

Wgtn-NZFFA submission to Plan Change 1, Dec 2023

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SUBMISSION ON “Plan Change 1 to the Natural Resources Plan”

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About this organization. The NZFFA represents people who own small-scale private forests and/or are interested in the many values of trees. Currently we have over 1200 members representing a good cross-section of the approximately 16,000 entities owning private forests in New Zealand. In the Wellington region, the NZFFA has about 100 members with direct interests or ownership in small scale forestry,

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Wellington Branch NZ Farm Forestry Association Submission on GW Plan Change 1 to Natural Resources Plan.

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Summary.

The Greater Wellington (GW) Plan Change 1 proposal to prohibit production forestry from 10% of the steepest forestry land (>26 degrees within an FMU) appears to be based on results of catchment modelling. The underlying premise is that the steepest land would deliver the most sediment to waterways via landslides (as perhaps has been shown for more erosion prone areas). This premise not based on objective evidence and did not consider other sources of sediment. The proposal flies in the face of long held beliefs and forestry best practise guidelines and is not supported by the opensource scientific literature on forestry erosion issues.

- The Case to prohibit Plantation Forestry from the highest 10% relative Risk of Erosion Prone Forestry Land does not stack up and may not reduce sediment levels in water bodies.
- Making all forestry operations a controlled activity is a draconian step. The need to do so is not supported by hard evidence.
- A new version of the NES-CF is now in force with much stronger environmental controls.
- There appear to be serious flaws in setting Target Attribute States (TAS) for Visual Clarity where Natural Brown Water contributes to values (for at least for Mangaroa River)
- The erroneous TAS have been propagated throughout the Plan Change 1 as justification of the need for more control over Plantation Forestry (whereas pastoral farming avoids Controlled Activity). This should not have happened.
- GW should allow the new NES-CF to bed in and actively monitor compliance and land performance (Commission research). GW also need to withdraw the prohibition on harvest in the meantime and not insist that all forestry activities are controlled.
 - Failing this, GW should exempt forestry under 20ha as a Controlled Activity.
- If GW really believe that Wellington, Hutt Valley and Porirua hills have an erosion risk severe enough to warrant banning of plantation forestry (as in Red Zoned land), they should ask for ESC data used by NES-CF to be reviewed and to make a technical case. It would be highly desirable to have national consistency in this matter and not revert to piecemeal regulations that differ between adjacent regions.
- The lack of input or review from experienced soil conservators and foresters for this Plan Review has resulted in a tunnel-view proposed solution to a problem that may not even exist. Greater Wellington used to employ high quality and respected soil conservators and people knowledgeable about forestry practise. Why were they not consulted?
- Rather than prohibit Plantation Forestry from the steepest slopes, GW should explore other ways of mitigating the risk of erosion from steep slopes after harvesting, as listed in the main text.

Preamble:

NZFFA represents not only its 1200 nationwide members but also represents, under the auspices of the Wood Products Levy Act, all the woodlot owners not otherwise affiliated to FOA, NZFFA, NZIF, Nga Pou A Tane. There are approx. 16000 unaffiliated woodlot owners in NZ with larger than 3.5ha woodlots. There will be an additional number of farmers and lifestyle block owners with woodlots smaller than 3.5ha, but who still need to comply with the National Environmental Standards for Commercial Forestry (NES-CF). Shelter belts, riparian planting and woodlots smaller than 1ha are not covered by NES-CF.

The Wellington Branch of NZ Farm Forestry Association supports regulations designed to minimise negative environmental effects of plantation forestry on water bodies but submit that the regulations

in the NES-CF are already sufficient to manage the process. The NES-CF is widely accepted and has sound scientific backing. It was deliberately set up to provide uniform regulations between different territorial authorities, so that forestry businesses were not constantly firefighting random regulation changes in different jurisdictions. Whilst NES-CF allows for local authorities to apply more stringent conditions to meet say freshwater objectives, surely there needs to be compelling evidence as to the scale of the problem, the source of pollutants and that recently instigated rules are not working.

The aftermath in recent years of several cyclones and heavy erosion events in highly erodible landscapes has put forestry activities under the spotlight. News stories (concerning forestry slash) are often inaccurate and fail to recognise the benefits and strong ecosystem services that plantation forestry can provide. The public might conclude that Wellington, Hutt Valley and Porirua hills are equally vulnerable, but we say that is definitely not the case. Our soils are much more stable and prolonged heavy rain events are less frequent.

Clear fell harvest sites can look confronting to a lay person but are generally better than they look. The vast amount of harvesting is carried out by experienced contractors with highly trained staff, subject to inspection by both WorkSafe for Health and Safety, and local body authorities and following harvest plans based on Best Practise Guidelines and subject to Erosion and Sediment Control plans. Very often, the harvest is overseen by a Forestry Management Company.

When it comes to rural land use, foresters think of themselves as the environmental good guys. Exotic Plantation Forestry provides ecosystem services and even after soil disturbance during road making and harvesting, has been repeatedly demonstrated to be a far better land use than pastoral farming on equivalent geology and land use categories. Foresters know that production forestry is an inherently good use of hill country land. This is reflected in Government policies, assisted afforestation schemes, and websites such as MPI/ TUR-Forest Service, MFE, and Canopy.

Aspirations vs What Can Reasonably be Achieved

The aspirations of National Policy Statement- Freshwater Management (NPS-FM), and in the Natural Resource Plan amendment 1 (NRP Plan Change 1), are challenging and perhaps deliberately set high and transformative. But when aspirational targets become regulations, and there are high compliance costs and heavy penalties or liabilities for not meeting them, you must ask what is fair and reasonable.

- Historically, plantation forestry has not competed for highly productive land used for food production. Instead, it tends to occupy low fertility and more erosion prone hill country. The avoided erosion, carbon services and other ecosystem services that it provides are highly valued.
- The aspirations required of plantation forestry (under NPS-FM), to release no more sediment to water bodies than what existed in the Natural State is unrealistic. Natural State is defined in the NPS-FM as before humans arrived in NZ. One has idyllic visions of primeval Gondwana Land forests, giant eagles and moas, but actually there were huge dust storms after the last ice age, massive volcanic eruptions, tectonic uplift and earthquakes, and tidal waves along with massive erosion. Due to climate change, some of the erosion events will now occur more frequently and with increased ferocity.
- This Plan Amendment will set a precedent in NZ, and more highly erodible areas and districts will surely follow suit.
- With proposed peak sediment discharges of only 100g/m³, high compliance costs via consenting, certification of plans and auditing and limited by the inability of current forestry

best practise and technology to deliver desired outcomes, regulations like this could effectively put plantation forestry in hill country out of business.

- Either forestry starts to compete against food production for land use on low erosion prone land, or NZ Inc. will have to import wood, wood fibre and biomaterials from overseas. - Importing from countries that do not have so stringent environmental regulations. Either that or we continue to use resources based on fossil fuels or inherently high carbon footprints. Some might describe that as scoring an own goal!

