-operative [NRKUKT], we are delighted to report we have reached 50 members in the Alliance and have open invitations from many more from all sorts of disciplines and contributing groups.

In December Ngāti Ruapani ki Uta ki Tai Co-operative Society Ltd held its AGM and voted to pursue our efforts to develop and support the HIA with as much vigour as we can muster. The success of which will be measured by first the growth in interest in our Harakeke – New Pathway HHH initiatives[1] and fruitful collaboration between all members on pending research that we expect will benefit a future Harakeke Industry. The following is an update on where we at.

[1] Harakeke
He huarahi hōu – Harakeke HHH Architecture

1 FLOODING AREA SHOWN POST AUCKLAND JAN'23 & CYCLONE GABRIELLE

THE JOURNEY SO FAR

Since the last update in November 2022, we have the following to report and welcome the new members to the Alliance:

- We have established options to develop HIA branding and messaging that is fit for purpose with the intention to develop more communication tools, website, digital media etc. [*Funding dependent. Currently seeking grant options*]
- We have now secured through our membership or are in preliminary discussions with related parties of up to seven planting sites that will form the basis of our 2 year research programme, most of which would become part of any future Social, Environmental, Sequestration and Commercial asset for the landowners. These include several biases as follows:
    - Farmland riparian (Tairawhiti)
    - Wetland restoration (East Cape) plus a second option (North Auckland)
    - Sub-Alpine (SI)
    - Papakainga Development (Te Whaiti/Te Urewera)
    - Pilot model planting <2Ha (Canterbury, East Cape, North Auckland)
    - Pa Harakeke Development/Enhancement (Rotorua)
    - Revegetation Kaupapa (Northland)
- We have preliminary support from Raranga Weavers of whom will guide us on Tikanga Māori (customary practices or behaviours) in our use and care of Harakeke integral to our research aims.
- No notification as yet from MBEI on our Vision Mātauranga Capability Fund grant application (*An overview of the research scope was explained in the last Newsletter*). We expect to hear April'23.
- Recent severe flooding at Meritelle Biodiscovery Gardens in Wellsford revelled a reinforcement of the understanding that Harakeke is a super strong plant in flood current versus other species. No noticeable loss in plants have been experienced over the last 15 years onsite since monitoring.

- During our recent weeklong effort in Hawkes Bay to assist Tangoio Marae (the marae of Marangatūhetaua), amongst others, in clearing debris and silt, it was most evident that the most notable failure and destruction of plant life was that of exotic and deciduous varieties. Native flora stood up extremely and non-surprisingly well to such a devastating onslaught of water during Cyclone Gabrielle on 13 Feb. Our hearts go out to the local Tangoio Marae whānau and we want to thank them again for the awesome Kai!
- In particular Harakeke was still very evident on water courses with the exceptions of steep embankments.
- Conversations might be best had around transition of flood prone sensitive land use to Harakeke and native biodiversity after horticultural food production and related dwellings if relocated to less vulnerable sites.
- The plan to hold our first HIA 3-day symposium [name & agenda still yet to be determined] at Meritelle Gardens in Wellsford, north of Auckland in March 2023 was halted due to serious weather events including Cyclone Gabrielle.
- A new target date for the symposium is at present **Nov' 2023** [To be confirmed by end of July'23 and funding dependent]
- NRKUKT will attempt to secure co-funding to facilitate.

QUIZ: CAN ANYONE TELL ME WHAT LEVEL OF LINOLEIC (OMEGA 6) FREE FATTY ACID IS FOUND IN HARAKEKE SEED OIL? CORRECT ANSWERS GO INTO A DRAW ON 28TH APRIL AT 15:00 FOR THIS SEASONS HARAKEKE HONEY!

…& NEXT STEPS

- Over the period to July 2023, the HIA intends to initiate the a planning calendar for research aims from June 2023 to July 2025 once we know if VM grant funding is secure.
- Researchers and HIA participating partners will be advised of budget and allocations soon after.
- Follow-up of participating partners and development of new ones to spread the mahi will continue over April/May'23
- KiwiFibre (HIA industry partner) will be supported in their Harakeke Composite product development and evolution. (see following update from the executives).
- Investigate and develop grant funding applications specific to immediate needs including Communications and Media / CRI support (Research Students / Botanical Sciences)
- Maintain and nurture relationships with our iwi partners, agricultural sectors, research institutes and tertiary sectors.

2

FEATURED PLANTING SITE MEMBER

Tangikaroro Manawa Ahu Whenua Trust

JJESAMINE DURING MARK'S VISIT 2 DAYS BEFORE GABRIELLE

We are delighted to welcome the Tangikaroro Manawa Ahu Whenua Trust of Ngāti Porou to the membership of our Alliance!

Most notable about their Wanoa whānau, in particular, Jesamine Wanoa (Trustee, Native plant and Nursery owner operator) has an exceptional knowledge in native plants and runs her "Te Mahi a Taiao" programme for local whānau at their Tangikaroro Native Nursery south of Te Araroa.

As a result of extensive eco-sourced propagation work Jesamine is undertaking for a number of large land blocks in the region, her nursery is perfectly poised to support not only regional Harakeke HHH Architecture R&D Kaupapa for the HIA over the next two years but may also provide a 2Ha pilot block within their whenua.

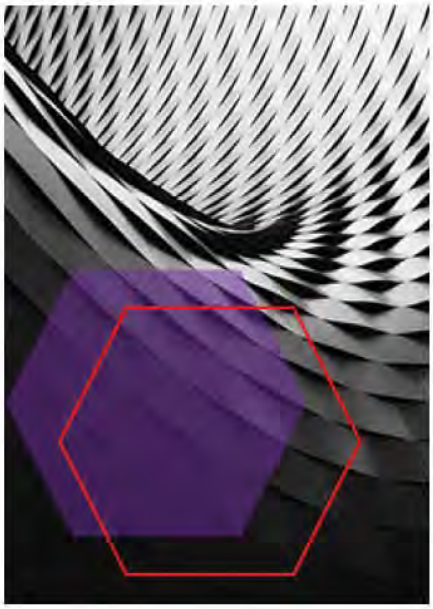
The giant rākau Pūriri standing in a rock garden on their whenua, is a fitting tīmatanga (starting point) for the Wanoa whānau's journey, as she is their Tipuna Rakau (ancestral tree) with the oldest whakapapa in that part of the ngahere (forest), as well as being a seed source for the Pūriri.

WANOA WHĀNAU LAND

A smaller pilot planting site like that at Tangikaroro is an ideal platform that carries the following benefits for our joint kaupapa:

1. At 1-3 Hectares, being easily accessible and in proximity to a nursery in a non-flood sensitive position, this attributes perfectly to research of ideal layout of an accessible, viable and ecologically sound harakeke and bio-diversity planting mix.
2. If next to existing native forest (as this site is), the enhancement of bio-diversity elements can be a lot more focused.
3. The final environmental asset is not lost but enduring in many ways especially if Pa Harakeke is established.

[2] *Image courtesy of Tangikaroro Manawa Ahu Whenua Trust - © Copywrite rights reserved.*



FEATURED INDUSTRY MEMBER

KiwiFibre Innovations

A new company well down the track in composites utilising Harakeke fibre is KiwiFibre Innovations. The HIA intends to demonstrate the absolute imperative to develop all key Harakeke pathways in UNISON: Environmentally Sustainable Resource; Social Access and Benefit; Industry and Market, all at once!

The rationale behind this is to see income streams result from what would normally be a simple and orthodox environmental effort only. While the whenua needs healing, the efforts that contribute to this outcome needs to ensure social and economic benefit also.

This is where companies like KiwiFibre come in.

We welcomed the KiwiFibre Innovations as an HIA member very early on along with their immediate supply partners, Templeton Flax Mill Heritage Museum in Riverton!

AN UPDATE FROM KIWIFIBRE FOUNDERS

KiwiFibre Innovations is a start-up business developing natural-fibre composite solutions to replace fibreglass and carbon fibre. We believe innovation has a key role in the Harakeke Industry Alliance, and we're incredibly proud to be part of it.

FOUNDERS - WILLIAM MURRELL (L) COO & BEN SCALES (R) CEO

We started out as a university project in 2020, experimenting with Ti Kouka leaves. While product use cases for Ti Kouka remain a goal of ours, our priority is Harakeke. We spent two years spending time with users of fibreglass and carbon fibre, exploring the technical and environmental problems of the composites industry.

We learned what industries like marine, automotive, sport & recreation and construction, needed in a natural-fibre composite. We validated that harakeke would indeed be viable in composite reinforcements. Industry told us it needed to be technically better than synthetic composites, and a direct replacement. That is exactly what we are building – harakeke fibre to directly replace carbon fibre and fibreglass.

Over the last 3 years we have attracted interest of domestic and global companies. We completed a pilot manufacturing run, creating 150m of 32mm diameter hollow tube. Testing was carried out on the harakeke composite, concluding that it has less degradation than fibreglass under extreme exposure to UV, abrasives, and water. We've supplied sample materials to customers.

We have a customer waitlist of 21 companies across 7 industries. Based on their feedback we are constantly improving and iterating the material. We've been tweaking and refining our business model with advisors from high-growth start-ups, wool, agriculture, and manufacturing industries. In November 2022 we completed a pre-seed capital raise from local investors. In January we moved our equipment into a workshop in Ōtautahi where we're building a composite manufacturing plant.

Watch this space!

RECAP OF OUR RESEARCH AIMS – HARAKEKE HE HUARAHI HŌU (A NEW PATHWAY)

The alliance will use, create, and grow Mātauranga Māori and progress existing harakeke research and acquire new knowledge using Māori research methodologies. The research themes the Alliance will explore include (but no limited to):

1. Analyse the extent of different varieties and cultivars of Harakeke, optimum growing conditions, and opportunities for a new extracts and fibre economy within Aotearoa - 01/06/2023 to 01/06/2025
2. Assessing Environmental Conditions of at least Three Harakeke Growing Sites - 01/06/2023 to 01/06/2024
3. Understanding of the architecture of the Harakeke - Riparian, Revegetation, or Restoration Planting Model (NRPM) - 01/06/2023 to 01/06/2024
4. Establish an Accessible Biodiversity planting model for viable and healthy harakeke resource - 01/06/2023 to 01/06/2024
5. Create Climate Change Guidelines including sequestration calculators for the Harakeke Industry with offset opportunities for agriculture and horticultural sectors - 01/06/2024 to 01/06/2025
6. Harakeke Industry in Aotearoa; Catalogue and establish Bibliography - 01/06/2023 to 01/06/2024
7. Harakeke Industry Code of Practice; Commercialisation - 01/01/2024 to 01/06/2025

KŌRERO ANŌ

While we appreciate spare time is scarce and that much of your involvement is in kind, if you can let the writer know of any suggestions, ideas, corrections (especially on the reo, Kāore au e kōrero i te reo Maori, engari ka ako ahau), comments and concerns, please send these to mark@ruapani.nz

For the purposes of communication transparency versus privacy, please respond by email on preferred 'sharing status' of your contact details as follows:

Options:

1. Remain on a blind copy [BCC] basis, or
2. Move to a visible copy basis [BC]
3. And, contact details shared in our HIA database with other members YES or NO

Ngā mihi nui, Mark Henderson – Co-Chair / Business and Bio-diversity Advisor

Ngāti Ruapani ki Uta ki Tai Co-operative Society Limited

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The Gisborne District (GDC) contains highly erodible soils and unstable geology. The districts hill country will continue to erode regardless of land use.

Pastoral farming, especially sheep was the predominate land use. Due to the soils natural high fertility, sites of soil slip and land slide erosion being the predominate erosion features naturally revegetated in pasture grass, so production loss occurred but at a rate that didn't significantly affect hill country farm economics .

Cyclone Bola changed the above due to the scale of the erosion features. Landcare Research undertook a land use survey of the Gisborne District following Bola and identified the best vegetation communities for soil conservation were Manuka or *Pinus radiata* trees. Local and Central Government promoted plantation forestry as a sustainable land use, hence the East Coast Forestry Act.

Afforestation worked at arresting the accelerated rate of erosion resulting in erodible landforms being effectively retired from intensive pastural land use to a passive forestry land use.

The Tarndale Slip and adjacent land is one of many examples where *Pinus radiata* trees stabilised a significantly eroding landform.

Central and local government promotion of plantation forestry on erodible hill country in the Gisborne District resulted in large scale plantings of trees in a short window of time, hence a large harvest in a short window of time.

GDC has good soil conservators, but like all councils, never had experienced or knowledgeable environmental forest management staff. Staff with the correct skill sets and experience in environmental forestry management are very few within NZ. Within councils there are staff involved in monitoring forestry activities, but their knowledge base of the subject is very limited.

9(2)(a) I am of the opinion that harvest and road construction contractors in the Gisborne District have limited knowledge of logging and the environment, limited application of forest industry environmental codes of practice, the NES-PF or compliance with resource consents especially when compared to the level of compliance in other regions, districts of the country.

At the date of the above mentioned Tologa Bay incident, GDC had struggled to provide resources for compliance monitoring of forest management activities. I am aware of one full time staff member monitoring forestry activities on the coast at this date.

Recovery of merchantable wood in Gisborne forests is somewhat different to other areas of the country. In the CNI a tree stem maybe cut into three logs with pulp logs and bin wood being recovered.

In Gisborne a stem pulled onto a landing is typically processed into two logs and the rest of the stem is waste, forming a bird's nest. Depending on the size of the setting, these nests can be large due to the limited market for log specification resulting in a large volume of waste wood. Typically, landings are constructed on ridges with a narrow crest, the fill soil is not placed on a bench and the tree stumps are buried in the outer fill soil. The landings grow in size greater than the footprint of

the construction. Poor construction methods, an absence of post-harvest rehabilitation and good water management often results in failure.

Cable yarding to ridge crests is the common method of tree recovery in the Gisborne District, with swing yarders being the preferred machine. The rigging used on swing and tower yarders tend to favour yarding systems that provide for the drag to sweep over the land surface during the in-haul. This results in the drag dislodging harvest debris on the cut over downslope with it accumulating at the lowest point, being on a gully floor or in a river.

Debris on gully floors can be mobilised by ephemeral water flow and rivers transport wood debris. Slope failure can transport debris and sediment to both drainage systems. While slope failure is a separate subject, we need to get away from rigging systems such as North Bending with tower yarders that have the drag moving over the land surface and promote the use skyline systems that enable drags to be lifted vertically off the ground and in hauled. Unfortunately OHS is working against prudent environmental outcomes by promoting the use of camera sight grapple rigging as opposed to breaker outs manually stropping of trees to sky line carriages operated on sky lines.

9(2)(a)

The investigation team didn't scratch the surface of the work that is required to ensure good work practices are carried out by the forest industry

The Tologa Bay incident is the first of more to come. The January 2023 event being one.

There is not a lot of environmental forest management knowledge in the GDC

More compliance monitoring and education is required

Work with central government to construct an international market for wood chip and or construct a pulp mill in the Gisborne district.

In regard to the current discussion, what is needed:

Be aware that a lot of the mobilised wood is legacy material. The sediment from soil and landslides and historic infrastructure works

Keep good intention, but uneducated people out of the discussion

The forest industry must become self-regulating, or the crown will regulate the industry to appease the squeaky wheel community of anti-forestry.

Be proactive, front load the argument and tell central and local government what the forest owners are going to do to manage the industry environmental footprint

Look for multi rotational forest management solutions, with a balanced outcome of economy and the environment, being mindful that people don't realise the environment cannot be sustained without a supporting economy.

Get buy in from forest managers and contractors to provide better environmental management outcomes

A cooperative whole Gisborne district catchment approach to plantation forest management by forest managers and GDC

Identify at risk catchments for accelerated soil erosion, debris flows and flooding.

Put in place catchment cut constraints eg the area of harvest in a 'at risk catchment' is not to exceed more than 30% of the total land area in the catchment over a rolling seven year period

Undertake risk assessments in storm responsive sub catchments and catchments with earth flows to determine mitigation methods to avoid any identified risk of accelerated soil erosion, debris flows and flooding.

Stage harvest catchments with identified severe to extreme risk, a third, leave seven years, the next third etc.

Burn birds' nests

Consider burning cut over if necessary

Be mindful that once the debris issue is resolved, sediment will be the next environmental management concern

Consider over sowing the cut over to establish grass if soil slip erosion is an issue or the land is exposed to public view

Work with the industry to improve operator knowledge of good infrastructure construction and harvest methods

Require yarders to operate skyline systems

What won't work

Regulating an already over regulated industry

Retiring land not LUC Class VIII from production forestry

Retiring stream margins from plantation forestry and establishing native trees

Removing harvest debris from the cut over

Live debris traps

Native plantings or minor species for commercial forestry

Tell us your experiences

My experience is not with Cyclones Hale and Gabrielle but with Cyclones and the extreme weather event occurring April to Queens Birthday 2018.9(2)(a)

9(2)(a) [redacted]

What is it about the way we use land, and how land use has changed over time that led to the effects being so severe?

Please explain your answer here

Gisborne District (GDC) contains highly erodible soils and unstable geology. The districts hill country will continue to erode regardless of land use.

Historically, pastoral farming, especially sheep was the common land use of Class VI to VII land. Note the sub class limitation to production land use is soil erosion Due to the soils natural high fertility, sites of soil slip, landslide and earth flow erosion being the predominate erosion features naturally re-vegetated in pasture grass, so production loss occurred but at a rate that didn't significantly affect hill country farm economics.

Cyclone Bola changed the above due to the scale of the erosion features and loss of productive soils. Landcare Research undertook a land use survey of the Gisborne District following Bola and identified the best vegetation communities for soil conservation were Manuka or Pinus radiata trees. Local and Central Government promoted plantation forestry as a sustainable land use, hence the East Coast Forestry Act.

Afforestation worked at arresting the accelerated soil erosion resulting in erodible landforms being effectively retired from intensive pastoral land use to a passive forestry land use.

The Tarndale Slip and adjacent land is one of many examples where Pinus radiata trees stabilised a significantly eroding landform.

Central and local government promotion of plantation forestry on erodible hill country in the Gisborne District resulted in large scale plantings of trees in a short window of time, hence as forest managers know results in a large scale harvest in a short window of time.

Short time frame, large land area clear fell harvests in catchments with steep to very steep hill slopes - Class VII to VIII land, with severe to extreme soil erosion potential are susceptible to accelerated soil erosion, especially where the forest infrastructure, harvest methods and rehabilitation of disturbed sites is not understood or appropriate for the erosion potential and adverse weather events that can occur.

In the 2018 period, there was a buoyant log market, so companies were harvesting a large resource at full capacity to a favourable market. This was observed in East Coast forests as forward road construction being undertaken in the winter season, harvesting being undertaken on recently constructed landings, log trucks on fresh roads an absence of erosion and sediment control and rehabilitating of disturbed sites.

However, it must be realised by forestry critics, that the rate of soil erosion experienced in Cyclones Hale and Gabrielle is far less then what would have occurred if the land had been in a pastoral land use.

In regard to the current discussion, we need to look for multi rotational forest management solutions, with a balanced outcome of positive economic and the environmental outcomes. Be mindful that people don't realise conservative environmental management cannot be sustained without a wealthy community.

3. Are there specific practices or ways in which we use the land that have caused more harm than others? Which of these practices are most important? Why?

Plantation forestry in the Gisborne District is a sustainable land use and can be managed so that the adverse effects of harvesting are avoided or mitigated, especially by applying prudent environmental management practices.

Unfortunately, there is an absence of knowledge and or understanding of sustainable land use and environmental forest management across the spectrum of forest managers and regulators involved in East Coast forestry. In their defence, experienced environmental foresters or experts who can provide the necessary technical knowledge and guidance are not a common resource in the East Coast or any other region of the country.

In my experience of the East Coast forest management, which includes the above mentioned investigation and also environmental management of forests in the catchment of Tokomaru Bay, the common the issues include: Working on a freshly constructed infrastructure often constructed on unstable geology, frequent cut to waste soil side cast onto steep to very steep hill slopes, harvesting large settings in small window of time, operating on hill slopes with soils in a high to extreme soil erosion risk category, not managing birds nests, an absence of appropriate storm water management, erosion and sediment controls and rehabilitation of disturbed sites, limited environmental monitoring, a large volume of non recoverable wood left on the cut over and in rivers or a position where it will enter a river, use of swing yarders and tower yarders using rigging systems that don't provide sufficient suspension of drags, inadequately managed end haul soil disposal sites and poorly constructed debris traps and not removing debris from rivers before line shifts have all been observed more than once. These are subjects where value can be added by regulation, compliance monitoring, education and improved processes.

Recovery of merchantable wood in Gisborne forests is somewhat different to other areas of the country. In the CNI a tree stem maybe cut into three logs with pulp logs and bin wood being recovered.

In Gisborne a stem pulled onto a landing is typically processed into two logs and the rest of the stem is waste, thrown onto the slope below the landing forming a bird's nest. Depending on the size of the setting, these nests can be large due to the limited number of log specifications resulting in a large volume of waste wood.

Frequently there are large number of tree stems that are not recovered in a harvest setting because the wood has no value. This includes wind throw and trees up rooted by earth flows or slope failure across a setting. This wood, is often found in rivers or on adverse slopes above rivers that are in the process of failing. Mid slope and birds nest failures often transport debris to rivers. This erosion

process and un-recovered wood accumulating in watercourses during yarding are the largest contributors of debris to watercourses on the East Coast.

In summary, I have observed a short fall in knowledge and environmental awareness in East Coast forest managers and earthmoving contractors. Some forest managers are aware of a resource consent for their earthworks and harvesting but have no idea what the compliance conditions require. Some managers were enthusiastic to learn while others were not interested. Working with contractors, teaching them improved work methods and explaining why they had to change and providing them with detailed work prescriptions and close supervision did improve their environmental performance.

4. Is there anything else we should know about that has contributed to the damage from severe weather?

Be aware that a lot of the recently mobilised wood would be legacy material. The sediment being sourced is probably from a combination of historic infrastructure works failing, and soil erosion on the harvested land. Be aware that more sediment was probably sourced from river bank erosion, soil erosion features in DoC managed Crown estate and on pastoral land than would have been sourced from growing plantation forests. Certainly a lot of the wood debris would have also been sourced from those non plantation forest lands. An analysis of debris on the Tologa Bay beach following the 2018 events identified a considerable portion was not sourced from plantation forests.

9(2)(a)

- The investigation team didn't scratch the surface of the work required to ensure good work practices are carried out by the forest industry on the East Coast.
- The Tologa Bay incident is the first of more to come. Cyclones Hale and Gabrielle confirming my comment.
- There is not a lot of environmental forest management knowledge in the Gisborne District Council.
- More compliance monitoring and education is required. Both staff and the forest industry
- Work with central government to construct an international market for wood chip and or construct a pulp mill in the Gisborne District. If successful, this could provide for the removal a lot of wood that is left on the cut over.

5. How do the current laws, policies and rules influence the way we use our land? What works well? What is unhelpful? Think about the current legislation, market drivers and conditions, regulations, rules, and the way in which requirements are enforced.

The National Environmental Standards for Plantation Forestry (NES-PF) are an effective and efficient instrument for delivering good environmental outcomes. It should be noted that Gisborne District has given effect to the National Policy Statement on Freshwater and has been for years requiring resource consents to provide for forest management activities within the Gisborne District. This is contrary to the statement frequently made by one environmental interest group representative voicing an opinion that the NES-PF is not delivering on good environmental outcomes.

Plantation forestry is a key driver of the district economy. Without forestry the district would be economically compromised, Over regulation of an already heavily regulated industry won't stop soil erosion and debris ending up on the beaches. To mitigate the effects of soil erosion, debris and sediment deposition the methodology of forest management on the East Coast has to change.

Gisborne District needs to undertake a plan review and address plantation forestry as a land use based on land classes, land use limitation and catchment flood response by identifying catchments with a known or potential soil erosion storm responsive and flooding and debris flow potential in consideration of both the forest and receiving environments. Apply a risk rating to these catchments weighted on the risk, develop rules that control land use in those catchments. In part the plan has this system in place, it just needs refining from land use classes to a whole catchment scale.

Put rules in the district plan for managing land use such as catchment cut constraints e.g. the area of harvest in 'at risk catchment' XYZ is not to exceed more than 30% of the total tree cover in the catchment over a rolling seven year period or;
Have regulations that address:
Stage harvest in catchments with identified severe to extreme risk, such as harvest a third, leave seven years, harvest the next third etc.
Burn birds' nests if a risk or debris flow remains after a digger has been used to pull back the slash it can reach
Burning cut over if necessary. Be mindful that once the debris issue is resolved, sediment will be the next environmental management concern
Working with the industry to improve contractor knowledge of good infrastructure construction and harvest methods
Require yarders to operate skyline systems that avoid drags sweeping debris downslope

What won't work

Regulating an already over regulated industry
Retiring land not LUC Class VIII from production forestry
Retiring stream margins from plantation forestry and establishing native trees
Removing all of the harvest debris from the cut over
Live debris traps
Native plantings or minor species for commercial forestry.

Both council staff and forest managers require education and support to increase knowledge of environmental forestry. Compliance monitoring needs to be more in-depth and undertaken at a more frequently undertaken by both the council and forest managers. Audits of compliance should be undertaken where the element of risk warrants a more in-depth understanding of forest management practices and how compliance is or not being achieved with compliance regulations.

As mentioned there is a need for a cooperative to be formed between central and local government to develop an end use for large to medium sized wood that is left on the cut over. One idea if economically viable and practical would be to create market for wood chip with a chipping plant

constructed at Tologa Bay with a floating pipe line out to sea and pump the chip onto ships for the export market.

6Anything else you would like to say about the current policy framework?

There is a need for a review of forest management and land use on the East Coast. Certainly, this enquiry doesn't come as a surprise to me. The problem with the enquiry will be the implementation of the recommendations. I don't think the council has the resources or staff with the knowledge and experience to implement the changes without support. The forest industry will need time to a djust their forest management regimes to accommodate any significant changes.
A public relations drive is required to identify the benefits that forestry provides to the district economy and well being of the district.
The benefits of plantation forestry need to be put in the public arena to correct the miss information that the media frequently voices on forestry and its affects on the environment.

7. What is your vision for the future of land use in the region?

Plantation forestry is a sustainable land use on the East Coast. It is the management of forest between harvest and year seven year window of risk or closed canopy that requires improved management to avoid or mitigate soil erosion, debris flows and sediment deposition in the receiving environment. This is achievable by implementation of improved practices as discussed above.

There are second and third rotation forests in other regions with an underlying weak geology and erodible soils where the incidence of debris flows and significant erosion has been avoided and or mitigated by ensuring the correct resource consent conditions are set for the proposed activities, in consideration of both the forest and receiving environment. Monitoring and auditing of compliance are carried out in a timely and professional manner, including NES-PF regulations. Enforcement work is also undertaken if necessary.

88. What do we need to do to achieve this vision?

9 Is there anything that shouldn't be changed, for example, things that if changed would make it worse?

Planting riparian zones in native trees and not being able to yard over them. Without this capability the alternative is to have to a road down every ridge. Roads produce a significant volume of sediment

Retiring land not Class VII from plantation forestry would result in losing a large land bank from productive use

Retiring land from plantation forestry resulting in forest boundaries that restrict or limit machinery and harvesting ability

Not allowing class VI to VII land to be used for plantation forestry
Recovering all of the wood off the cut over. The harvesting contractor will not recover wood he is not going to get paid for. The forest owner does not want to pay the contractor to recover wood that cant be sold. If all of the wood on the cut over had to be recovered then the economic viability of some forests would be questionable as harvest production rates would fall and costs increase significantly. A typical East Coast ridge top landing is too small to store the significant volume of wood that would accumulate if all of the wood on the cut over was recovered onto the landing. The consequential birds nest would most likely fail while the crew was still working on the landing. Debris on the cut over provides medium to protect the soil from rainfall impact, diffuse and slow storm water run off by creating roughness on the land surface. Removing it as some people suggest would result in an elevated volume of sheet, rill and gully erosion.

10 In your view, which groups need to be involved in developing solutions and what is the best way for these groups to be involved?

Please explain your answer here

First, it is important to identify the groups and persons who should not be involved. This includes groups who have no connection with both the East Coast community and forestry on the coast. Groups who champion their own vision of how forestry and the environment should be managed, but have little and mostly no real experience of forest management.
People who have good intentions but have no working knowledge of the subject of environmental forest management.

As mentioned local and central government need to work together to establish a market for the wood that is left on the cut over. If a market is produced for this wood, the debris flow issue will be significantly mitigated.

Initially you will need experienced environmental foresters to work with the council staff to provide advice guidance and supervision.

Forest managers and their contractors need to be educated to lift their work standards to an acceptable level of compliance with regulations and inline with forest industry best practice guidelines. They also have to be monitored and or audited to ensure they are compliant with consent compliance conditions or the NES-PF regulations.

Forest managers and contractors need council staff who understand the working environment of a production forest and have an ability to problem solve.
Frequently forestry people criticise council regulators who tell them the have a compliance issue, but have no idea how to achieve compliance or when asked for advice wont comment.

BACKGROUND MATERIAL TO SUPPORT LAND USE INQUIRY SUBMISSIONS

What is the context for sediment in New Zealand?

New Zealand is a geologically young country and erosion is a natural feature of the landscape. New Zealand has 0.2% of the world's land area but contributes 1.7% percent of the sediment washed into the world's oceans annually. Sediment occurs through soil erosion from natural causes, but land cover has a short-term influence on how much sediment is lost. For example, 40% of sediment comes from land in pasture. Highly erodible land is defined as "land at risk of severe mass-movement erosion (landslide, earthflow, and gully) if it does not have protective woody vegetation". However, there are some areas in the North Island (particularly Gisborne) where erosion rates are excessively high in comparison with everywhere else due to very soft rock.

As a consequence, land at risk of landsliding in Gisborne will be producing an order of magnitude more sediment into rivers in the long term than land at risk of landsliding in other areas, such as Manawatu-Wanganui. River systems wash sediment into the ocean. The rate at which this occurs can vary between hours and years, depending on e.g. high rainfall events. In the ocean, sediment moves and settles with waves eroding and preventing sedimentation, and tidal flows redistributing sediment. Sedimentation also occurs when the seabed is disturbed e.g. from bottom fishing and dredging. These local factors make it difficult to compare sediment accumulation rates between regions or locations without long-term monitoring.

Inshore Fisheries in New Zealand

Inshore fisheries include the area of the ocean out to the 12 nautical mile limit, as well as rivers and lakes within New Zealand. Species covered by these fisheries include:

• finfish fisheries – e.g. snapper, blue cod, flatfish, gurnard, terakihi, and trevally

• shellfish fisheries – including cockles, pipi, pāua, and rock lobster

• freshwater fisheries – mostly longfin and shortfin eels

• other aquatic life (like seaweeds).

Excess fine sedimentation is a stress on coastal marine ecosystems. Sedimentation affects fisheries through deposition of fine sediment on reefs, sessile organisms and the seabed and by increasing turbidity in the water column. Storms events and benthic disturbance (e.g. trawling and dredging) can cause land sediments to be retained and re-suspended in coastal systems for long periods of time. Species with little tolerance for sediment include paua, scallops, macroalgae and reef fish. They may be negatively affected by:

• clogging the gills of filter feeding shellfish (e.g. cockles, pipi and scallops);

• reducing settlement success and survival of larval and juvenile phases (e.g. paua, kina and rock lobster);

• reducing light transmission and growth success (macroalgae);

• impairing foraging success (e.g. reef fish and juvenile snapper); and

• modifying or removing important nursery areas and fisheries habitat (e.g. mussel beds, biogenic reefs, seagrass meadows and kelps).