The NPS-FM Part 1.3.5 states:

There is a hierarchy of obligations in Te Mana o te Wai that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems

(b) second, the health needs of people (such as drinking water)

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future

We fear that part C is being overlooked in favour of an unrealistic vision for the health and wellbeing of water bodies.

General comments on retiring out steepest 10% forestry land (defined as highest risk erosion prone)

- Plan Change 1 proposals are naïve about the implications for plantation forestry, ill thought out, and subject to unintended consequences.
- The Plan Change 1 **appears to be founded on three false premises.**
 1. That Visual Clarity (and by implication suspended sediment) measures fail Target Attribute States (TAS) in some rivers with abundant Plantation Forestry.
 2. That the steepest forestry land within a working forest is responsible for delivering the most sediment to water bodies.
 3. The steepest (“highest erosion risk” forestry land has a landslide risk factor similar to that for “the highest erosion risk” pastoral land.
- We challenge the technical correctness of the Visual Clarity TAS set for Mangaroa River. This river has a major input of Natural Brown Water and the TAS does not appear to have been adjusted appropriately by GW.
- Points 2 and 3 above are discussed later in this paper.
- There is no evidence presented that retiring out the steepest (so called “most erosion prone”) plantation forest land will improve sediment outcomes in waterways. We say that leakage of sediment could actually get worse if management practises have to change.

Basic Understanding of Erosion in Forestry

- Sheet erosion (surficial scouring) and slope failure (slips) are the most common types of erosion in Wellington and Porirua hills. There are also other categories used to describe natural erosion events, not dealt with here.
 - In our analysis, origins of forestry sediment can be described under perhaps 5 broad categories occurring under different circumstances and at different frequencies.
 - a. Periodic soil disturbance occurring at or shortly after harvest time, including:

- i. Soil disturbance from new roading, preparation of skid sites, access tracks, batters and side cast collapsing (banks above and below road lines).
 - ii. Sediment arising from soil disturbance due to of tree felling/harvest and dragging stems across slopes. Relatively minor when using cable aerial haulers but can be significant for ground-based operations. In particular, the use of skidders to tow logs along crude unmetalled tracks.
 - iii. Sheet or surficial erosion on bare soil exposed immediately after harvest and before revegetation. Soil is not necessarily disturbed. Runoff will be worse on steeper land. The tree leaf canopy is no longer there to intercept up to 25mm rainfall. Surface soils are potentially more vulnerable to being washed away under heavy rain. If rain events are not intense, leaf litter and small branches armour the slope. Immediately after harvest, surficial erosion of bare soil (undisturbed) is a minor risk. Risk will be somewhat elevated if herbicide is used prior to replanting as by then, debris and litter that armoured the slope, and small roots have started to decay. (Often replanting is delayed by 12-18 months so that natural regeneration can be sprayed out and replaced by genetically improved stock at correct spacing).
- b. Soil disturbance from old/existing roading, maintenance of gravel roads and water tables, vehicles driving along wet gravel roads. This category of erosion is more or less evenly spread across the years under moderate and heavy rain events.
- c. Sediment from large earth flows, shallow and deep slips. Relatively rare events in Wellington forests, but capable of releasing huge amounts of sediment when they do occur. Woody vegetation (roots) and stump roots hold the soil much better than open pasture. In Wellington region (west of Tararua and Remutuka Ranges), large slips are relatively rare in Plantation Forestry, no more so than in native forest. (We have very few mass land flow/porridge sites). While there is an elevated window of vulnerability for slope failure 3 -6 years after harvest until a closed canopy is reestablished, the degree of vulnerability depends on many factors such as soil type, underlying rock type, rainfall, slope, condition of roots, and any cover crop vegetation. See diagram on page 14.
- d. Sediment arising from tree toppling in major windstorms (and snow) (perhaps 10-30+ year repeat cycle): Wellington and Hutt Valley hills are subject to extreme wind turbulence from time to time. Forest susceptibility to toppling is dependent on tree species (some can root graft which improves stability, or coppice), tree height, height to diameter ratios (affected by stocking rate and age of trees), soil properties and waterlogging. The age of the forest and forest management regime are major factors. Unmanaged stands are likely to be worse for toppling. Toppling is not restricted to steep sites, being worst in extreme wind exposure (ridge lines), from rarely experienced directions (normally sheltered) or wind turbulence and on waterlogged soils.
- e. Sediment from scouring gullies and streams: Includes stream bank scouring with or without mechanical damage. Severity of scouring depends on where you are in the catchment and the speed/turbulence of water flows and associated debris. Large areas of recent harvest within a catchment will elevate peak flows in rivers. Intact forest canopy is said to hold back about the first 25mm of rainfall. For prolonged heavy rain events, the forest canopy probably has only a minor effect on restricting the volume of water scouring a slope or riverbed, but obviously roots and woody debris help to slow water and hold slopes together.

- i. Permanently vegetated riparian setbacks are supposed to restrict streambank and riverbank collapse.
 - ii. Note that an increased intensity and frequency of rain events due to climate change means that historical stream and river channels may no longer be adequate to take the higher storm water flows. Arguably, channel width needs to be larger under climate change conditions, and channel scouring could be regarded as a necessary natural process.
- In our opinion, and contrary to reports from highly erodible sites elsewhere, the majority of sediment arising from Wellington's plantation forestry operations is to do with roading, skid sites/track making and skidding logs (during ground-based harvest operations) and stream/river scouring. This happens in spite of contractors generally following best practise guidelines. Our region has very few landslides in forested areas, even after harvesting.
 - Large operations using haulers are usually well managed and designed, with access along ridge lines, and roading built to published best practise guidelines. Earthworks are minimised on the steepest slopes.
 - We would argue that in well managed forests, the steep "high risk erosion prone" slopes do not contribute much sediment to water bodies under usual circumstances. Under extreme weather events, and time averaged over the life cycle of the forest, steep slopes are little worse than comparable sites under continuous native bush cover.

Evidence of Sediment in Water Bodies Arising from Plantation Forestry

There are no studies available (that we are aware of) that actually measure the amount of sediment (or relative amount of sediment) emanating from forestry operations in the Whaitua Te Whanganui-a-Tara or Te Awarua-o-Porirua Whaitua. (Some use of modelling has occurred, but these models are subject to broad assumptions).

The paucity of refereed scientific studies in science journals is for good reason. Wellington forests historically have a minimal erosion problem so have not been closely studied. The science work has instead focussed on highly erosion prone land in other areas, Eastern Wairarapa, Hawkes Bay, Manawatu/Whanganui, Gisborne/Tarawhiti, Marlborough Sounds, Takaka Hill, etc. These areas have large amounts of orange and red zoned land, the two highest categories of erosion prone land under Erosion Susceptibility Classification used by NES-CF. There are no such land classes present in the Whaitua Te Whanganui-a-Tara or Te Awarua-o-Porirua Whaitua.

Planners at Greater Wellington however, are convinced that there is erosion prone land and that Forestry must play an equitable role in reducing sediment levels in water bodies. We were told (Q&A session for PF) that when they prepared this plan amendment, that they did not consult or seek professional forestry or soil conservator advice, even from within their own ranks. (e.g. People such as Stan Braaksma, recently retired from GW). Some of the policies seem to have been based on models of erosion risk, not real data. Erosion models make broad assumptions and need reality checks.