Some coastal fisheries have declined or been closed to fishing due to the cumulative effect of these and other stressors on coastal ecosystems. Fisheries and habitats where sedimentation is a factor in their decline include:

• kelp beds in the Hauraki Gulf;

• estuarine shellfish (e.g. pipi and cockle) beds that were historically productive and important to iwi, and provide crucial habitats for the juveniles of many recreationally and commercially important species;

• the scallop fishery in Golden and Tasman Bay; and

• harbours such as the Kaipara where the abundance and health of scallops and other shellfish have significantly declined in recent years.

Sediment from harvested forests tends to be an episodic contributor to excess sediment in the marine area, particularly under high rainfall. Sediment from other land uses, such as pasture, is significant and more likely to be chronic.

Plantation forestry in New Zealand

New Zealand has around 1.7 million hectares planted in production (for harvest) forest. Over 90% of forests are pinus radiata, which is generally harvested at age 24-28 years. Plantation forests occur throughout the country with Central North Island being the largest wood supply region by a significant margin. Large forestry companies which own or manage over 1,000 hectares of forest account for 70% of the forest estate. By contrast, there are around 10,000 owners with fewer than 40 hectares of forest.

Around 71% of production forest is located on Land Use Classification class 6-8 land. This is generally steeper and more erosion prone than other land classes. In most cases forest cover of some sort provides the most effective form of erosion control on such land; rotational production forests can provide this cover. In the past the New Zealand Government established exotic forests to control erosion. Production forests also help manage water flow, sequester carbon, enable biodiversity, and deliver national and regional economic benefits.

After harvest the land is vulnerable to erosion for a period between 3-8 years due to the elevated risk of landslides until the next crop reaches canopy closure and root site occupancy. The vulnerability of a particular site depends on factors such as tree stocking density, the interval between harvesting and planting, geology, slope and terrain. It is during this period that debris flows are most likely.

A significant part of forestry environmental planning and management relates to managing this period in the forest cycle e.g. engineering works for roading and tracking.

How is plantation forestry regulated?

Councils manage sediment from land use activities. The Resource Management Act enables regulators to address sediment in three national direction instruments:

• National Policy Statement for Freshwater Management - introduced sediment attributes for suspended fine sediment in rivers and deposited fine sediment in wadable rivers.

• New Zealand Coastal policy Statement – Policy 22 covers sedimentation and the impacts of vegetation removal including the impacts of harvesting plantation forestry.

• National Environmental Standards for Plantation Forestry - set rules to prevent or manage erosion and sediment in every forestry activity to minimise the chances of it reaching freshwater systems and coastal environments.

National Environmental Standards for Plantation Forestry (NES-PF)

The NES-PF is administered by Te Uru Rākau. It requires:

• setbacks from freshwater bodies and the coastal marine areas at afforestation and replanting to reduce streambank erosion;

• control of sediment from the harvest cutover, earthworks, roading and tracking, stormwater, river crossings and quarry activity;

• qualitative in-stream sediment standards; and

• increased control requirements as the risk of mass movement erosion increases, based on the Erosion Susceptibility Classification (ESC).

o The ESC was developed by Manaaki Whenua Landcare Research to identify risk of mass movement erosion (gullying, earthflows, landsliding, and tunnel gullying) that delivers significantly more material to waterways than surficial erosion.

o 'Red zone' is the highest ESC rating. Resource consent is required for most activities in the red zone, including afforestation. Councils can refuse afforestation consents in the red zone. The intention of this provision is to avoid afforestation for harvest on areas that should remain in permanent forest or scrub cover. However, a number of forests on red zone land still need to be managed carefully to retain some form of forest cover in perpetuity.

Under the NES-PF, local authorities may apply more stringent rules to give effect to the New Zealand Coastal Policy Statement and the National Policy Statement for Freshwater Management.

Some of the noted effects of Forestry on Fisheries (insights drawn from past discussions)

Slash – the Tolaga Bay/Uawa floods and the deposition of thousands of tonnes of timber on beaches attracted media attention but the problem did not end at the beach. Many thousands of tonnes of timber went to sea creating navigation hazards for inshore fishing vessels and entangling static fishing gear, in many cases causing it to drag with subsequent damage to pots. There was direct and indirect cost in salvaging the gear including lost catches, additional operating time and lost fishing opportunity. Slash would cause even greater damage to set-nets and is a known disruption to inshore trawling in some areas.

Slash and whole trees have always been a hazard around the three big rivers, Waipoua, Uawa and Waiapu. Erosion and storm events have delivered natives, willows and now pine into the rivers. Observation from local fishers is that the lighter pine quickly ends up above the high tide line. Kanuka,

pohutukawa and eucalypts tend to remain in guts and crevices on the seabed. An event at Tolaga where >100 lobsters were found in slash drifts on the beach after a storm is linked to lost holding pots used by an illegal fishing operation. A dive or remote camera seabed study could be useful.

Pollen as sediment – there are millions of pine trees planted adjacent to coastlines and/or inland waterways which empty to the sea. Fishers can only speculate the massive tonnage of pollen that falls from those trees in every year and is blown or washed into the ocean. That is potentially a biological sludge which may be causing ecosystem effects, however further research to prove this is needed. Fishers suspect there is likely to be a significant tonnage of pollen ending up in the sea. During August/September off the coast between Mahia and East Cape every westerly sector wind sends thick yellow clouds out to sea. Seabed sampling is carried out by Port Eastland around the dredge dump sites close to the port but unsure if pollen was/is reported. The CRAMAC3 (Crayfish Area 3 commercial entity) is running some studies which look into the effects of pollen.

Copper is toxic to a wide range of marine organisms, hence it's application as an anti-fouling, but significant concentrations/doses are difficult to determine. Copper gets into the sea from two forestry processes, regular spraying of standing trees with copper fungicide for Dothistroma and spraying logs at the port with a soluble copper fungicide for sapstain. Ironically, when Port Eastland upgraded the log yard on the reclamation from bare ground to a sealed surface the stormwater runoff copper content increased. The Port has tidied up its sampling and reporting and now retains the first 50,000 litres of runoff and cycles it back through the log spray. Resin acid leachate from logs stored at the port are another concern but it has been hard to quantify the risk. Julie Hills wrote a consent submission last year that acknowledged that the Ports view on the value of testing lobsters was reasonable. Generally, after multiple consent hearings, the Port is adhering to sampling and reporting conditions. The Gisborne District Council is doing more to oversee Port operations and informing us of any issues. Staff turnover at the Port and GDC is probably the biggest risk.

Leachate from bark – It is my understanding that pine tress are sprayed with a copper compound which eventually leaches from the bark and is an observed pollutant in the vicinity of Gisborne harbour. If the copper treatment is standard across the industry then similar will be happening elsewhere. There is no study that I can find which would suggest that copper leachate is safe or unsafe to the marine environment. In Gisborne it is assumed to be safe. This is another strand of research being looked into by CRAMAC 3.

Submission to the Ministerial Inquiry into Tairawhiti/Gisborne and Wairoa Land-use

By Bill Hodge, retired law professor (University of Auckland, 1972-2021)

Re "slash" and aggravated flood damage

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2. "Slash" used to mean a verb, a sweeping movement with a bladed tool or weapon. Now "slash" as a noun, has entered our vocabulary as a nuisance. Not only in ordinary speech, but also in law, slash can be the tort of nuisance. We don't have an exact precedent for slash but see the examples below:

3. The non-sporting Miller family found a new-build house, nice garden, patio, good indoor-outdoor flow and moved in. The bonus was the neighbouring village green. Once the summer came, however, the lads of village, perhaps invigorated by the new pink ball, began to rain down sixes upon the Millers' patio, making it difficult to sit outside on a weekend day of cricket. The Millers sued in nuisance and won. *Miller v Jackson* [1977] QB 966.

3. Ironically, about 100 miles away, and a few years earlier, Mr Weller was happily operating his auction and sale yards for local stock, especially cattle. An upwind neighbour of Mr Weller was the appropriately named Foot and Mouth Disease Research Institute. Unfortunately, the well-intentioned researchers allowed the virus to escape. It could not be excluded that the virus was wind-borne, and Weller's downwind business had to be quarantined and totally shut down. Weller sued and succeeded. The common grounds, so far, are cricket balls and a lethal virus emanating from the neighbouring property. *Weller v Foot and Mouth Disease Research Insittute* [1966] 1 QB 589.

4. The Langans were organic farmers, raising tomatoes, beans, garlic and cucumber, all certified to be herbicide and insecticide free, and thus highly valued in the organic markets. Their neighbours, the Thalheimers, suffered from a beetle infestation in their crops and hired a "crop duster", in this case a helicopter, to spray a chemical pesticide known as Thiodan. Unfortunately, on the day of the intended spray, the wind came up, unexpectedly, and the pesticide fell on the hitherto organic crops. The crops were tested, found to be contaminated, and the Langans' property lost its organic certification. The Langans won their case in nuisance for the difference in value of prime organic crops versus non-organic produce. Cricket balls, a lethal virus, and a pesticide. *Langan v Valicopters Inc* (1977) 88 Wash 2nd 855; 567 P 2nd 218.

5. Down in Christchurch, Greenwood constructed a glass-walled verandah roofed with reflective glass installed on a 60 degree angle. For six months of the year, when the sun shone from mid-morning to early afternoon, a blinding reflected glare of the sun poured into the BNZ business premises, making use of computers and other work difficult. BNZ sued for nuisance and won the cost of expensive venetian blinds. *BNZ v Greenwood* [1984] 1 NZLR 525.

6. Meanwhile, out in Glendowie, in east Auckland, Mr French was constantly battling to free his land from invasive variegated thistles, a non-indigenous nasty import. It was not difficult to locate the source and the breeding ground which was up-wind parkland, known as Mt Taylor. The owners had made no effort to control the noxious thistles, and Mt French won his case in common law nuisance in the High Court. Cricket balls, a lethal virus, a pesticide, artificially reflected sunlight, and thistle seeds. *French v Auckland CC* [1974] 1 NZLR 340.

7. On the other hand, and closer to town, the Bloodworth family of Seaview Rd Remuera, unsuccessfully sued the operators of noisy motorcycle racing at a park (which has now unfortunately slipped away) known as Sarawai Park in Newmarket. While recognising that noise can be a nuisance, the High Court found in that case, that, according to "plain sober and simple notions" of living "among our people", the plaintiffs were being a bit supersensitive, and their action in nuisance failed. *Bloodworth v Cormack* [1949] NZLR 1058.

8. The common ground of all these cases is an uphill, upwind, upstream landowner who uses their land in such an unreasonable way that it interferes with the neighbouring downstream or downwind or downhill

landowner and the peaceful use of their land. It is an aspect of common law, common law nuisance, and the courts are open to hear such cases.

9. In my view, respectfully submitted, we have forgotten that landowners have rights against other landowners, and our common law heritage has been largely occluded by the expectation of Council responsibility for anything and everything. It really began in 1986.

10. In 1986, the Brown family sued Heathcote County and the Christchurch Drainage Board for failing to advise them that the Heathcote River had, in the past, overflowed its banks; the house that Mrs Brown had built on a subdivided lower terrace flooded three successive years. They were successful, against the Council, although Mrs Brown's father, who had subdivided the land for his daughter, had been in possession since 1949, and should have had knowledge of the winter storms. The Court of Appeal, in Brown's successful case, said,

"in New Zealand the functions of local authorities regarding the subdivision and development of land [are broader than their counterparts in England]. Local authorities. . . . are concerned generally with matters going well beyond the range of personal health and safety; the preservation of community building and living standards, property values and amenities [are] part of their proper sphere." [Cooke P in *Brown v Heathcote County Council* [1986] 1 NZLR 76]

11. I think the problem is, ever since the *Brown* case, that we have all been acculturated or programmed to assume that all land use problems, or land misuse problems, from leaky homes to noxious weeds, begin and end with Governments, especially Councils. Add the overweening statutes, such as the RMA, and associated legislation. We look to Council to regulate, license, prohibit and control land use, and look to them when something goes wrong.

12. Farmers, orchardists, and other landowners who have suffered damage to fences, races, orchards, crops and fields, buildings and homes have an arguable case in common law nuisance against upstream landowners who have unreasonably used or misused their land, as their forestry is harvested. Upstream, uphill, upwind etc landowners have a duty not to use their land for their own benefit so as to unreasonably injure those - downstream, downhill, downwind, etc landowners - who could be foreseeably injured if they do not take care. Foreseeability would no longer seem to be an issue here.

13. Injured landowners should record, photographically and otherwise, the damage caused and do their best to identify the land of origin of the logs and branches. The plaintiffs, in the tort of nuisance, would be individual landowners, whose cases could be combined, in something like a class action. The defendants would be the identifiable upstream landowners and those on the land lawfully, such as contractors, who have responsibility for the log harvest. (Alternatively, the first defendants, the upstream landowners, would join as second defendants those contractors, where the owners had contracted out the harvest. In that case, the argument would be between the first and second defendants, as the damage suffered by the plaintiffs seems to be unarguable. It is common, for example, to have a dispute between defendants in 'leaky " home cases as to which defendant should pay).

14. Part of the problem is that we have been nurtured to think that all problems arise with the local body, as an automatic defendant. In fact, private landowners continue to owe a duty to other landowners, even if the relevant council could, conceivably, have restricted the damage. Indeed, to the extent that the relevant council owns bridges and other improvements, they too could be a plaintiff.
The good thing about the remedies available are twofold: plaintiffs can receive damages for proven losses, and plaintiffs can seek injunctive relief to prevent it happening again. The Courts are open.

Bill Hodge
Faculty of Law,
University of Auckland
(Retired)

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9. In my view, respectfully submitted, we have forgotten that landowners have rights against other landowners, and our common law heritage has been largely occluded by the expectation of Council responsibility for anything and everything. It really began in 1986.

10. In 1986, the Brown family sued Heathcote County and the Christchurch Drainage Board for failing to advise them that the Heathcote River had, in the past, overflowed its banks; the house that Mrs Brown had built on a subdivided lower terrace flooded three successive years. They were successful, against the Council, although Mrs Brown's father, who had subdivided the land for his daughter, had been in possession since 1949, and should have had knowledge of the winter storms. The Court of Appeal, in Brown's successful case, said,

"in New Zealand the functions of local authorities regarding the subdivision and development of land [are broader than their counterparts in England]. Local authorities. . . . are concerned generally with matters going well beyond the range of personal health and safety; the preservation of community building and living standards, property values and amenities [are] part of their proper sphere." [Cooke P in *Brown v Heathcote County Council* [1986] 1 NZLR 76]

11. I think the problem is, ever since the *Brown* case, that we have all been acculturated or programmed to assume that all land use problems, or land misuse problems, from leaky homes to noxious weeds, begin and end with Governments, especially Councils. Add the overweening statutes, such as the RMA, and associated legislation. We look to Council to regulate, license, prohibit and control land use, and look to them when something goes wrong.

12. Farmers, orchardists, and other landowners who have suffered damage to fences, races, orchards, crops and fields, buildings and homes have an arguable case in common law nuisance against upstream landowners who have unreasonably used or misused their land, as their forestry is harvested. Upstream, uphill, upwind etc landowners have a duty not to use their land for their own benefit so as to unreasonably injure those - downstream, downhill, downwind, etc landowners - who could be foreseeably injured if they do not take care. Foreseeability would no longer seem to be an issue here.

13. Injured landowners should record, photographically and otherwise, the damage caused and do their best to identify the land of origin of the logs and branches. The plaintiffs, in the tort of nuisance, would be individual landowners, whose cases could be combined, in something like a class action. The defendants would be the identifiable upstream landowners and those on the land lawfully, such as contractors, who have responsibility for the log harvest. (Alternatively, the first defendants, the upstream landowners, would join as second defendants those contractors, where the owners had contracted out the harvest. In that case, the argument would be between the first and second defendants, as the damage suffered by the plaintiffs seems to be unarguable. It is common, for example, to have a dispute between defendants in 'leaky " home cases as to which defendant should pay).

14. Part of the problem is that we have been nurtured to think that all problems arise with the local body, as an automatic defendant. In fact, private landowners continue to owe a duty to other landowners, even if the relevant council could, conceivably, have restricted the damage. Indeed, to the extent that the relevant council owns bridges and other improvements, they too could be a plaintiff.
The good thing about the remedies available are twofold: plaintiffs can receive damages for proven losses, and plaintiffs can seek injunctive relief to prevent it happening again. The Courts are open.

Bill Hodge
Faculty of Law,
University of Auckland
(Retired)

SUBMISSION ON

Ministerial Inquiry Land Use

6 April 2023

To: Ministry for the Environment
Name of Submitter: Horticulture New Zealand
Supported by: Citrus NZ, Onions NZ, Process Vegetables NZ, and Summerfruit NZ

Contact for Service:

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Horticulture™ New Zealand
Ahumāra Kai Aotearoa

OVERVIEW

Submission structure

1. **Part 1**: HortNZ's Role

2. **Part 2**: Executive Summary
   An outline of the key topics our submission covers.

3. **Part 3**: Submission
   Our submission covers the impact of Cyclone Gabrielle on growers and the policy measures that exacerbated adverse effects.

Our submission

Horticulture New Zealand (HortNZ) thanks the Ministerial Inquiry Land Use (MILU) Inquiry Panel for the opportunity to submit on the MILU and welcomes any opportunity to continue to work with the Ministry and to discuss our submission.

The details of HortNZ's submission and decisions we are seeking are set out in our submission below.

PART 1

HortNZ's Role

Background to HortNZ

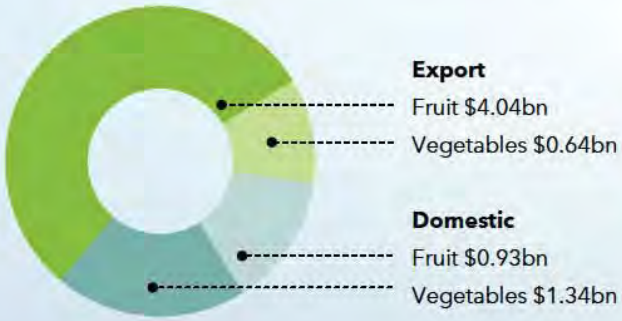
HortNZ represents the interests of approximately 5,500 commercial fruit and vegetable growers in New Zealand who grow around 100 different fruit, and vegetables. The horticultural sector provides over 40,000 jobs.

There is approximately, 80,000 hectares of land in New Zealand producing fruit and vegetables for domestic consumers and supplying our global trading partners with high quality food.

It is not just the direct economic benefits associated with horticultural production that are important. Horticulture production provides a platform for long term prosperity for communities, supports the growth of knowledge-intensive agri-tech and suppliers along the supply chain; and plays a key role in helping to achieve New Zealand's climate change objectives.

The horticulture sector plays an important role in food security for New Zealanders. Over 80% of vegetables grown are for the domestic market and many varieties of fruits are grown to serve the domestic market.

HortNZ's purpose is to create an enduring environment where growers prosper. This is done through enabling, promoting and advocating for growers in New Zealand.



Industry value $6.95bn
Total exports $4.68bn
Total domestic $2.27bn

PART 2

Executive Summary

Impact of Cyclone Gabrielle on Horticulture

The devastating impact of Cyclone Gabrielle led to destroyed homes, workers accommodation, facilities, and equipment. Entire crops were contaminated with flood waters, swept away or left to rot because they couldn't be harvested or processed after the storm. Trees were torn from the ground and orchard infrastructure was damaged and destroyed.

Cyclone Gabrielle has highlighted the vulnerability of horticultural land on floodplains to the large climatic events predicted to become more frequent with a changing climate.[1] The loss of vast quantities of soil from pastoral hill country and slash from plantation forestry has an immense impact on downstream uses of highly productive land.

National Policy

Financial support will make the most immediate impact to relieve the burden of recovery on growers. In the longer term, clear national policy direction across resource management, freshwater, and climate change is needed to enable and provide for low-emissions food production. Our submission goes into great detail about a suite of policy changes that would support this aim.

PLANNING AND POLICY OUTCOMES SOUGHT:

- Make an explicit policy provision that recognises the importance of food production and supply to support the health of New Zealanders;
- Protect highly productive land for primary production for future generations;
- And support those who are willing to reshape our landscape to avoid the erosion and sediment-related problems seen in Tairāwhiti and Hawkes Bay.

Local Policy

Regional councils need to take responsibility for catchment modelling and maintaining flood infrastructure in line with the changing climatic conditions. Gisborne needs improved connectivity to other regions in the face of disaster, and that requires massive investment in new road infrastructure and maintaining the existing roads.

[1] Chapter 5: Looking ahead: future emissions and climate | Ministry for the Environment; NIWA Client report (gdc.govt.nz)

PART 3

Submission

1. Horticulture in Tairāwhiti, Tūranganui-a-Kiwa, and Te Wairoa

Horticulture is integral to the Gisborne and Hawke's Bay regions. In Gisborne, there are approximately 390 growers across 8,155 ha of land (3,074 fruit, 5,081 vegetables)[2]. Gisborne grows about two-thirds of the New Zealand citrus supply, one-half of sweetcorn, and one-third of squash.[2] A significant amount of kiwifruit, broccoli, cauliflower, and other vegetables are also grown in the region.

There are approximately 380 growers in the Hawke's Bay across 17,800 ha of land (9,572 ha for commercial fruit production, and 8,256 for vegetables).[2] Seventy percent (70%) of all apples produced in New Zealand are grown in the Hawke's Bay. The region also produces over thirty percent of New Zealand's processed vegetables.[2] Summerfruit, squash, kiwifruit and onions are other significant crops for the region.[2]

Gisborne and the Hawke's Bay produce significant quantities of food for domestic supply, which is important for the health and well-being of all New Zealanders. The contributions of these regions to the domestic food supply are important because of the warmer climate which means that they can provide fresh produce when other regions are not able to provide fruit and vegetables into the supply chain.

2. Resilience

The devastating impact of Cyclone Gabrielle led to destroyed homes, workers accommodation, facilities, and equipment. Crops were contaminated with flood waters, rendering them unsafe to sell or consume. Trees were torn from the ground and washed away. This type of devastating weather event will unfortunately only become more frequent and intense as climate change progresses, which is a massive threat to our domestic food supply and valuable crop exports. The NIWA report *Climate change projections and impacts for Tairāwhiti and Hawke's Bay* found that "extreme, rare rainfall events are projected to become more severe in the future," a finding that is not exclusive to those regions but indicates that we need to prepare for future, potentially more severe cyclones.[3]

The resilience of our food supply must be strengthened in the face of increasingly unpredictable weather, with produce production spread across multiple regions. Growers need the ability to move regions more freely to diversify and reduce risk from natural disasters. Regions with overly restrictive policy settings but favourable climatic

[2] freshfacts-2021.pdf (p. 5)
[3] NIWA Client report (gdc.govt.nz), Nov 2020. (p. 14)

conditions to horticulture like Canterbury and Waikato make this difficult. This redundancy in supply is only possible if regulatory conditions across regions enable horticulture. National policy direction for food security is the best path forward to push consistent and workable rules for horticulture across New Zealand.

3. Protecting Highly Productive Land

The objective of the National Policy Statement for Highly Productive Land (NPS-HPL) is that "Highly productive land is protected for use in land-based primary production, both now and for future generations."[4]

Highly productive land is particularly valuable for supporting domestic food production that support New Zealand's transition to a low emissions economy.

Highly productive land should be managed as a strategic intergenerational asset. This land supports the most efficient use of space for primary production and grows the healthiest food for New Zealanders.

The Intergovernmental Panel on Climate Change (IPCC) are confident that demand-side adaptation, such as consumer adoption of healthy and sustainable diets in conjunction with reduced food loss and waste, can allow more food to be produced on less land area.[5] That implies a cultural shift toward more fruits and vegetables, so while less land is needed to produce the same number of calories as other food types, higher quality soils must be protected for growing.

3.1. Protecting highly productive land from natural hazards and adverse impacts from upstream land use

It is critical that highly productive land is protected for future generations from flooding, debris and sediment dumps during flooding events. This protection should include catchment scale assessments of risks, land use management and regulation to reduce the adverse effects of landslides and debris flows on downstream land uses.

3.2. Protecting highly productive land from inappropriate development

Highly productive land is a finite asset that is under threat, most significantly due to urban development. The Ministry for the Environment report 'Our Land 2021' states that the area of highly productive land that was unavailable for horticulture because it had a house on it increased by 54% from 2002 to 2019.[6] The NPS-HPL attempted to resolve this conflict

[4] National Policy Statement For Highly Productive Land 2022 (environment.govt.nz)
[5] Chapter 5 : Food Security – Special Report on Climate Change and Land (ipcc.ch)
[6] Our Land 2021. Ministry for the Environment.

between development and production on quality soils, and its policy direction must be acted upon as East Coast regions rebuild. Highly productive land, which is most often flat, may have a lower level of flood protection compared to built-up urban areas. Climate adaptation planning should be at the heart of the rebuild conversation, as well as how to reduce the risk to food production from future flooding events.

There is still the need to retain supporting activities such as packhouses and workers accommodation on highly productive land. The NPS-HPL must ensure the flexibility to build these facilities on highly productive land where they are ancillary and necessary to support primary production. However, it should be recognised that providing for large, collective facilities that may serve more than one grower may be more suitable than requiring growers to provide for these supporting activities on their own properties – particularly when some of these properties may be subject to unacceptable flood risk.

4. Threat to Food Security

Before the cyclone, Gisborne contributed 67% of citrus, 33% of squash, and 49% of sweetcorn.[2] The Hawke's Bay was home to over half of the country's apple growing land, 60% of squash, 30% of summerfruit, and 30% of beans and peas.[2]

Most vegetables are grown for domestic consumption, and many fruits as well, particularly summerfruit and citrus.[2] These crops were impacted by the cyclone to varying degrees, but both regions provide significant amounts of our national supply of fruits and vegetables that will be lost if affected growers don't get the support they need to recover. Due to New Zealand's geographic isolation, it is not possible to import all the fresh produce we need to feed our population, so domestic production of fruits and vegetables is critical.

When major growing regions like the ones covered by this consultation are battered by severe weather and forced to halt production, the country's food supply suffers. As we've seen the last few months, the price of fresh produce skyrockets which increases the cost of living and makes it difficult for families to get nutritious food.

Food insecurity is already pervasive in New Zealand, linked with poor physiological health outcomes and psychological distress.[7] A 2019 Ministry of Health study analysed household food insecurity among children in New Zealand and estimated that 19% of all children in New Zealand (174,000) live in food-insecure households.[8] There are complex social and economic reasons why people struggle to meet their nutritional needs. Addressing the issue of food insecurity will be even more difficult, however, if supply is reduced because growers are forced out of the business or entire food producing regions are left hanging out to dry, forcing prices of healthy food to increase.

Beyond the first step of feeding communities, it is critical that we prioritise healthy, nutritious foods to improve health outcomes. New Zealanders diets aren't as healthy as they could be. Ministry of Health data indicates that only 33.5% of adults and 44.1% of

[7] *The association of food security with psychological distress in New Zealand and any gender differences*, Social Science & Medicine 2011

[8] Ministry of Health. (2019). *Household food insecurity among children, New Zealand Health Survey*

children are meeting fruit and vegetable intake guidelines.[9] For families living in deprived areas, increases in fruit and vegetable prices compel them to substitute the purchase of healthier whole fruit and vegetables with cheap, energy-dense and nutrient-poor products.[10]

Importing fresh produce to New Zealand at scale is not viable because of our geographic isolation, so enabling local food production is the best way to improve access at the start of the supply chain. Vegetable growers, who grow over 80% of their product for domestic consumption, rely on access to highly productive land. KPMG's 2017 report on New Zealand's domestic vegetable production demonstrated that of the ten key vegetables that are staples of New Zealand diets, the vast majority are consumed or processed in New Zealand.[11] Should access to highly productive land for food production decrease, fruit and vegetable supply will fall with it.

[9] New Zealand Health Survey Data. Accessed: https://minhealthnz.shinyapps.io/nz-health-survey-2019-20-annual-data-explorer/_w_b6ac76b1/#!/explore-topics

[10] Rush, E., Savila, F., Jalili-Moghaddam, S., & Amoah, I. (2018). Vegetables: New Zealand Children Are Not Eating Enough. Front. Nutr.

[11] KPMG, 2017 New Zealand's domestic vegetable production: the growing story.

Discussion Questions

The following are HortNZ's responses to specific questions from the inquiry.

Q. 1	**Tell us about your experience during Cyclones Hale and Gabrielle? What effects have you experienced?**

Cyclone damage from floods and the river of debris that came along with the water touched every aspect of growers' lives. As HortNZ Chief Executive Nadine Tunley wrote, "Growers are counting the cost of the cyclone, flooding and silt, in terms of lost homes, orchards, vehicles, packhouses, tractors and all the other equipment and technology that goes to make up a modern growing operation."[12] Some growers returned to their land to find orchard trees torn out of the ground and washed away, their homes destroyed, and metres of lifeless silt burying productive soil.

In some orchards, flood waters rose high above the canopy of fruit trees and didn't fully retreat for days, drowning their roots and inflicting long-term damage to plant health.[13] Fruit or vegetables that were touched by floodwaters became unsafe to sell or eat, which meant a massive loss of income for impacted growers. Crops are rarely, if ever, insured due to lack of affordability.[14] Even in those orchards where floodwaters didn't contaminate the fruit, the ground was often too saturated to send workers out to harvest it in time.[15] For those who are able to pick, growers are concerned about the logistics of getting their produce to market, from Gisborne to domestic markets and the ports in Napier and Tauranga for export.

Growers are still shifting silt and piling up debris, whether it's orcharding frames, trees or vines. This is a gruelling and anxious time as fruit growers determine whether the trees and vines that they've invested so much time and money into are still viable and as vegetable growers assess the damage to their soil from lifeless silt. Soils that were buried in sediment became anaerobic (lacking oxygen), killing any plants living there.[16] Serious remediation is required to restore organic matter and oxygen to the earth.

Clean up is mind-bogglingly expensive – one grower estimated that he spent $12,000-$15,000 on diggers and labour to move silt just in his first day after the cyclone passed.[17] The Tairāwhiti Horticulture Cyclone Recovery Group estimates costs of $30,000 - $40,000 per hectare for deep silt removal, plus tens of thousands more to rebuild and replant.[18] For those who lost fruit trees, it may take many years to get

[12] Clean up's underway in earnest | Horticulture New Zealand – Ahumāra Kai Aotearoa (hortnz.co.nz)
[13] Floods add to kiwifruit woes (ruralnewsgroup.co.nz)
[14] Cyclone Gabrielle: Prime Minister Chris Hipkins returns to Hawke's Bay, hears most crops uninsured - NZ Herald
[15] Hawke's Bay orchardists assess future, more than a week on since cyclone | RNZ
[16] Understanding silt – and what to do about it (farmersweekly.co.nz)
[17] Bevin, Andrew, "Bulk of fruit crops uninsured." 28 Feb 2023. *Greymouth Star*, page West Coast 4.
[18] Crop damage estimated at $42m – The Gisborne Herald

production up and running again between remediating the soil, buying new trees, and waiting for them to reach maturity.[19]

It is an open question where money will come from to rebuild businesses. One grower said that banks will not fund new capital expenditure for those impacted – if an orchardist has lost their infrastructure, radical downsizing is the only option for most. Another grower's opinion was that they won't be able to replant until their business is profitable again given lack of support from the banks – which is quite a task without trees. Getting reimbursed for crop losses is helpful, but one grower estimated that lost crop value only accounts for about 15% of the capital cost to re-establish an orchard.

This barren paddock was once a five hectare apple orchard.

Growers are wondering, do I replant as soon as I can (for some vegetable growers, that might not be for another 18 months) or do I wait for further relief or policy signals about whether growing will be viable? Many growers lease their land and are still making rent payments on lots that were destroyed. One grower said that a landowner who owns 25% of the land he leases was giving him some leeway, but the grower is still on the hook for the other 75%. Some are already walking away from their leases.