Without hard data on the relative contributions of sediment from natural sources, forestry, pastoral farming and urban/roading development, it is not possible to allocate equitable contributions to reducing sediment loads to about ½ of the current levels.

Water Quality in Wellington Forestry Catchments

We can see no evidence from water quality data held in Greater Wellington (GW) website of increased sediment in catchments with a high proportion of plantation forestry.

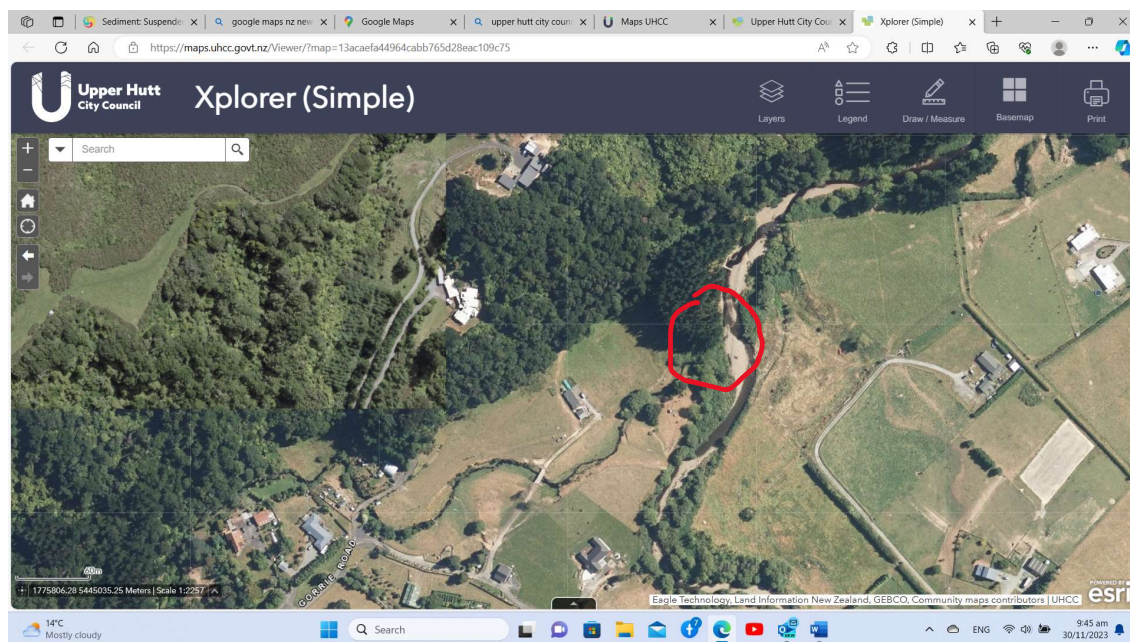
The water clarity for Mangaroa River exceeds guidelines, the Target Attribute States (TAS) set by the National Policy Statement for Freshwater Management (NPS-FM), but the test result in this case is an inappropriate surrogate measure for suspended solids. We strongly suspect that regulators have not realised that the **test failure was due to a natural source of brown water**. However, regulators have promulgated policies and Plan changes based on the alleged failure in water quality attributed to human activities (visual clarity, apparently converted to dSedNet as mean annual load in tons/year, Table 8.5 of Plan Change 1). In respect of Mangaroa River, we dispute the values for required sediment load reductions shown in Table 8.5, and also suggest that the data interpretation for Wainuiomata/Black Creek is incorrect.

The NPS-FM acknowledges that **natural sources of brown water exist** and **allows regional authorities to set different TAS** (clause 3.32 of NPS-FM). This does not appear to have been done for Mangaroa and possibly some other streams including Wainuiomata/Black Creek but does appear to have been done for the more controversial Hulls Creek that includes drainage from the Hutt Council owned Silverstream Tip.

Hulls Creek achieves an A rating with only 1.2m visual clarity, but Mangaroa (1.5m) and Black Creek (1.3m) score D grade. The TAS values listed for these rivers (2.22m) appear to be default values from the tables, not adjusted to baseline values or reset by GW. In the case of Hulls Creek, we are not aware that this drains a peat swamp and wonder whether buried iron adjacent to the railways activities is actually a source of the opalescent water. (see photo below). The creek draining from below the adjacent landfill site, and intercepting Hulls Creek runs relatively clear. (Note: high iron natural content can oxidise and precipitate from water ways, thereby coating rocks and plants in the manner seen in the photos for lower Hulls Creek. Brown peat extract won't drop out in the same way.)



The photo below shows the confluence of Black Stream with Mangaroa River. Confluence area circled in red. This is upstream of the regular monitoring point for Mangaroa River at Te Marua.



Black Stream drains Waipango/Mangaroa Wetland peat swamp and is quite dark tea coloured water.

The visual clarity test is through what depth of water can you see a black disk, so of course having peat-stained black water in a river will decrease the test value.

We have suggested elsewhere that the monitoring point be moved upstream from the confluence of Black Stream and Mangaroa River, but the TAS could also be changed by GW.



TABLE: Data extracted from a Greater Wellington data base for Water Quality in some selected rivers with a high proportion of Plantation Forestry activity.

Attribute	Mangaroa at Te Marua	Akatarawa	Whakatikei	Pakuratahi	Hutt intake at Te Marua
Clarity (State, median, metres)	D, 1.41*	A, 3.75	A, 3.33	A, 4.08	A, 3.72
Total Suspended Solids, (min, med, max)	1, 2, 41	1, 1, 36	1, 1, 13	1, 1, 240	1, 1, 21
Suspended Sediment (min, med, max)	5, 5, 66	5, 5, 42	5, 5, 5.5	5, 5, 280	5, 5, 18
Deposited Fine Sediment (State)	A (2%)	A (5%)	A (5%)	A (3%)	A (1%)

Note *: this measurement is affected by Natural Brown Water and a different TAS needs to be set.

The catchments (except for the Hutt intake at Kaitoke) are mixed use, with some pastoral farming and lifestyle blocks as well as native bush and plantation forestry. Pakuratahi River does show higher maximum values, perhaps reflected by a relatively large catchment with cleared farmland, or different lithology in the head waters (near the Remutuka Incline summit, fractured argillite?) but it also has the clearest water.

Another report commissioned by Whaitua Te Whanganui-a-Tara, indicates that deposited fine sediment levels were low in some rivers with extensive Plantation Forestry activity. The author concluded that fine sediment was not significantly impacting ecosystem health.

Figures and Table below taken from: Deposited Fine Sediment data taken from “Whaitua Te Whanganui-a-Tara River and stream water quality and ecology 30th October 2018 Report prepared for Greater Wellington Regional Council by: Dr Michael Greer Dr Olivier Ausseil Aquanet Consulting Limited”.

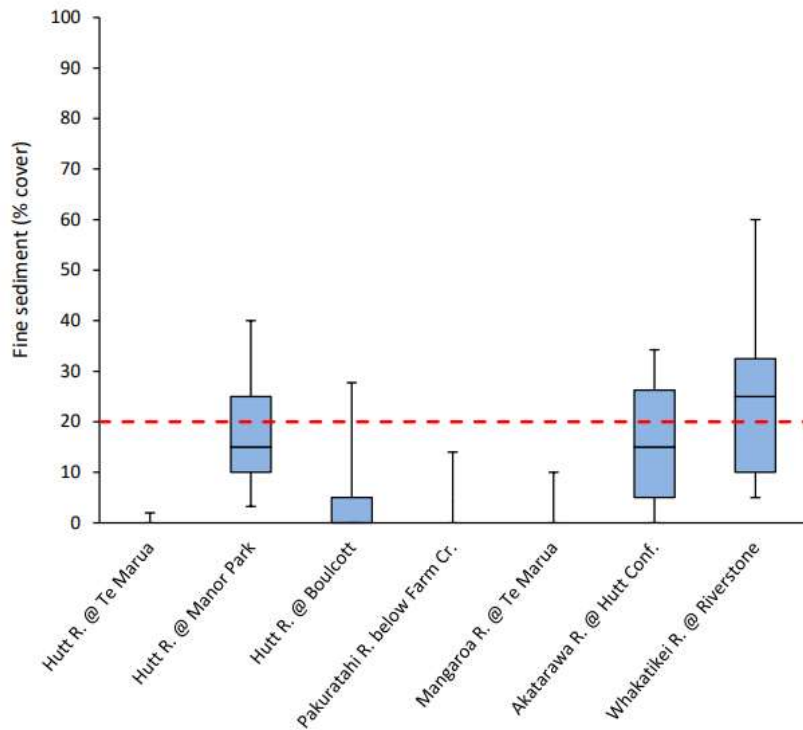


Figure 10: Distribution of fine sediment cover data recorded in rivers in the Hutt River catchment sub-zone. The red line indicates the Clapcott *et al.* (2011) guideline for the protection of biodiversity.

Instead of being a result of upstream farming, urban earthworks or forestry activity, we query whether the relatively high levels of **fine sediment** seen downstream in the Hutt River (Manor Park) are actually a result of intermittent bulldozer activity in the riverbed carried out by GW for flood protection. Heavy equipment used in the riverbed will crush the rocks and create more fine sand that would occur under natural conditions.

The data shown by Greer and Olivier are from 2013-2015. The current data (Table on Page 10 as of Dec 2023) held on the GW website, for the Hutt Valley sub catchments with high levels of plantation forest, do not indicate elevated levels of deposit fine sediment . [Sediment: Suspended & Deposited, Water Clarity | 2021/22 River water quality and ecology monitoring | Greater Wellington \(gw.govt.nz\)](#)

Table 27: Annual maximum fine sediment cover recorded in rivers in the Hutt River catchment sub-zone from 2012 to 2016. Values highlighted in green meet the guideline set out in Clapcott *et al.* (2011) for the protection of benthic biodiversity, values highlighted in red do not.

Site	Clapcott <i>et al.</i> (2011) guideline (%cover)	2012	2013	2014	2015	2016
Hutt R. @ Te Marua	20	-	0	0	10	-
Hutt R. @ Manor Park		-	40	30	40	-
Hutt R. @ Boulcott		-	0	15	30	-
Pakuratahi R. below Farm Cr.		-	30	10	5	-
Mangaroa R. @ Te Marua		-	5	5	10	-
Akatarawa R. @ Hutt Conf.		-	20	30	40	-
Whakatikei R. @ Riverstone		-	70	50	60	-

The multiple sources of sediment data fail to show that forestry practises are degrading the rivers.

Mapping

- Greater Wellington (GW) commissioned Collaboration to identify the highest risk erodible land for pastoral, woody vegetation and plantation forestry land. These maps form part of the Plan Change.
- The method of Easton et al (2023), Collaborations, acknowledges a high prevalence of landslides on steep pastureland (as opposed to land protected by woody vegetation), but then proceeds to rate erosion susceptibility on forestry land as if it were converted to pasture. There appears to be an assumption (not stated) that bare land after clear-felling will have a risk of erosion similar to that of pasture and that there is a significant window of vulnerability after harvest. We say that is overstating the risk, as roots and minor debris armour the slope for a period, and that there are ways of mitigating erosion risk after harvest. Besides which, **forestry land is only about 10% of the time in a more vulnerable state (after harvest), so should be regarded as if it was permanent woody vegetation**, not pasture or bare soil.
 - The erosion risk mapped by Easton is not absolute, it is relative. Highest risk erosion land must be steeper than 26deg and there are other factors including length of slope, rainfall and fundamental soil layer. The mapping does not take into account underlying geology/lithology and acknowledges that risk may be overstated. Also, it has ignored roadworks, soil disturbance and forestry related activities as a potential source of sediment.
 - Mapping uses a 5-metre resolution, which is higher than that used for NES-CF. Nevertheless, much of the highest risk erosion prone areas identified by Easton are

- so large that, had they qualified as Red Zone, the NES-CF/ESC resolution would have picked them up.
- The C factor (a multiplier to account for cover management) includes 0.005 for plantation forest, native forest and scrub, 0.01 for pasture and 1.0 for bare earth. We do not agree that pasture is only twice as susceptible to erosion as woody vegetation, and that otherwise undisturbed bare earth (with or without roots) should not be 10 times worse than pasture.
- So there are rather crude assumptions that underpin the modelling. The Risk of Erosion model is not nearly as sophisticated as that used to calculate Erosion Susceptibility Classes (ESC) for the NES-CF.
- Greater Wellington (and their consultants) will have known about earlier mapping (2012) that considered the risk of pastureland slipping into water bodies. Hypertext link [Highly erodible land | Stats NZ](#)

The Highly Erodible Land (HEL) model identifies five classes of land at risk of erosion:

- high landslide risk – delivery to stream
- high landslide risk – non-delivery to stream
- moderate earthflow risk
- severe earthflow risk
- gully risk.
- Several researchers note that shallow landslides often do not reach water bodies, and most of the material is retained on site as talus, particularly on sites with woody vegetation. The mapping contracted to Easton et al, did not consider the risk of sediment actually getting into water bodies.
- The identified land parcels show the relative risk of erosion, one part to another part within the FMU. They do not take into account the underlying lithology and Land Use Class Categories as is done for Erosion Susceptibility Classification used by NES-CF, which is intended to reflect an absolute risk of erosion.
- The approach used by Easton et al, and data produced should be subjected to expert technical review (Personal communication from M. Bloomberg, School of Forestry, Canterbury University, Nov 2023)

NZ Literature on Erosion Associated with Plantation Forestry

- The NZ literature is actually quite extensive. In the name of brevity, only small parts relative to the Wellington situation are referred to here.
- Wellington's relatively stable hill country soils are the envy of contractors and foresters outside our region. Our greywacke slopes are 10-16 times more stable than a range of Hawkes Bay hill country soils (see graph Figure 3 taken from a report prepared for Hawkes Bay Regional Council)