Faced with the prospect of rebuilding from the ground up, some growers are wondering whether it's even possible to recover or if they should leave the industry altogether.

[19] Hawke's Bay orchardists assess future, more than a week on since cyclone | RNZ

Is this a chance to retire or reduce overheads and simplify operations, particularly given all the current uncertainties in New Zealand and the rest of the world? Especially for older growers, taking a decade or more to return to full production is not an option. Rather than just reimbursing each grower for crop lost, it might make more sense to make additional grants available for those with a business plan to scale up production to make up for those who leave the industry.

Time is short to give growers the support they need, or they may leave the sector altogether, leaving New Zealand short on food supply.

The section below details the crop loss in both Tairāwhiti Gisborne and the Hawke's Bay across multiple fruits and vegetables.

Two people stand on top of a seven metre deep pile of slash on a four hectare orchard. That makes 280,000m³ of material to remove or burn.

Damage to the Pine Valley Orchard which is on the banks of the Nuhaka River, between Gisbone and Wairoa.

Tairāwhiti Gisborne

Farm and orchard gate crop loss inflicted on horticulture by Cyclone Gabrielle is estimated at $42 million in the region, according to the Tairāwhiti Horticulture Cyclone Recovery Group.[20] This is in addition to the estimated $80 million of pastoral farming damage.[20] In total, 57.6% of crop producing land sustained partial or complete losses based on the Recovery Group's survey of growers, not including LeaderBrand's massive operation in the area.[20]

[20] Crop damage estimated at $42m - The Gisborne Herald

Gisborne Crop Losses[21]	
Crop	**Farm Gate Value (NZD)**
Seasonal crops (tomatoes, sweetcorn, maize, squash)	$23.469 million
Apples	$6.069 million
Kiwifruit	$5.667 million
Grapes	$4.912 million
Citrus	$1.780 million

The kiwifruit industry is looking at the impact in terms of three categories of fruit:

- A – will be fine to pick;
- B – will need a close assessment this year, and will probably have ongoing plant health issues;
- and C – lost crop and structural damage to orchard.

For kiwifruit, 15% (105 ha) of the Tairāwhiti Gisborne crop is estimated to be in categories B and C, as of March 15th. 12% of orchards in the region were impacted.

The damage to the apple industry is yet to be accurately estimated.

In terms of vegetables, 80% of process tomatoes were lost, 35% of squash and 50% of sweetcorn, as of March 15th, 2023. The total yield loss was 26,000 tonnes of produce. Please note these are still the early estimates.

For citrus, the estimated yield loss was 1,760 tonnes.

For up to ten days after the cyclone, Gisborne's water access was severely restricted due to damage to pipelines to the Mangapoike Dams and the Waipaoa Water Treatment Plant.[22] Water is critical for washing and processing fruits and vegetables, and tomatoes in particular – which were at peak harvest time when the cyclone hit – require a lot of water. Cedenco is the biggest processing plant for tomatoes in Tairāwhiti Gisborne and a major local water user. Due to the crisis, they were unable to operate for over three weeks until they were able to put in their own treatment plant and truck water from growers' irrigation systems. In the meantime, two thirds of Gisborne's tomato crop was lost, rotting in flooded paddocks because it couldn't be

[21] Tairāwhiti Horticulture Cyclone Recovery Group newsletter, 23 March 2023
[22] "Every Day Feels Like a Year," *NZ Grower*, Vol 78, No. 02, March 2023. (p. 20)

processed. 400 million tonnes of tomatoes per day were ready for harvest, for 24 days with no water. In total, 9,600 mega tonnes were lost because they couldn't be processed, and another 2,400 mega tonnes were lost due to flooding.

This is the second disaster year in a row due to factory covid lockdowns and a cyclone last year which meant tomato growers lost thirty harvest days in March. After two years of crises in a row, it's difficult to plan ahead. Growers need to order seed in the next few weeks if they want anything to harvest in 2024, but buying that seed is not financially viable with the current damage. Government compensation and loans are the only way to ensure there will be a harvest next year. There are hundreds of jobs at stake between farms and the packhouse at peak season.

Tomato harvest in Gisborne.

Destroyed tomatoes post Cyclone in Gisborne.

Hawke's Bay

Because of the cyclone, the Hawkes Bay apple crop is down by 33%, which is a reduction of 4.3 million TCEs (tray carton equivalents) across the range of varieties grown in the region. Just under half the area planted in apples (3,400 hectares out of 7,300 hectares) have been affected by the cyclone, and just over half the apple growers in the region (80 out of 150) have been affected. NZ Apples and Pears estimates that clean-up costs will vary from $17,800 per hectare for orchards with flood damage but no silt to $129,800+ per hectare for those with severe flood damage and over 500mm of silt, assuming that growers are allowed to burn tree waste. The long-term impact on the industry is very hard to estimate, as at this stage, there are so many variables.15 However, the industry would like to return to its previous growth trajectory.

50% (105 ha) of the Hawkes Bay kiwifruit crop is estimated to be in categories B and C described above, representing an estimated loss of $18 million in total fruit and service payments (TFSP).

60% of vegetable growers (30 out of 50) were impacted by the cyclone.[23] 72% (5500 of 7600 ha) of vegetable producing land was impacted, and 19% of that land faces a long term impact to soil and production which will likely mean no crop in 2023.[23] The estimated farm gate value loss due to the impact on squash, onions, tomatoes, beans, sweetcorn, pumpkins, potatoes, and melons is $78.2 million, with squash comprising $49.8 million of that as of March 24, 2023.[23] Vegetable growers estimate that clean-up will cost them $1,000-15,000 per hectare. Of growers surveyed, 23% reported a severe impact from the cyclone which threatens the survival of their business.[23] Together, those businesses employ 161 permanent employees and 452 seasonal workers whose employment is now at risk.[23]

[23] Hawkes Bay Vegetable Growers Association Survey, 24 March 2023

For summerfruit, 246 ha out of 651 total ha and 25 out of 64 growers were affected.

Community Resilience

Growers have been remarkably resilient and community minded. NZ Apples and Pears organised a website to donate machinery and other support to those impacted to help with the clean-up. South Island apple growers even shipped equipment up to cyclone-impacted regions.[24] When Gisborne's water infrastructure was wiped out in the cyclone, keystone vegetable grower LeaderBrand shared water from their private dam with neighbouring businesses.[25] LeaderBrand's generosity, and other farms' bores and irrigation schemes, kept the horticulture sector running at all during this trying period.

Q. 2	**What is it about the way we use land, and how land use has changed over time that led to the effects being so severe?**

Wood Debris from Plantation Forestry

It's no secret that carbon farming and forestry are responsible for the deluge of slash that covered vegetable crops and orchards.

The incentives within the Emissions Trading Scheme (ETS) have led to increased forestry planting, and the averaging method has supported logging of plantation forest. The current ETS forestry settings incentivise replacing farming land with exotic forests without regard to food security or the negative externalities for rural communities.[26]

While plantation forestry has an important role in providing carbon offsets, the economic incentives are being privatised while the economic costs to downstream land and infrastructure are being passed on to tax-payers, ratepayers and users of flat land.

Sediment Loads from Pastoral Hill Country

Vast sediment deposition has resulted from extensive erosion of pastoral hill country. The impact and management of sediment from pastoral hill country is not adequately managed. In evidence developed for the TANK hearing, Catherine Sturgeon analysed the Council's assessment of sediment risk and proposed management approach. She found that council had misattributed bank erosion to activities adjacent to rivers and sought to manage sediment loads though riparian corridors and setbacks. While we are supportive of these measures, analysis of the sediment loads told a different story.

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[24] South Island apple growers donate machinery to cyclone-hit orchard owners | Stuff.co.nz
[25] Salde, Maria. "Private dam saves the day in post-Gabrielle Gisborne." 28 March 2023. *National Business Review*.
[26] Final-He-Waka-Eke-Noa-submission-18-Nov-22.pdf (hewakaekenoa.nz)

The hill-country was overwhelmingly the highest risk activity and had the least priority for management in the proposed plan.

Erosion on pastoral hill country was immense.

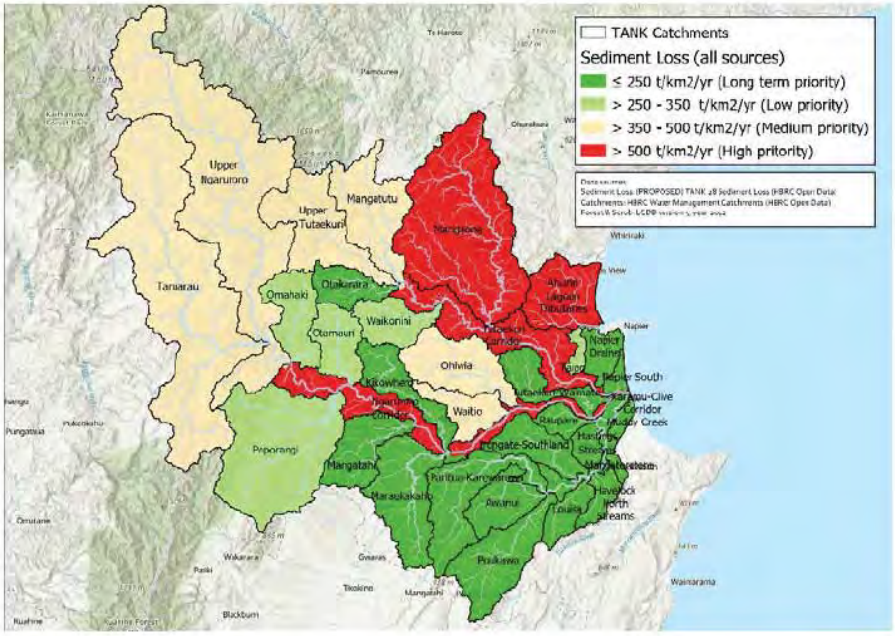

Figure 1: Sediment loss priority map, recreated by Jacobs using HBRC web portal data. This figure matches the PC9 sediment yield priority map except for the Poporangi and Omahaki sub-catchments.

An alternate priority map that omits the streambank erosion proportion of the sediment yield (Figure 2). The priorities have been mapped based on quantiles (as without the streambank proportion no sub-catchment gets above the 500 t/km^2/yr threshold for 'high priority').

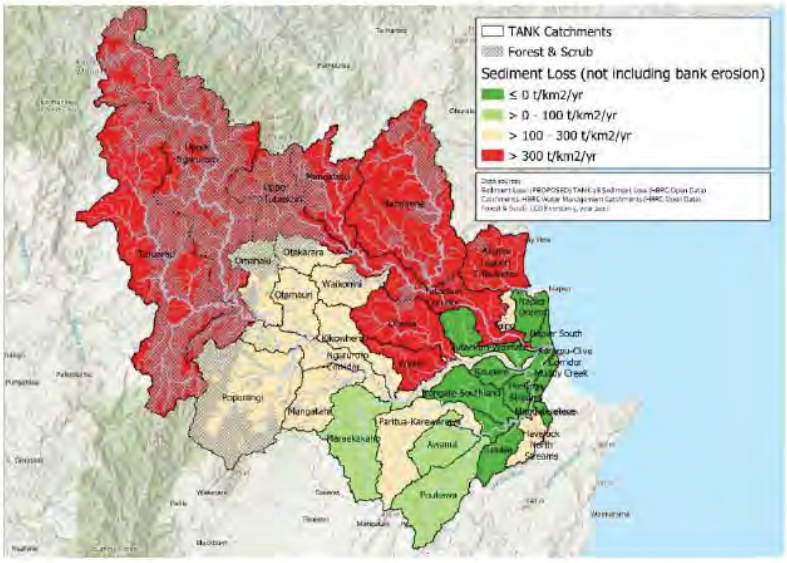

Figure 2: Sediment yield priority map, not including bank erosion and with forest and scrub overlaid, created by Jacobs.

For the high priority sub-catchments in Figure 2 that are largely unforested, landslide processes are the main proportion of total erosion. The percentage of the total sediment load from landslides for each sub-catchment is displayed below:

Sediment Loads in TANK Sub-Catchments

Sub-catchment	**% total sediment load from landslides**
Ahuriri Lagoon tributary	106% of total sediment load is from landslides*
Mangaone	83%
Mangatutu	69%
Ohiwia	97%
Tūtaekurī Corridor	82%
Waitio	102%*

** Note these sub-catchments are where deposition occurs leading to > 100%.*

These erosion processes would only occur on steeper slopes where certain land uses, such as horticulture, would not occur.

Appendix 9 of the s42a report is a technical memo on the water quality attributes in Schedule 26.[27] Further information from the SedNet model is presented that shows contemporary hillslope erosion compared with pre-human hillslope erosion. The pre-human sediment load excludes net bank erosion; therefore the comparison is only made on hillslope erosion types (such as landslide, earthflow, gully, surficial). SedNet predicts approximately 230% increase in sediment loads from hillslope processes across the TANK catchments post-human settlement. In the Ngaruroro tributaries, the model results show there is a loss of more than 4 times and up to 7 times the amount of sediment from hillslope erosion compared to pre-human times. This indicates that hillslope erosion is significant in the TANK catchments.

Road Infrastructure

Road infrastructure in Gisborne was not prepared for a disaster like Cyclone Gabrielle. Cyclone or not, State Highway 2 – the only direct route north – is plagued by slips and flooding which disrupt the flow of people and fresh food out of Gisborne toward the Bay of Plenty and Auckland.[28] Following the cyclone, flooding, silt and slips in the portion between Te Karaka and Matawai created the greatest disruption. Gisborne needs improved connectivity to other regions in the face of disaster, and that requires massive investment in new road infrastructure and maintaining the existing roads.

Gisborne's roads are at risk from the pastoral and forestry uses on steep hills. Impact on road connectivity must be kept front of mind while evaluating the erosion and water retention issues associated with upstream land uses. A thriving horticulture sector in the region requires strong infrastructure to move large volumes of produce.

Topography

The shape of the land also had a part in why the impacts of flooding were so severe. The Poverty Bay flats drained slowly after the cyclone, leaving growing land saturated and food production at a standstill. That area needs the ability to move more water, faster, but the river doesn't have the capacity to drain the land from such a major rain and flooding event. The other option is retention, or better absorption of water. If we are relying on the land for that absorption, the topography pools that water in growing areas, severely disrupting food production.

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[27] Haidekker, 2021

[28] SH2 closed between Whatatutu intersection (north of Te Karaka) and Matawai | Waka Kotahi NZ Transport Agency (nzta.govt.nz); Slips, State Highway 2, Te Karaka | LiveNews.co.nz; Temporary SH2 closures to clear slip | Waka Kotahi NZ Transport Agency (nzta.govt.nz)

Q. 3	Are there specific practices or ways in which we use the land that have caused more harm than others? Which of these practices are most important? Why?

Slash Management

There is little doubt that the torrent of slash that buried orchards and vegetable growing land in Gisborne and the Hawke's Bay was attributable to forestry practices that leave organic material on the ground in a push for efficiency. Pine forests were initially planted in response to the erosion caused by land clearance for pastoral farming. The problem is that when those pine forests reach maturity, they are cleared all over again when the lumber is harvested, once again making the land vulnerable to erosion.[29]

One grower shared that their stop banks have worked well for over a century and likely would have last through the cyclone too if not for the slash which blocked the flow of water, causing the river to artificially rise even higher. Yes, the weather was terrible, but there was a man-made component to the degree of destruction.

Here, the edge of a dam popped over the bank before the bridge gave way.

[29] Cyclone Gabrielle triggered more destructive forestry 'slash' – NZ must change how it grows trees on fragile land | RNZ News

Slash backing up behind a bridge, and because of that blockage, causing a debris flow on the adjacent horticultural land.

As for the source of the silt, the clearance of native bush in favour of bare pastoral hill country is the likely culprit.[30] The lack of substantial vegetation to hold the soil in place creates the conditions for erosion. It is worth questioning whether it is viable to keep hillsides in place with only grass, or whether there needs to be a push for more native trees on those slopes.