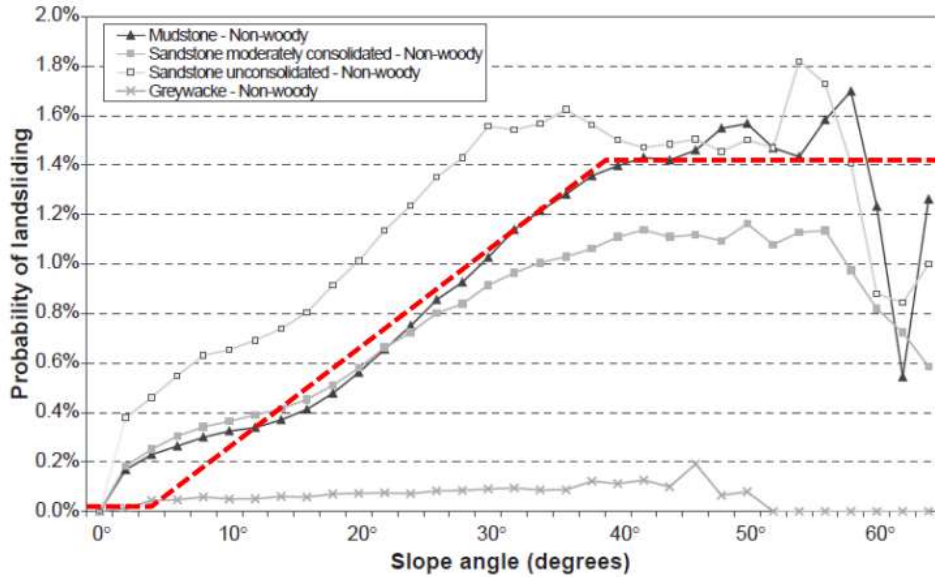


Figure 3: Landslide probability under non-woody vegetation versus slope angle for the four main rock types in the Manawatu-Whanganui hill country, with landslide probability calculated as the proportion of land in an erosion scar (after Dymond et al, 2006). The red dotted line illustrates a theoretical floor (5 degrees slope) and ceiling (40 degrees slope) representing slope in relation to erosion across different rock types (this work).

Figure 3 above copied from the Scion report *Planting eroding hill country in the Hawke’s Bay Region: Right tree, right place, right purpose*, Michelle Harnett ed. **Note low risk of landslide on greywacke.** Forested slopes on greywacke should have even better performance than that shown here.

The figure copied below demonstrates the reduction in root reinforcement in the years following harvest of a pine forest, during the so called “window of vulnerability”. In our view, for Wellington, Porirua and Hutt Valley soils, the risk of landslide never quite gets as bad as for unreinforced bare soil.

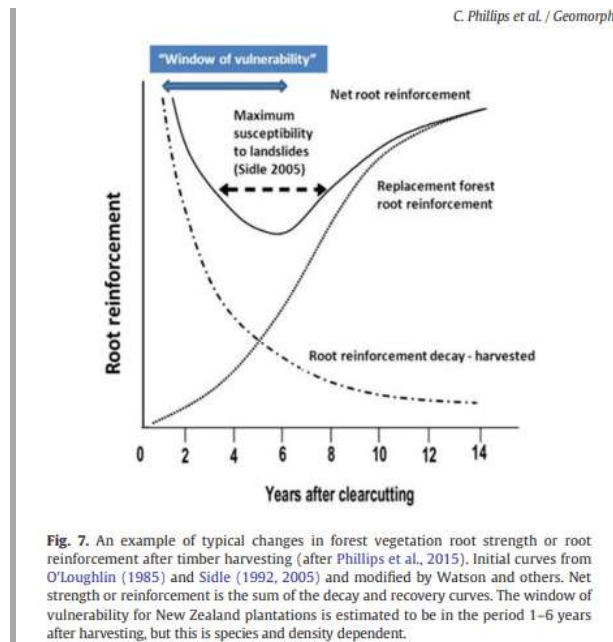
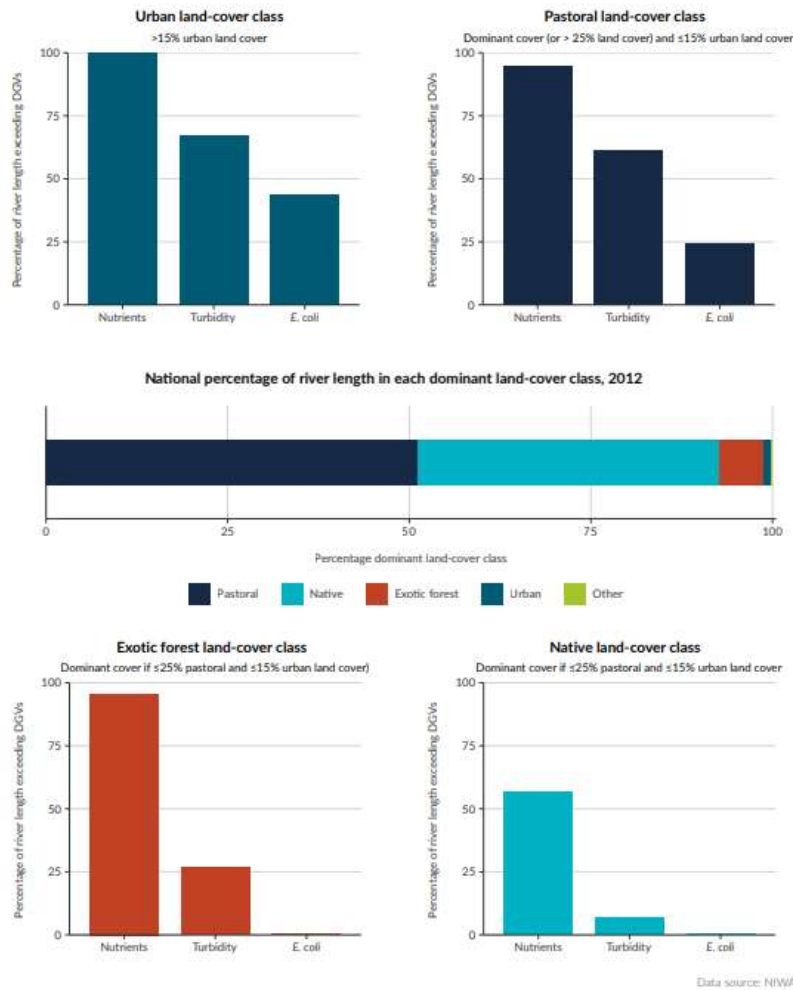


Fig. 7. An example of typical changes in forest vegetation root strength or root reinforcement after timber harvesting (after Phillips et al., 2015). Initial curves from O’Loughlin (1985) and Sidle (1992, 2005) and modified by Watson and others. Net strength or reinforcement is the sum of the decay and recovery curves. The window of vulnerability for New Zealand plantations is estimated to be in the period 1–6 years after harvesting, but this is species and density dependent.

- NZFFA Comment: So-called bare land in a harvested pine forest, whilst not having a canopy to intercept rainfall, does not actually behave like unprotected bare soil either. Fine roots and leaves/small branches will armour the slope against surficial erosion from moderate rainfall events for at least 1 year after harvest. Larger roots (of pines anyway) take several years to significantly decay, so the risk of shallow landslides is not as great as for bare soil until the roots have decayed, by which time a new woody vegetation crop should be well on the way to being established. (see Fig 7 above)
- We can find no specific data differentiating the various sources of sediment in Wellington water bodies (forestry versus natural sources vs pastoral farming vs industrial and urban land development).
- Even for a generalised activity such as forestry, to understand the implications and potential solutions, there needs to be a breakdown of sediment yields between different soil disturbance factors, including landslides, and at different stages of the forestry cycle.
- A general figure/illustration from one paper is reproduced below. ([our-freshwater-2020.pdf](#) [environment.govt.nz](#)) The figure shows percentages of river length where turbidity was said to exceed expected concentrations above natural levels (Data not from Wellington regional rivers).
 - **Note that urban and pastoral land cover classes are much worse than predominantly plantation forestry catchments and native catchments.** It is a fair bet that the mixed catchments for Plantation Forestry and Native land cover were negatively affected by the minority urban and pastoral cover within their respective catchments.

Figure 5: Percentage of river length in each land-cover class that exceeds expected concentrations for expected natural conditions (DGVs) for E. coli, turbidity, and one or more nutrient (nitrogen, ammonia, and phosphorus), for 2013-17



Note: ANZG (2018) does not include a DGV for E.coli, so the expected concentration for natural conditions is based on the guideline value determined by McDowell et al (2013). Because of the way a DGV is defined, under natural conditions it is expected that about 20 percent of river length will not meet the DGVs and about 5 percent of river length will not meet the E. coli guideline. The exceedance figures exclude 2 percent of New Zealand river length where the guidelines could not be applied. The 'other' land-cover class is made up of catchments dominated by gorse, broom, surface mines, dumps, exotic shrubland, or transport infrastructure.

- Another paper is from a paired catchment study in Hawkes Bay (Pakuratahi study, (Garth Eyles and Barry Fahey, 2006) (ISBN 1-877405-05-1 HBRC plan No. 3868) for highly erodible soils. The study was for a limited time period (12 years), but did include roadworks, harvesting period, and the regeneration period until canopy closure. The sites do include steep slopes and a range of soil types. Forestry performed better than the adjacent pasture for all but a couple of years during harvest. (Forestry was also worse while there were large numbers of goats browsing out the forest understory). Overall, forestry was much better than pasture. The intervening period until next harvest is not illustrated, but presumably strongly favours forestry. Earthworks including road making was a substantial contributor to sediment in the stream. This study suggests that slips on steep land under periodic forestry cover are not a major source of suspended sediment, even taking into account the period of vulnerability between harvest until

canopy cover is restored, but stream bank collapse, tracks and roads, batter collapse are significant sources of sediment.

For Fig 5 copied below, Pakuratahi is the plantation forest catchment, and Tamingimingi is the pasture catchment. Harvesting was carried out over several years.

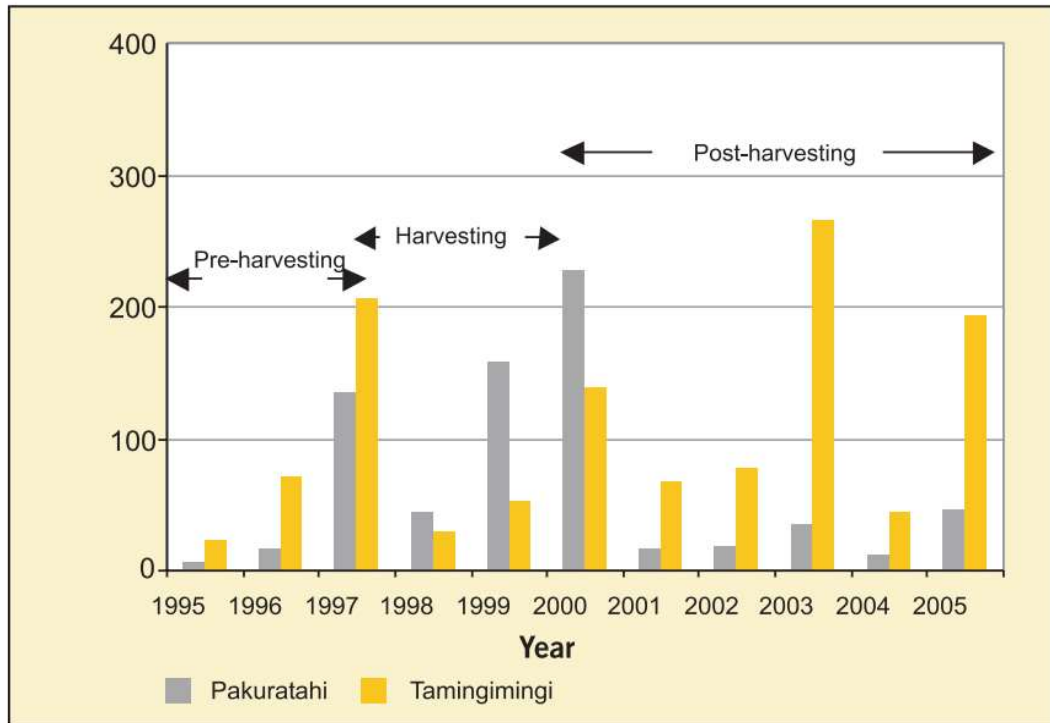
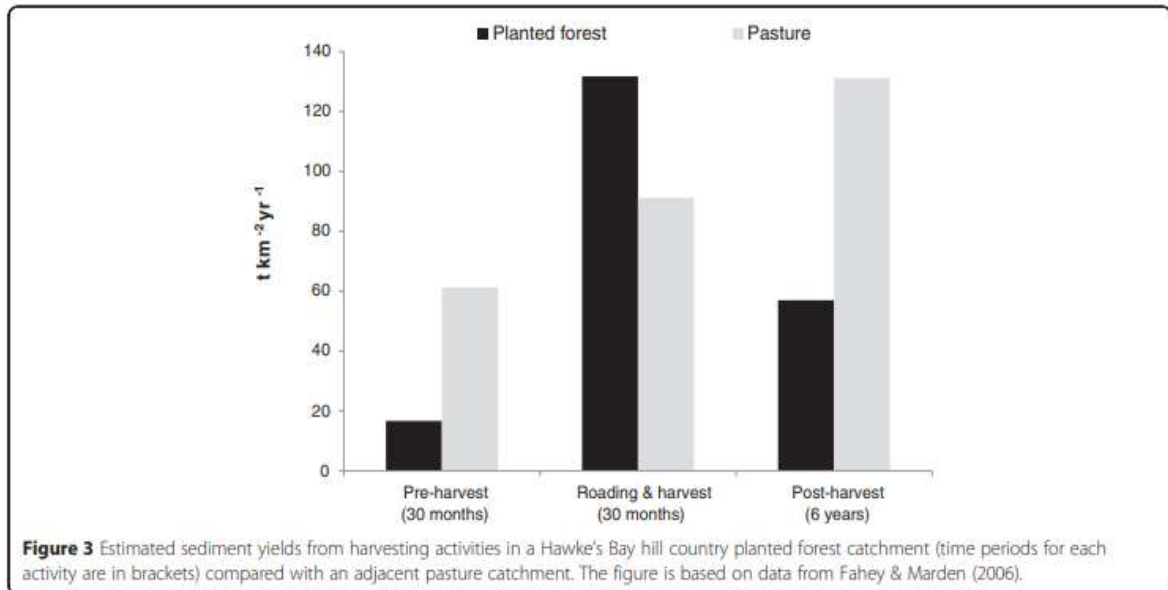


Figure 5. Annual suspended sediment yield for the Pakuratahi and Tamingimingi catchments from 1995 to 2005.