Q. 4	**Is there anything else we should know about that has contributed to the damage from severe weather?**

Delay in Silt Removal

The volume of silt that needs to be removed is immense. The demand for help from Council to remove silt and site and operate new dump sites has exceeded their capacity to assist.

Growers have attempted to save trees by removing sediment from their orchards, but many are hampered by their inability - or lack of permission - to remove the sediment from their site.

The scale of the removal of sediment, triggers earthworks volumes. The Emergency Legislation provides a pathway for removing sediment without consent. However, there are extensive areas of archaeological sites on land impacted by sediment. The provisions within the Emergency Legislation to require 20 working days of notice, permissions and the requirement on iwi and hapu to provide cultural management plans, is likely to cause significant delay.

[30] Understanding silt - and what to do about it (farmersweekly.co.nz)

There is a lack of knowledge about the quality of the sediment and potential contamination – scientific testing is required. The cost of removing and testing the sediment, as well as rehabilitating the land is significant and largely uninsured. Government relief is yet to be released to enable growers to pay for testing and private contractors to remove silt.

A meaningful, collaborative partnership between Council, the Crown, and land users is required to make sure the burden of cost and management do not fall solely on growers, who are not responsible for the damage and whose work is critical to national food supply.

Flood Protection and Land Drainage

Council needs to refocus its priorities and be clear about its responsibility for catchment hydrology and protection. There has not been a concerted effort to maintain and upgrade stop banks in the region to make them suitable to current climatic conditions. Consistent review and maintenance of flood protection infrastructure has a huge potential to mitigate damage in future storms. According to an op-ed in the *Gisborne Herald*,

> Several landowners on Papatu Road offered the council a $100,000 interest-free loan last year to help clear the Te Arai River of overgrown willows in the area where it overflowed and caused all the damage to properties, orchards and crops around Manutuke and even over to parts of Patutahi. The offer was declined, but nothing was done.[31]

This lack of action and accountability for risk mitigation must be addressed. Growers themselves know their land and drive through rural roads every day. The Council needs to listen when community members raise infrastructure concerns, because it can be a matter of life or death for a business.

Q. 5	**How do the current laws, policies and rules influence the way we use our land? What works well? What is unhelpful? Think about the current legislation, market drivers and conditions, regulations, rules, and the way in which requirements are enforced.**

Flood Management

The legislative framework for managing food risk is complex, with a range of powers across several Acts. Some of these Acts are remnants, with some powers difficult to understand and with inconsistencies. The main acts that are used for managing flood risk are:

- Resource Management Act 1991
- Building Act 2004 (and Building Code 1992)

[31] Bold leadership needed for a brighter future - The Gisborne Herald

- Local Government Act 2002
- Land Drainage Act 1908
- Soil Conservation and Rivers Control Act 1941
- Rivers Board Act 1908
- Civil Defence Emergency Management Act 2002
- Water Services Entities Act 2022

The purpose of the 'Flood Management' statutes listed above is to enable a wide range of approaches to managing flood risk. These measures include hazard control measures such as stop banks, channel maintenance, clearance, and dams. The Local Government Act 2002, the Soil Conservation and Rivers Control Act 1941, and the Rivers Board Act 1908 are the primary statutes that permit these works to be carried out. The Land Drainage Act 1908 and localized drainage acts also allow waterlogged land to be drained for urban and food production purposes and contribute to modifying flood events. Various agencies provide information and education about flooding, including scientific and practical advice on minimizing the impact of flood events. Mechanisms like land information memoranda (LIMs) pursuant to the Local Government Official Information and Meetings Act 1987 enable members of the public to access site-specific flooding information from territorial authorities where available. Flood hazard preparedness, response, and recovery measures are primarily authorized under the Civil Defence and Emergency Management Act 2002, which provides the legislative framework for national, regional, and local communities to prepare for and respond to flooding. Flood loss insurance and financial assistance are primarily provided by the Earthquake Commission under the authority of the Earthquake Commission Act 1993, while the government may also offer disaster relief funding to support local communities affected by large-scale flood and other natural disaster events.

The Water Services Entities Act will transfer stormwater management to the new entities. There are some risks with this because stormwater needs to be managed at a catchment level. Horticulture exists in peri-urban areas. There is often a complex set of drainage infrastructure that serves the land, including stormwater and land drainage infrastructure, and not all parts of the stormwater network are "hard infrastructure." Important elements like storage areas are likely to stay with territorial authorities.

HortNZ recommends that greater national direction is provided to ensure a more consistent approach to flood management across the country. This could involve the development of a national policy statement or guidance on flood management under the RMA. Such national direction could provide more clarity and guidance for local authorities to manage flood risk and could help to ensure that a consistent approach is taken to flood hazard assessments, flood risk management plans, and flood protection works. Additionally, we recommend that national direction should take into account the impacts of climate change on flood risk and should provide guidance on how to integrate climate change considerations into flood management planning and decision-making.

The proposed outcomes within the Natural and Built Environment Bill (NBA) includes an outcome relating to climate change and natural hazards.

Our expectation is that the new National Planning Framework under the NBA provides an opportunity for national direction for natural hazards including flooding and direction on how highly productive land at the urban fringe will be managed in a coordinated manner across various legislation.

Three Waters Reform

In Gisborne, the cyclone decimated the potable water supply, leaving the community in a dismal situation. Those who had local storage were able to help their neighbours and provide for their own drinking water and business needs. In catchments that are not over-allocated, water storage is a way to build resilience into local systems by making sure there is water available for essential activities in times of disruption.

Commonly, horticultural growing areas are in peri-urban catchments. The water that growers rely on to grow crops for domestic food security is frequently shared with urban communities. The freshwater receiving environments in peri-urban catchments are often under pressure from stormwater and non-point source discharges, abstractions and hydrological changes related to drainage.

The Water Services Legislation Bill would direct water services entities towards options that serve urban development in an efficient manner, without adequate consideration of the wider social, cultural and economic impacts, including detrimental health impacts on urban communities due to adverse impacts on domestic food supply.

In our view, values in the second hierarchy of Te Mana o te Wai, such as drinking water, does not equate to an exemption from contributing to the costs of providing for the first hierarchy. This is particularly important in the context of a changing climate where investment in water storage, augmentation and recharge may be required to support freshwater ecosystem health. The investment in infrastructure that supports the health of freshwater and provides for drinking water and irrigation is likely to provide greater benefits than an approach where drinking water is afforded priority to the lowest cost water, without consideration of wider costs and benefits aligned to achieving the regional freshwater vision and regional Te Mana o te Wai objective.

Shifting the hard engineering parts of the stormwater network into the water services entities, may improve investments into that part of the system, but creates new risks for the catchment scale approach that is required for flood management.

Freshwater Management

Freshwater is managed under the RMA. Freshwater management is influential in land use patterns and the flexibility to change land use.

NPS-FM

In submissions on the Visions and Value setting process, HortNZ sought an integrated approach to freshwater management, where the freshwater vision not only directs instream freshwater outcomes, but also directs freshwater limits.

In our experience, Regional Councils are not taking an integrated management approach to setting visions, values, outcomes and limits under the NPS-FM. Councils are focused on instream values but not on considering how the principles of "Manaakitanga" and "Care and Respect" should be applied to provide for the health of the nation when determining outcomes and limits.

Te Mana o te Wai

Te Mana o te Wai establishes a hierarchy of obligations. The first priority is the health and wellbeing of water bodies and freshwater ecosystems.

The six principles of Te Mana o te Wai provide guidance on who makes resource management decisions and which matters are to be considered.

The second priority obligation under the Te Mana o te Wai framework is the health needs of people (such as drinking water).

Food, and in particular vegetables and fruit, are essential human health needs.

HortNZ seeks that the production of vegetables and fruit for domestic supply are recognised within the second priority obligation of the Te Mana o te Wai hierarchy.

Providing for the health of the Nation under Te Mana o te Wai

HortNZ seeks that the production of vegetables and fruit for domestic supply are recognised within the second priority obligation of the Te Mana o te Wai hierarchy.

The recent high court decision relating to the Specified Vegetable Growing Area Policy in the NPS-FM 2020 notes "Continuity of supply in fresh vegetables is important for national food security and human health".

The Te Mana o te Wai principles most relevant to providing for the health needs of people are Manaakitanga, and Care and Respect. The principle of Manaakitanga incudes 'generosity and care for freshwater and for others'. The principle of Care and Respect includes 'care for freshwater in providing for the health of the nation'

The term 'nation' within the care and respect principle indicates freshwater decisions, need to consider both the local and national scale health benefits that are achieved through catchment activities, and 'providing' for the discharges and allocations that support the health of the nation.

New Zealand is geographically isolated. We cannot import most of the fresh fruit and vegetables our people need to eat, because most fruits and vegetables are too perishable to be efficiently transported to New Zealand.

New Zealand's national food system relies on reciprocity between regions, and a responsible approach to the management of natural resources to provide for the health of the nation.

Trade, manaakitanga and reciprocity underpinned the traditional approach to trading of goods. Horticultural production has had a long history of having certain crops and varietals being produced in some areas and traded to other areas.

The principles of Manaakitanga and Care and Respect express that care for freshwater is part of how the health of the nation is provided for. However, the application of this principle is not limited to human health associated with in-stream freshwater values such as swimming and collecting mahinga kai from within waterbodies.

Under clause 3.2.2.c.ii of the NPS-FM, Councils must apply the hierarchy of obligations to the National Objectives Framework, this includes applying the hierarchy of obligations to limit setting.

Enabling communities to provide for their social, economic, and cultural wellbeing in a manner consistent with the NPS-FM, requires that second and third priority obligation activities are differentiated, and that the concept of health under the second obligation includes the health of the nation.

Recognising the importance of the production of fruit and vegetables for domestic supply within the second priority obligation of Te Mana o te Wai, doesn't negate the need for fruit vegetable growers to manage their environmental effects through good management practices and to operate within the freshwater limits of the catchments they are located within.

The value of domestic food supply in resource allocation decision making, has been recognised within a series of policy instruments including: NPS-FM specified vegetable growing areas; Waikato PC1 Policy 3; Horizons PC2 Policy 14-6; Canterbury PC7 section 42A reply, Policy 4.36A.

Long Term Visions and Values

The people of NZ will rely on the Vision and Values in the Gisborne and Hawkes Bay Freshwater Plan, when they apply the principles of Manaakitanga, and Care and Respect to make sufficient provision to produce enough fruit and vegetables to provide the reliable supply fresh fruit and vegetables to the rest of NZ, and in particular regions such as Otago, Southland, West Coast and Wellington that have less favourable climates for year-around growing and are far from self-sufficient in producing healthy food for their populations.

It is inherent that the NPS-FM 2020 long-term visions focus on freshwater, however, consider that this should not be interpreted too narrowly. Long-term visions must include the whole of freshwater considerations. "Freshwater related" by its nature gives a broad interpretation.

The clause relating to long-term visions in the NPSFM 2020 (clause 3.3) speaks to long-term wishes for waterbodies and freshwater ecosystems in the region and that long-term visions must express what communities and tangata whenua want the Freshwater Management Unit (FMU) to be like in the future. An FMU means 'all or any part of a water body or water bodies, and their related catchments, …'.

The NPSFM 2020 seeks integrated management, for example:

Policy 3 states: 'Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments'.

Clause 3.2 Te Mana o te Wai,

… (2) Every regional council must give effect to Te Mana o te Wai, and in doing so must: … (e) adopt an integrated approach, ki uta ki tai, to the management of freshwater (see clause 3.5).

Clause 3.5 specifically addresses integrated management

In our view, Te Mana o te Wai is about the whole freshwater system, which is also a reflection of land use that have an inherent relationship to the health of waterbodies. We think that long-term visions should reflect integrated management.

Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community. HortNZ consider that this requires as part of the conversation, consideration of other important values as part of that balancing act.

In our view, the specified vegetable growing area (SVGA) provisions in the NPS-FM 2020 are a specific acknowledgment of the need to balance different values, while still improving freshwater. The SVGA provide a way of doing so in catchments with specific freshwater challenges. In our view, the same priniciple applies elsewhere but without the ability to set target attribute states below national bottom lines.

To quote the Ministry for the Environment's factsheets and website:

> "The hierarchy does not mean, however, that in every case the water needs to be restored to a pristine or prehuman contact state before the other needs in the hierarchy can be addressed."[32]
>
> "Making this the first priority in freshwater management does not mean that councils will ignore the health needs (or other needs) of people."[33]

To an extent, the other Te Mana o te Wai priorities are somewhat reflected in the proposed long-term vision statements (e.g. recognition that land and water resources underpin the economic prosperity, national contribution of the Tongariro hydro-electric scheme). However, we think it is necessary to include the values of domestic food supply and food security explicitly as part of the long-term visions.

HortNZ consider that food production for domestic food supply (and food security) is a critical part for providing an essential human health need, and accordingly that it fits within the second hierarchy priority. We note that the High Court (in the Judicial Review decision) held that food security and Te Mana o te Wai are not inconsistent nor unachievable, but that the council must undertake this balancing act.

There is also a broader value related to the economic and social value of growing as part of the communities which they are part of (for all food production – whether it serves only the domestic market, or also export markets); this aspect fits within the third hierarchy priority.

The third hierarchy of Te Mana o te Wai is the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

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[32] https://environment.govt.nz/assets/Publications/Files/essential-freshwater-te-mana-o-te-wai-factsheet.pdf

[33] https://environment.govt.nz/acts-and-regulations/freshwater-implementation-guidance/clarification-of-the-essential-freshwater-programme-implementation-requirements/#implementing-te-mana-o-te-wai

Except for food produced for the domestic market, most food production and primary production more generally is managed within the third priority obligation of Te Mana o te Wai.

Achieving these freshwater visions requires a policy framework that recognises and supports food production. This framework includes freshwater limits, but other non-freshwater policy settings have a considerable impact on food production.

Long-term visions are ultimately linked to environmental outcomes and limits, and therefore need to respond to values in water bodies and values associated with the use of water (assimilative capacity of freshwater to support abstractions and discharges) in catchments – in a manner consistent with Te Mana o te Wai.

Regional Plans

GISBORNE UNITARY PLAN

Land use in Gisborne is constrained by the lack of water. Any irrigation-based business, like kiwifruit or vegetable growing, has to go on a waiting list of at least five years dictated by water access. Despite horticulture's low risk of erosion, those activities are disincentivised by the resource allocation process.

One solution proposed to alleviate the region's water shortfall is managed aquifer recharge of the Makauri aquifer. After a decade of favourable investigative work, this project remains stalled by uncertainty about the regulation of freshwater and the layers of bureaucracy to be overcome to 'get it done'. Not only would this improve the availability of water for community and irrigation use, it would play and important role in the regional climate resilience, including reducing the risk of groundwater salinisation due to sea level rise.

Land Management

NES PLANTATION FORESTRY

The National Environmental Standards for Plantation Forestry (NES) have provided regulatory certainty for foresters to enable them to harvest forest provided environmental standards are met.

It is apparent from the vast volumes of slash that were discharged from plantation forestry land, that the NES is not effective at managing the adverse effects associated with this activity.

It is important to acknowledge that plantation forestry often occupiers steep and erosion prone land, that under pasture would also be very erosion prone and result in downstream effects.

The review of the NES may be able to strengthen the requirements and oversight for the management of risks from plantation forestry. If foresters were required to meet the costs of managing their environmental effects, this would reduce the attractiveness of this land use resulting in reduced offset, but that would not reduce the risks associated with this land use.