- Bayley and Neary (Figure 3 below) show relative sediment yield from Hawkes Bay catchments (highly erodible). (This is technically a different way of presenting the same data from the Pakuratahi Study) The post-harvest period will include landslides. (Comment: one would expect a much lower incidence of landslide from Wellington’s more stable Greywacke soils.)



- Another commissioned study for Hawkes Bay (Michelle Harnett, SCION) claims that risk of shallow slips on non-wooded greywacke steep slopes is 10 to 16 times less than for other soil types in Hawkes Bay hill country. (figure on page 14)
- GW have a land and forestry resource and the ability to monitor matched catchments in the Wellington area (steep pasture, steep bush, steep plantation forest) on a range of soil types and underlying rock types.
 - We suggest that GW commission or obtain live data about shallow landslide incidence after harvest from their own extensive forests to see if retiring out steepest slopes from forestry could actually make a significant difference to sediment in water bodies.

The Natural State of Sediment in Water Bodies

- The expectation (in the proposed Plan Change) for Plantation Forestry to produce little more sediment than the same catchment would under natural cover is unrealistic with our current land-based harvesting and stem/log transport technology (and the same could be said for any of the other Food and Fibre producers in the rural space). Pastoral, intensive farming, horticulture and arable/market gardening do not seem to be held to the same high expectation.
- Sediment production from the natural state is not well quantified. The NPS-FM, clause 3.25 part 3, defines natural state (in respect of sediment in rivers), as its state before the arrival of humans in New Zealand. We think that achieving sedimentation rates close to the natural state is an unrealistic goal and does not take into account climate change, effects of earthquakes and volcanic eruptions, land use changes and clearance and other natural dynamics over the last 1000 or more years.

- There appears to be little awareness of recent “natural” sedimentation dynamics (for instance, influence of feral animals, deer, goats pigs) or that in recent years sediment from unmodified natural catchments is increasing (Kit Richards personal comment).
- The natural state sediment levels of any particular waterway will depend on stream size and water volume, steepness, state of vegetation cover, input from mineral rich seepages. Iron and other mineral oxides can be a major portion of sediment and turbidity near the sources of these seepages. Visual clarity is sometimes a poor surrogate test for suspended sediment load, as peat-stained water (and free of suspended sediment) from natural sources fails the test.
- Typically, water quality is routinely monitored at only a few readily accessible sites low down in the catchment.
- In terms of a forest owner’s ability to manage their own forestry sediment loss.
 - Is the “natural state” a waterway in the foothills surrounded by climax bush (undisturbed by ungulates)?
 - or is it a water body flowing from a recently regenerating seral forest as covers much of the Wellington hill country and heavily browsed by pest ungulates (goats, deer, pigs)?.
 - Or is it only defined at the few official monitoring points low down in a catchment area?
- If Natural State and TAS can only be determined at defined regular monitoring sites, how can individual land managers up-stream be individually held accountable?
 - Rule WH.R20, part (d), for consented activities, requires that the most recent GW monitoring record for visual clarity not exceed the TAS at any monitoring site within the relevant FMU.
 - Given that consent may have been granted 30 years previously, it is not obvious how any aspects of the forestry management then escalates to discretionary activity. Could planting or harvesting consent be suddenly withdrawn because there was a recent flood, earthquake, bulldozer activity in the Hutt River, urban development gone wrong, pastoral or arable activities affecting water clarity (not caused by the forest owner)? There are huge financial and logistical issues here. Contractors with millions of dollars in bank loans cannot afford to wait around until the river clears.
- Are Target Attribute States (TAS) realistic? Do they take into account dynamics of natural systems including increased erosion caused by climate change or earthquakes.
- We agree that if land is steep enough and erodes a lot, it should go into protection forestry. However, we don’t see that type of land in the Wellington, Hutt Valley and Porirua areas.
- Most of the steep land around Wellington is inherently much more stable than the land classes usually proposed for protection forestry.

The Cyclical Nature of Forestry Activities Vs Peak Discharge Limits

- Because many forestry cycles (from planting through to clear-fell) operate over a 25-35 year repeat period, it is unreasonable to set worst case stormwater sediment discharges as if they operated at the same frequency year in and year out (or with every rain event), as might be

assumed for pastoral farming or urban site developments. It is far more logical and equitable to time-average the discharge limits for forestry over a 25-35 year period.

- There appears to be little understanding demonstrated in the draft plan of the nuances surrounding sediment loss to waterways within a cyclic forestry environment.
- Our view is that the peak point source sediment limit of $100\text{g}/\text{m}^3$ is too difficult to meet and is unrealistic. (see photo on page 10).
 - Should a roadside culvert discharge into a sediment trap near a water body, then a truck driving up a gravel road under wet conditions would likely cause a non-compliant test, a faint colour in water.
 - Even DOC administered walking tracks near Catchpool cannot meet the point discharge standards (photo). Our point is not to criticise DOC operations, but to point out that forestry operations are expected to reach a much higher performance standard than many other circumstances that we take for granted.

Trackside culvert near Catchpool after light rain. Main streams were running clear. Based on colour, the culvert water clearly exceeds the $100\text{g}/\text{m}^3$ sediment limit. No sediment traps seem to be used.



- Greater Wellington operate walking tracks and gravel roads throughout their territory. Forestry Roads maybe built to best practise guidelines (with water tables and sediment traps) but will still leak sediment. The more so after road maintenance or heavy vehicle use.

- Instead of setting aspirational and unrealistic peak discharge limits, it is much better to define forestry best practise (which will improve over time) and audit to those standards.