National Policy Statement for Highly Productive Land

Highly productive land is a finite and intergenerational asset that is under threat in New Zealand, most significantly due to urban development. 'Our Land 2021' states that the area of highly productive land that was unavailable for horticulture because it had a house on it increased by 54% from 2002 to 2019.[34]

The importance of highly productive land and the need to manage this natural resource strategically were clearly articulated in consultation on the NPS-HPL. Submitters wrote about the lack of clarity under the RMA, which means highly productive land is given inadequate consideration by local government:

> "The value of this land for primary production is often given inadequate consideration, with more weight generally given to other matters and priorities. This absence of considered decision-making is resulting in uncoordinated urban expansion over, and fragmentation of, highly productive land when less productive land may be available and better suited for urban use. This is preventing the use of this finite resource by future generations… National direction on highly productive land could provide councils with a clearer framework for managing this resource and assessing trade-offs between competing land uses …"[35]

Highly productive land needs to be protected from urban and lifestyle sprawl and enabled for primary production, so this land's productive potential is retained for future generations. Highly productive land is particularly valuable for supporting domestic food production and horticultural and arable crops that support New Zealand's transition to a low emissions economy.

Natural and Built Environment Act

OUTCOMES

The Bill's outcomes drive planning direction throughout the rest of the Bill. In the HortNZ submission on the NBA, we asked for an amendment of the outcome for urban and rural areas to provide for food production and supply for New Zealand.[36] The Select Committee recommended this change in the first report, although it did not carry through to the next draft of the Bill.[37]

We also suggested an amendment to the highly productive land environmental outcome to mirror the NPS-HPL by protecting highly productive land for primary production, rather than just ensuring its availability. This change seeks to protect land for "primary production," not "land-based primary production" to ensure that packhouses, glasshouses, or other supporting infrastructure for horticulture can sit adjacent to similar activities to reduce transportation required for product movement.

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[34] Our Land 2021. Ministry for the Environment.
[35] Valuing Highly Productive Land: A discussion document on a proposed national policy statement for highly productive land, Ministry for Primary Industries, August 2019.
[36] Horticulture-NZ-Submission-on-NBA-and-SPA-Final.pdf (hortnz.co.nz)
[37] Interim Report (Natural and Built Environment Bill and Spatial Planning Bill) (selectcommittees.parliament.nz)

NATIONAL PLANNING FRAMEWORK

HortNZ supports the National Planning Framework (NPF) as a means of providing integrated national direction. We support the proposed timeline from the NPF in terms of providing national limits, targets and allocation principles, to Regional Spatial Strategies and then NBE plans.

We consider that this framework should and will support allocation within management units and result in a consenting framework that provides some certainty for existing uses, while allowing re-allocation of natural resources over time to stay within use limits, meet limit states or target states and achieve outcomes.

In our submission, HortNZ asked that national food production and supply are included as matters the National Planning Framework (NPF) must address.[38] The domestic food system is nationally significant, requires cross-regional cooperation, and is essential to human health and well-being. As we've seen with the cyclone, national food planning is critical to keep grocery store shelves stocked and healthy food available at affordable prices for New Zealanders.

Spatial Planning Act

The Spatial Planning Act (SPA) will direct land-use across the country. In HortNZ's submission on the SPA, we asked that highly productive land is added to the key matters included in Regional Spatial Strategies (RSS) to integrate soil resource management with other regional planning. In the cyclone, we saw some of our most fertile soils decimated by silt, so it is all the more important to protect highly productive land elsewhere in the country. We also called for mitigation and adaptation measures to be mapped individually in the RSS given that these are two difference climate change response strategies. Land use conversion to horticulture might be mapped as a mitigation measure given our industry's lower emissions than other rural uses, which shifting residential zoning away from flood-prone areas would be an adaptation measure.

HortNZ seeks for highly productive land to be a key matter included in regional spatial strategies. Regional planning councils will already be required to map highly productive land under the NPS-HPL, and this mapping should be used in an integrated management approach with other mapping for planning purposes, such as that in the regional spatial strategies. Productive land most suitable for horticulture often sits in peri-urban areas that may not fit cleanly into urban or rural categories. Protecting that land from inappropriate use requires considering highly productive land directly, instead of just areas to be reserved for urban or rural use.

With the Bill's current emphasis on infrastructure, there is cause for concern that planners may prioritise urban expansion around existing transit corridors without regard to soil, climate, topography, or hydrology that may make those areas more suitable for other land-uses. Considering highly productive land is part of a more holistic planning approach.

[38] Horticulture-NZ-Submission-on-NBA-and-SPA-Final.pdf (hortnz.co.nz)

Climate Change Response Act

The RMA Amendment Act 2020 includes the requirement to have regard to the Emissions Reduction Plan and the National Adaptation Plan when making and amending regional policy statements, regional plans and district plans.

The Emissions Trading Scheme and the system for pricing agricultural emissions, that will come into effect in 2025, provide a market system for disincentivising higher emissions activities.

Analysis to support He Waka Eke Noa has shown there is a strong link between achieving freshwater outcomes and reducing agricultural emissions. The link between freshwater and climate requires an integrated approach to freshwater and climate policy.

EMISSIONS REDUCTION PLAN

The Emissions Reduction Plan includes a key action to transition to lower emissions land uses and practice.

Supporting land use diversification to lower emissions land uses such as horticulture is critical to New Zealand achieving our 2050 emissions reduction targets within the Climate Change Response Act.

The opportunity horticultural expansion provides for reducing emissions was canvased in the Climate Change Commissions advice to Government. This advice assumed conversion of 2,000 ha to horticulture annually between 2025 and 2035 (and noted that land use change would need to play a larger role than this if new technologies to reduce livestock emissions do not eventuate).

The emissions reduction plan includes transition to lower emissions systems and land uses, however this action appears to be focused on making systems changes to pastoral farming, rather than exploring ways of supporting and enabling land use change to horticulture. We see this as a missed opportunity. While regenerative farming may offer opportunities on the margin to reduce emissions from pastoral farming, much more significant emissions reductions could be achieved through land use change, and unlike many of the initiatives within the emissions reduction plan, the emissions reductions are certain.

NATIONAL ADAPTATION PLAN

The National Adaptation Plan recognises the important role our planning and investment systems have in guiding how we use our land and resources, and that currently regulatory systems do not always account for changing risks.

According to Plant and Food Research, climate change is expected to have an impact on the future suitability of growing areas in New Zealand. The Otago region, and in particular, Central Otago, will see their growing areas suitability increase as the effects of climate change become apparent.

Horticultural adaptation will include:

- Planting breeding (more heat/drought resistant varieties), and the use of crop protection products such as agrichemicals, biopesticides and biological controls to manage new and increasing pest threats.
- Infrastructure investment, including crop protection structures, such as wind and hail shelters and plastic and glasshouses, to protect crops from more erratic weather. Infrastructure investment will also include water storage to provide irrigation reliability while supporting the freshwater ecosystem health.
- Land use change, crop changes within growing systems and crop rotations to match crops with the changing climates and manage new and increasing pest threats.

The role of crop protection structures is likely to become increasingly important with changing climate, although it should be acknowledged that these structures are not immune to damage, with some glasshouse and covered growers experiencing significant damage to infrastructure in the cyclones.

EMISSIONS TRADING SCHEME

HortNZ recognises the Emissions Trading Scheme (ETS) as an important tool to help New Zealand achieve its climate change budgets.

Technology is starting to become more available for the abatement of carbon emissions, but currently there is a tension, where the costs of abatement is not always economically viable.

Offset has an important part to play in managing the impacts of emissions. The horticulture sector is not opposed to the use of forestry for offset, but we consider that the alongside the carbon price there is the need for stronger regulation to ensure that environmental effects are managed and that the price of the carbon offset does not distort land use patterns such that low emissions food production is replaced by carbon farming.

PRICING AGRICULTURAL EMISSIONS

Fruit and vegetables are low emissions foods. Over the past decade, growers have progressively reduced fertiliser application as growing techniques have become more efficient thanks to advances in technology. This trend will continue.

Growers are already engaging with emissions reduction; this has been largely linked to freshwater reform which also requires them to carefully match nutrient supply with crop demand.

We are seeing increasing market demand for climate action. GLOBAL GAP version 6 includes Climate Change and Greenhouse Gas requirements. All horticultural exporters in NZ are certified under the GLOBAL G.A.P. scheme.

One of the key reasons HortNZ has participated in the He Waka Eke Noa partnership is because we believe the primary sector coming together to support climate change action is powerful and important.

The analysis undertaken by He Waka Eke Noa, indicated that the emissions price was one of the drivers that would result in reductions in emissions, but that on its own price

is too blunt an instrument to drive lower emissions will maintaining a productive economy that is resilient in the long-term.

In our view, the analysis undertaken for He Waka Eke Noa, supports the inclusion of climate change emissions and adaptation outcomes in the Natural and Built Environment Act, where achieving long-term climate change outcomes can be a drivers for managing natural resource allocation decisions.

Sequestration

One of the issues that He Waka Eke Noa partnership has grappled with is how to reward sequestration that is not eligible for recognition under the ETS, but that is still credible or has co-benefits for biodiversity.

Where the benefits of sequestration are not related to greenhouse gas emissions – but related to other benefits such as biodiversity or managing erosion risk, it does follow that the cost of incentivising these activities should fall to those emitting greenhouse gas emissions.

Q. 6 **Anything else you would like to say about the current policy framework?**

Strategic Land Use Planning for a Resilient Future

Horticulture presents an opportunity for New Zealand to build prosperity from primary production in a way that is within environmental limits.

Our climate change mitigation and adaptation policies require strategic planning, so we actively invest in adaptation that supports a low-emission resilient future.

Our 2050 net-zero greenhouse gas emissions targets require us to meet net zero in 2050 and every year after that. Sequestration from plantation forestry is a necessary short-term stopgap. The current policy settings risk locking in emissions from pastoral farming and locking in our dependency on offset from plantation forestry.

Cyclone Gabrielle has highlighted the vulnerability of horticultural land on floodplains to the large climatic events predicted to become more frequent with a changing climate. What was very apparent was the loss of vast quantities of soil from pastoral hill country and the loss of vast quantities of slash from plantation forestry. The adverse effect of these hill country land use choices on downstream highly productive land has been immense.

There are low-lying lands and active flood channels that we should retreat from and return to wetlands. There is hill country that we should retreat from and return to native forest.

We should not be retreating from or diminishing the productivity of highly productive land. New Zealand's highly productive alluvial terraces are an intergenerational asset that have taken thousands of years to develop. This land is the most suitable for low

emissions, high-value primary production. The NPS-HPL recognises this land should be protected for land-based primary production. This should include protection from urban sprawl, protection from sediment deposition through upstream catchment management, and flood protection.

The NPS-HPL supports the use of the most productive land in NZ to be used for plantation forestry. When we consider the risks of using hill country for plantation forestry, and the value of carbon forestry, there is an emerging risk that we will see more LUC I, II and III land go into plantation forestry. To manage this risk, we consider it important that the NPS-HPL and the policy direction in the National Planning Framework is explicit in prioritising the use of NPS-HPL for low emissions food production.

STRATEGIC LAND USE PLANNING OUTCOMES SOUGHT:

- Reaffirming our commitment to reducing our greenhouse gas emissions to avoid the type of devastation we have seen;
- Make explicit policy provision that recognises the importance of food production and supply to support the health of New Zealanders;
- Protect highly productive land for primary production for future generations;
- Support the development and adoption of new technologies as we transition to lower emissions food production;
- Ensure everyone pays a fair share for their greenhouse gas emissions and that those who have chosen to leave larger parts of their farms in sequestration-eligible species are rewarded;
- And support those who are willing to reshape our landscape to avoid the erosion and sediment-related problems seen in Tairawhiti and Hawkes Bay.

National Food Strategy

Since Cyclone Gabrielle, consumers around the country have felt in their wallets and seen on the sparse supermarket shelves what happens when a weather event slams the domestic food supply. With these extreme weather events getting more common with climate change, our land use planning must make plans and back up plans to preserve our country's fruit and vegetable baskets. Resilience means that government must enable horticulture in multiple growing regions. If a weather event knocks out one area for a while, there should be redundancies in supply from other regions to continue feeding our people.

This disaster has been indescribably difficult for our sector, and the unsettling flipside is that it also presents the government with a policy window to refocus on the importance of food supply. The government needs to take advantage of that political moment and national awareness of the vulnerability of our domestic fruit and vegetable production to make bold changes to the way we think about food.

FOOD STRATEGY OUTCOMES SOUGHT

- To develop a National Food Strategy, that includes consideration of the importance of New Zealand in supporting food security in the Pacific;

- Specifically recognise the importance of food security in supporting human health in the NBA;
- Specifically recognise the importance of highly productive land for food production in the NBA;
- Ensure the National Planning Framework under the NBA promotes Te Oranga o te Taiao in a way that enables the benefits of strategically important outcomes to be balanced against localised effects;
- In the NPS-HPL, specifically prioritise and support the use of HPL for low emissions food production;
- In the NPS-HPL, specifically recognise that the productive capacity of HPL is measured in its social, cultural and economic contribution;
- Develop a National Environmental Standard for commercial vegetable growing, to provide a longer-term planning certainty than provided for by the NPS-FM SVGA.

Q. 7	**What is your vision for the future of land use in the region? (In this section, we are seeking your vision for the future about the way we use our land in Tairāwhiti, Tūranganui-a-Kiwa, and Te Wairoa.)**

Long term catchment management is necessary and must specifically model silt flows and other whether other debris may wash up in flooding events. With this information available, planners can make decisions about land use to mitigate those impacts.

In Gisborne and the Hawke's Bay in particular, an ideal future would look like reliable infrastructure with multiple roads in and out of region, creating redundancy in case of disaster.

The most erosion-prone hill country will be covered with native bush to hold the soils in while supporting biodiversity and emissions reduction.

A thriving horticulture industry in Gisborne would have consistent access to water and confidence that access will continue for the long term.

Soils would be remediated to their highest productive capacity and protected from urban encroachment.

Flood protection would be designed to protect human health – that includes housing, lifeline infrastructure and domestic food supply are the top priorities.

We accept that with a changing climate, some land will require managed retreat – we expect this to include retreat from pastoral and plantation forestry and restoration of native bush, retreat from very low-lying land and restoration of wetlands.

When times of natural disaster strike, other regions of New Zealand are still producing enough fruits and veggies to feed the country because horticulture is thriving in multiple growing regions. One grower said that though they lost all of their orcharding land in the Esk Valley, they don't intend to replant there due to future flooding risk. They would rather leave the silt where it is as a natural buffer for future floods and move their orchard elsewhere. That is a business decision that won't work for all growers, but other regions need to have policy settings that allow for horticulture for strategic relocation to work.

Q. 8	**What do we need to do to achieve this vision? Please think about:** **Immediately? (in the next 12 months)** **In the short term? (next 1- 2 years)** **In the medium term? (3-5 years)** **In the long term? (10+ years)** **Far into the future? (30 – 100 years)**

Immediately: Soil Remediation and Replacing Crops

A huge amount of work is needed to regenerate the soil until it is useable for cropping. Immediately and in the short term, some orchardists may need to change land use to short-term cover cropping to remediate the soils. Scientific research shows that grass cover crops, arables (like wheat or maize), or process crops can increase organic matter, prevent wind-based erosion, and reduce compaction in soil.[39, 40, 41, 42] There is limited potential for growers to recover some income by selling these commodity crops or providing animal feed.

One grower who lost 90% of his apple harvest in Cyclone Gabrielle told RNZ that he is planning to plant annual seed crops in the years it takes to get back to higher value orcharding. He estimates it will take 4 years to return to apple production after spending hundreds of thousands of dollars pulling out damaged trees and planting new ones.[43] The trees then need time to reach fruit-bearing maturity.

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[39] Blanco-Canqui, H. and Jasa, P.J. (2019), Do Grass and Legume Cover Crops Improve Soil Properties in the Long Term?. Soil Science Society of America Journal, 83: 1181-1187. https://doi.org/10.2136/sssaj2019.02.0055

[40] Darapuneni MK, Idowu OJ, Sarihan B, DuBois D, Grover K, Sanogo S, Djaman K, Lauriault L, Omer M, Dodla S. 2021. Growth characteristics of summer cover crop grasses and their relation to soil aggregate stability and wind erosion control in arid Southwest. Applied Engineering in Agriculture 37: 11-23.

[41] Blanco-Canqui, H, Ruis, SJ. Cover crop impacts on soil physical properties: A review. Soil Sci Soc Am J. 2020; 84: 1527– 1576. https://doi.org/10.1002/saj2.20129

[42] Koudahe K, Allen SC, Djaman K. 2022. Critical review of the impact of cover crops on soil properties. International Soil and Water Conservation Research 10: 343-354.

[43] Midday Rural News for 24 March 2023 | RNZ

Immediately and in the short term, we need water solutions to allow people to irrigate and process their harvests.

Short Term: Building Science Capability

In the short to medium term, New Zealand needs to build the science capacity to support the horticulture industry to recover and thrive. After weather events like the cyclone, growers need the evidence base to identify alternative crops that can work in degraded soil or grow in changing weather conditions. In the current science system, industry organisations have to pay Crown Research Institutes (CRIs) or consultants vast amounts for crop research due to the minimal horticulture research happening in universities.[44] For smaller sectors like vegetables, this is simply not viable due to economies of scale. One solution to the lack of coordination between industry need and science delivered are innovation hubs like the Pukekohe Vegetable Centre of Excellence currently in development, which will bring extension services, university research and teaching, and workforce development all under the same facility. Projects like this one are starting points to redirect science where it's needed, but they require government co-investment to launch.

Medium Term: Return to Orcharding

In the medium to long term, those operations that were able to remediate their soil health will be able to return to perennial orcharding if the market and regulatory conditions exist that foster enough confidence to make the long-term investment in trees. Replanting will not happen immediately – tree and post availability will both have an impact on the timeline to recovery. NZ Apples and Pears estimate that it will take at least three years to replant all 1,600 ha of damaged or destroyed orchards in the Hawkes Bay. Nursery operators who have been growing trees for 50 years said that anyone ready to order trees now wouldn't get them until 2025, and in a couple of weeks, a new order would be looking at 2026. With some nurseries impacted by the cyclones as well, supply will be even lower. Growers have estimated up to seven to ten years for a return to full operations.

Long Term: Water Solutions

In the long term, large reservoirs are a potential solution to control the release of water and sediment/slash discharged into waterways.[45]

Far Future: Thriving Horticulture

In the far future, Cyclone Gabrielle could be remembered as a turning point that pushed people to recognise the importance of investing in lower-erosion, lower-emissions land uses like horticulture. In 30+ years, Gisborne and the Hawke's Bay will once again be major fruit and vegetable baskets for the country, helping feed New Zealanders and the world.

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[44] Foley, John. (2022), Science and Innovation in New Zealand Agriculture: We need to work Together, Nāu te rourou, nāku te rourou, ka ora ai te iwi. Nuffield New Zealand.

[45] https://www.gisborneherald.co.nz/business/20230327/bold-leadership-needed-for-a-brighter-future/

Q. 9	Is there anything that shouldn't be changed, for example, things that if changed would make it worse?

Protecting highly productive land via the NPS-HPL is even more important across the country as we rehabilitate soils that were destroyed by silt. That productive capacity must be picked up elsewhere as the East Coast recovers.

Q. 10	In your view, which groups need to be involved in developing solutions and what is the best way for these groups to be involved?

In our view, it is critical that growers are included in conversations about solutions. Their work feeds New Zealand while providing considerable export value. Industry representative bodies like Horticulture NZ, product groups (NZAPI, NZKGI, Vegetables NZ, etc), and district associations (Gisborne Produce Growers Assn Inc, Hawkes Bay Fruitgrowers Association, etc) should be included in working groups and consulted on relevant policy. It is especially pertinent to include the Tairāwhiti Horticulture Cyclone Recovery Group, which is comprised of relevant stakeholders already.

Q. 11	Any general feedback on the consultation?

It is unclear why all of the Hawke's Bay was not included in the inquiry. The questions could have been better defined and more specific, especially if the intent of the inquiry was to focus on the specific impact of forestry slash.

Submission to the Ministerial Enquiry on Land Use Following Damage Caused by Cyclone Gabrielle

ID: ANON-KXGS-PU7F-Y

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Introduction

I have spent a long career in forestry mostly as a senior manager in the then N Z Forest Service. I graduated as a Forest Ranger following a period of 4 years study, modern day Diploma level. I also spent my early years with the Indigenous Research Division of the then Forest Research Institute (now called Scion), as Field Manager, on the Indigenous Forest Ecological Survey which took place over most of the North Island. Following that I spent around 20 years in plantation forestry and 3 years as District Conservator in the newly formed Department of Conservation in Taranaki. I am also a qualified Health and Safety Auditor.

Summary of Submission

There are no easy fixes to the problem of logging slash that occurred on the East Coast. Rather it is a combination of factors, not the least of which is the sensitive nature and topography of the soils there. I have spoken to a number of people and have viewed aerial images pre and post Gabrielle. My conclusions are that plantation forestry fared better than other land uses, and that there is a good future for forestry in the region. This needs to be further investigated on the ground. Future management objectives including operational performance of forestry managers and quality control should be at the forefront. Controlled (prescribed) burning should be undertaken to remove slash wherever sites are sufficiently tolerant to this solution. Riparian zones should be established at time of planting and retained by intermittent inter-planting to ensure ongoing zone performance. The Regulations under the Resource Management Act 1991 clauses 60, 70 need

to improve, and clear guide lines produced that managers can follow. This would provide a clear understanding of requirements and best practice imperatives.

The Causes

Everyone is agreed that it is very likely that there will be more weather events like Cyclone Gabrielle. We need to be ahead of the game and I do believe that it is possible to greatly improve on the situation we have. It appears that the most intensive rain events occurred in the back hill country. In addition, from the imagery provided by LINZ, there were quite a number of localised areas where extraordinary rain events occurred. Rain fall in excess of 1 inch (25.4 mm) per hour in these areas is not unheard of, under normal circumstances. The most common cause of log and slash movement and the build-up of silt, is slumps and gullying, in the hardest hit areas. One or two land movements also occurred. There is no interface between the land and major rivers, or very little. It's a pity that when an area of plantation is logged that a riparian zone isn't retained. Cyclone Bola in the 1980's and the steady build-up of logs on the beaches, months and months prior, should have been a wakeup call to the decision makers. In geological terms the young soils are sensitive to movement and subsidence has been happening for many years. Historically, plantings of willow and poplar have only been partially effective.

I note with concern from the pre-Gabrielle imaging that there are many areas where saw logs are lying around on old logging areas, river banks and on river beds. This is particularly notable in the Moto River area. There needs to be greater care taken here. In the past there was rigorous 'cutover inspections' which were a very effective management tool. The industry is quick to point out that these logs are box grade. If they are, then a market needs to be developed, i.e. finger jointing machinery can turn all the material into high grade clear boards. Either way they shouldn't be lying where they are.

Land Management Legislation

Plantation management is covered by the National Environmental Standards for New Zealand. This is a good document and provides plenty of insights into what is required. The regulations though, tend to be over restrictive in some instances. For example the Environmental Standards do not preclude the controlled (or prescribed) burning off of logging slash. On the other hand the Regulations list a few things that are permitted. Clause 71 Slash and Debris is a case in point.

Headed, Slash and Debris Management. Regional Council, Restricted Discretionary Activity & Matters to which discretion is restricted:- Clause 75 Prescribed Burning is not mentioned. There are many effective ways of land clearing that are not listed. For example, Local Authorities and Plantations Managers interpret this to mean that prescribed burning is not a permitted activity. Local Authorities should be able to interpret the Regulations confidently and produce a Guide for their local industry that is able to be understood by all practitioners.

Possible Solutions and Discussion

The clean-up following Cyclone Gabrielle will be a big job, restoration and preventative actions will take much longer. I am of the view that detailed site investigations need to be carried out to determine priority areas for a range of initiatives to prevent the scale and impact of events the East Coast has experienced.

Riparian Zones

Where there is a high probability of soil and debris movement, Riparian zones will play a vital role. This will be a sizable operation and will involve the establishment of trees over hundreds of kilometres. This is not impossible. Over the years Taranaki Regional Council has achieved something similar in size in response to protecting waterways from dairy farm run off. The costs are not prohibitive. TRC provide the trees, advice and support. In earlier times the N Z Forest Service promoted Farm Forestry initiatives like this and provided for 50% of all costs. Successive Governments supported this as it was only equated to a tax remission in advance. The scheme was very popular in some regions and not so in others. I think that the current MOF has a similar scheme but it is not widely promoted. Carbon farming may also be an option for many land owners. The design and application of Riparian zones will be key to success. For example, plantings in an offset grid pattern forming a ‘V’ structures might be more effective than what we do now. This way, any downhill debris will be met with a solid wood barrier. Under plantings with flax for example would help retain silt movement. Selective logging and inter-planting would ensure longevity of the zone. By comparison, the costs involved with slash traps would be prohibitive. They may though be useful in highly specialised applications.

Burning Off / Slash Reduction

Prescribed burning was standard practice in forest management until just recently. It's clean, safe, effective and a very cheap form of land preparation. People have a perception that burning off with clouds of smoke is bad for the environment. In fact burning a piece of slash is carbon neutral. This is because the CO2 in wood combustion emissions is basically equivalent to the amount of CO2 trees need to grow. Hence the combustion of wood does not contribute to the net increase in atmospheric levels of CO2 (a greenhouse gas), as does the combustion of fossil fuels. *Source - US Department of Agriculture*. The world is changing from burning fossil fuels to biomass, in an effort to reduce climate warming. I noted that one of our most trusted TV investigative reporters said that "When people planted the forests here they thought they were doing the right thing" Well they were, but it's the management practices that have changed. I note in a recent news article that Christchurch Hospital said that they can use all the East Coast slash to heat their facility now. A bit tongue in check as transport would probably be prohibitive, at least in log / slash form, but they are obviously aware of the benefits. In any event with New Zealand's 2.1M hectares of plantation forestry sequestering tonnes and tonnes of carbon from the atmosphere every day, a few forest owners carrying out a controlled burn once a year shouldn't be of any great concern. Better to deal with the slash in situ, rather than have to push it into piles and burn it there, which I understand is the plan. It's also worth noting that the damage caused by slash alone is estimated to be around $7B. Of general interest, forest research in New Zealand, in an article by Scion and Land Care Research, found that the release of carbon into the atmosphere during burning has a correlation with FWI (Fire Weather Index), a measure of flammability, where relatively cooler burns release less carbon. They indicate that they need more data to confirm this, but the trend is quite clear. We didn't know this in my day, but we always scheduled controlled burning for late afternoons, as this was the best time from a safety perspective.

I hope this submission will be of value to your enquiry as the cost to the nation, personal injury, death and loss of livelihood of all those affected, deserves much planning and action to enable responsible and thoughtful actions in the future.

SUSTAINABLE FUTURE

Anne Salmond: Greenwashing and the forestry industry in NZ

By Dame Anne Salmond
Mar 27 2023 | 6 min read

The inquiry into forestry slash destruction in Tairāwhiti, and review of the Emissions Trading Scheme, should prioritise the state of the planet not the balance sheets of global corporations, writes Dame Anne Salmond.

Over the past few weeks, New Zealanders have been exposed to shocking images of local landscapes ravaged by forestry sediment and slash during Cyclone Gabrielle, from Tairāwhiti to Hawke's Bay.

They've heard heart-breaking stories about the suffering and harm inflicted on individuals, families and communities by surges of mud and logs from pine plantations, putting lives at risk, taking out roads and bridges, fences, crops and animals, farm buildings and family

homes, choking streams and rivers, and smothering paddocks, vineyards, orchards and beaches.

At the same time, investigative journalists have begun to explore the story of how this has been allowed to happen, in the face of scientific reports over the past 20 years predicting this kind of damage, and the successful prosecutions of forestry companies which include scathing court judgments about their practices.

Neither politicians nor officials can plead innocence or ignorance in this matter. International forestry companies are among the largest landowners in New Zealand; and as Guyon Espiner has recently shown, they routinely employ lobbyists and lawyers to persuade ministers and officials to serve their interests, rather than those of the electorate - in the design of the Emissions Trading Scheme (ETS), for instance, and the National Environmental Standard for Plantation Forestry (NES (PF)).

The tone of texts and emails between ministers and lobbyists is telling. 'Hi mate,' writes a minister to a forestry lobbyist who is pleading with him not to exclude pine plantations from the 'Permanent Forest' category of the ETS. Sure enough, soon afterwards a declared policy preference for restricting this category to native forests is overturned, and pine plantations are included, a decision ratified by Cabinet. They should all be ashamed.

The beauty of this policy shift, from the forestry companies' point of view, is that it will allow them to earn a handsome income for leaving their pine trees in the ground, without having to pay harvesting costs. Instead, they will be able to claim ETS carbon credits for a very long period.

A brilliant escape route, given the probability that after the carnage caused by forestry slash during Cyclone Gabrielle, their licence to clear fell pine plantations on highly erodible land might be curtailed or removed altogether, making this kind of forestry unprofitable.

At the same time, the forestry companies are signalling an intention to claim compensation if these restrictions are imposed, instead of paying compensation for the damage they have caused. They must think that New Zealanders are very dim-witted indeed.

Why does this matter? Well, pine plantations are not 'permanent,' and they are not 'forests.' In comparison with native forests, with their long-lived trees and diverse ecosystems, these are relatively short-lived, shallow rooting and highly flammable industrial monocultures, at high risk of destruction from fire, disease and storms at a time of climate change.

This is not a credible form of long-term carbon sequestration, and inevitably, it will be called out as 'greenwashing' by the international community. Once again, New Zealand taxpayers will be left to foot the bill.

Once again, too, local communities will be the losers, left with aging plantations full of weeds, pests and trees that fall over in storms, few jobs and not even the export income from logs being sent to overseas markets.

Nor can the forestry companies claim innocence, or ignorance. Most of the major forestry companies in New Zealand are certified by the Forestry Stewardship Council in Bonn, and have signed up to a set of standards that are supposed to guarantee that their timber is sustainably produced.

If those standards had been upheld, much of the carnage caused by forestry waste in Cyclone Gabrielle might have been prevented, or mitigated. Even a cursory look at the FSC

standards compared with the evidence in recent court judgments shows that these standards have been radically breached by companies that are still FSC-certified. How can that be? The forestry companies are allowed to hire their own auditors, it seems.

This kind of gaming goes back to the design of the ETS, with the huge financial privilege it gives to pine plantations over native forests. This is supposed to reward superior carbon sequestration, and yet according to the Food and Agriculture Organisation of the UN, the global industrial forestry supply chain emits twice as much carbon as it sequesters.

New Zealand's forestry supply chain, which mostly sends raw logs to China for processing into very short-lived products, is likely to be on the high side of that calculation. Permanent native forests, on the other hand, will keep on sequestering carbon for centuries.

Yet in Tairāwhiti, a landowner who plants pines will earn 10 times more by Year 5 than if they restore native forest, at a time when it is almost universally agreed that this is the best land use for highly erodible slopes and gullies and around waterways. The ETS is an ecological (and economic) idiot, it seems.

What needs to happen now? Let's hope the inquiry into forestry slash and land use in Tairāwhiti has integrity. It needs to listen to local people, look at local landscapes and serve local interests, not those of the forestry corporations. Likewise, the current reviews of the ETS by Treasury and the NES (PF) must not be captured by the forestry industry.

Rather than parroting words put into their mouths by forestry lobbyists, our politicians need to serve local communities and defend them from the kinds of ravages and losses they have suffered in Cyclone Gabrielle. Otherwise, they deserve to be voted out of office.

Clear felling on highly erodible gullies, slopes and around waterways needs to be banned. The 'permanent forest' category in the ETS should be reserved for native forests and made financially competitive with pines, giving landowners a realistic option for planting and regenerating native forests. Lobbyists should have to register and their activities made transparent, as in other developed countries; and politicians who take campaign donations from industry interests should not be given portfolios in those areas.

It's not just the quality of our democracy that's at stake, but the future of our children and grandchildren. In tackling climate change, the biodiversity crisis and the degradation of waterways and the ocean, we need to take action that will make a real difference to the state of the planet, not to the balance sheets of global corporations.

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