Where is the Sediment Coming From (over and above Natural State contributions)

- We need data and /or research to find this out, for the Wellington area.
- Our opinion is that for plantation forestry near Upper Hutt, that forestry earthworks including roading and associated batters, culverts, stream crossings, use of skidders are much more frequent and significant sources of sediment than shallow land slide and surficial erosion from steep slopes after tree harvest.
 - This view is supported by the Hawkes Bay Pakuratahi Paired catchment report, (Eyles) mentioned earlier.
 - Natural State sediment contributions can be significant. Eric Cairns has personally observed stream bank scouring or collapse from under 60 year old woody vegetation, in intense rain events.
- Forestry roadworks and associated harvesting earthworks can generally be managed to minimise but not eliminate sediment loss to waterways, but rather than focus on extremely conservative peak discharge limits, the sediment losses over the whole forestry cycle need to be factored in.
- In theory, steep slopes have a window of increased susceptibility to erosion after harvest when pine roots are beginning to decay and before the canopy of the next forest closes.
 - In practise, we have not observed evidence that these slopes are producing significant areas of shallow landslides (Upper Hutt area). Perhaps Greater Wellington can produce evidence from their own forests (rather than rely on dubious modelling).

What could happen if Plantation Forestry were Prohibited from “highest risk erosion prone” Slopes.

- After harvesting, the site is likely to be left to fend for itself.
- Around most of Wellington, that would mean extensive regeneration in pine, gorse and other weeds. Significant amounts of native vegetation are unlikely to get going until the stand opens and lets more light into the forest floor.
- As regrowth pine gets older, and if not tended, there will be a natural self-thinning process, but it will have an elevated risk of disease and toppling, especially in wetter gullies.
- Due to the large scale, these pines will be regarded as “wildings” and could be expensive to remove or control. Old-woman pines produce far more seed than young plantation trees. i.e. the problem could escalate over the longer term. Who will own or be blamed for the problem?
- Tree toppling on unmanaged sites over the longer term could generate significant levels of sediment. (Stand collapse akin to what happens for native Beech Forest). Even more so for sites subject to severe easterly turbulence or periodic snow damage, as Upper Hutt hills are.
- Retiring of steepest land currently under forestry will affect a substantial part of some forestry blocks and will affect the viability of many forestry operations. For some existing forests, it may restrict plantation forestry to just ridge areas, lower slopes and valley floors.
- If cable harvesting can no longer be carried out (due to mid-slopes no longer having plantation forestry), then to harvest the lower slopes, machine access must be along low-

lying territory with more crossings of streams and seepages. This will exacerbate sediment and erosion issues. Due to runoff, roading and vulnerable disturbed soil on lower slopes will be subject to higher stormwater flows than ridgelines. (Best practice now is to run roading along ridgelines, avoiding water courses and seepages as much as possible).

- Skidders currently used for “ground-based harvesting operations” drag full length logs to skid sites for processing. They are very heavy on the wetter soils and will produce more ground compaction, pugging and sediment than a hauler operation.

Replacing Pasture or Plantation Forestry with other Woody Vegetation

The performance requirement for woody vegetation replacing pastoral land is simply woody shrubs or trees and to get > 80% canopy coverage within 10 years. This is a very low expectation compared to the performance of exotic timber species in managed plantations. It does not meet the performance standard required in the Emission Trading Scheme for pre 1990 forestry succession.

Whilst carbon sequestration is not the focus of this Plan Change, there is potential to improve carbon sequestration by encouraging managed exotic forestry species instead of wilding pine, gorse, broom, manuka, Himalayan honeysuckle, inkweed and blackberry.

If plantation pine is replaced by shrub weeds or even a managed or self-regenerated native forest, there will be a net loss of carbon stock that will take many years to recreate. At this scale, the cost to the National Economy for carbon losses could be significant.

Rather than banning production forestry from the steepest slopes, why not consider alternative timber species (coppicing and/or longer rotation times), Permanent Forestry (where partial harvesting is allowed), Carbon forestry or Continuous Cover Forestry / Close to nature Forestry practises as a tool to reduce risk of sediment loss and to manage the broader risk to the environment?

Are there likely to be Unintended Consequences from Prohibiting Plantation Forestry from Steep Slopes.

- YES
- If steep mid slopes are removed from production forestry, this entirely alters the forestry management plans as production forests may then be restricted to broad ridge lines and lower slopes/valley floors.
- Sediment discharges from forestry roading and tracks might get worse. Forestry best practise is to run access roads and tracking along ridge lines. This greatly reduces runoff volumes and hence sediment. Also, sediment discharge is often onto a vegetated hill slope, well away from water bodies. Reducing the ability to haul logs to elevated skid sites will require more roading and tracking across lower and inherently wetter slopes.
- If cable logging (stems suspended from the ground) cannot be done, there may need to be increased use of ground-based log transport (skidders/ bulldozer with logging arches, or shovelling) which is carried out using heavy machines on soft temporary tracks rather than on engineered and metallised roads and will create much more soil disturbance and soil compaction than that caused by cable logging. Pugging and consequent sediment loss can be severe under wet conditions.

- More stream crossing and seepage crossing, and faster and heavier runoff flows from the upper slopes will impact earthworks.
 - In the narrow valleys, there is often limited space available to install structures to manage sediment near waterways.
- Due to restricted access and economies of scale, larger areas of land than mapped will become uneconomic to grow and harvest trees from.
 - It is likely that some individual land parcels will no longer be able to operate a production forestry business. They may not be eligible to join an emissions trading scheme, which in any event, is now restricted to averaging. Much of the forest will be pre-1990, so must be replanted or converted into woody vegetation and will be ineligible for an ETS carbon income stream. This could trigger claims for compensation, or a claim under RMA section 85, concerning that the provision or proposed provision would render their interest in land incapable of reasonable use.
 - Pastoral farmers have been encouraged to use plantation forestry (as well as permanent forestry and native revegetation) for Government sponsored Hill Country Erosion programmes, other subsidised planting schemes (e.g. Billion Trees) as well as to offset livestock GHG emissions. Prohibition of plantation forestry on steep slopes will significantly reduce their options. It will only be the steepest land that they want to take out of grazing. Carbon income is not guaranteed in the longer term, so production forestry is a much safer option for farmers.
 - It is likely that after harvest of most erosion prone land, that rather than replanting, landowners will allow natural regeneration to occur. In Wellington area, this will invariably be dense groves of pine seedlings, possibly many thousand per hectare. Such stands quickly achieve canopy coverage, but will grow tall and thin, and be subject to disease, stem breakage and later toppling in storms. As wilding pines get older, they will produce large amounts of seed, more so than for plantation aged trees. There is likely to be public backlash about a perceived wilding pine problem. Who will be accountable to fix this problem?
 - Stan Braaksma, former soil conservator for GW, asserts that radiata pine needs active management (spaced planting and harvesting). It is not a suitable species for unmanaged stands.

Are there Alternative Solutions to Mitigate the Risk of Sediment Loss from Steep Slopes?

- Yes, there are many.
- The production forestry ban will pre-empt and undermine research into improved technologies for harvesting and silviculture on steep slopes.
- Panpac's method of re-grassing or sowing a cover crop immediately after harvest. The cover crop greatly reduces surficial runoff. This would enable use of selective herbicides to reduce woody regrowth (pines/gorse etc) later and prior to replanting in crop trees. Tree planting spots in grass can be spot sprayed rather than blanket sprayed.
- Immediate replanting of crop trees a possibility in some situations
- One could replant at higher than usual planting density. This might reduce the time taken for canopy coverage and have a higher density of rooting. It will, however, require additional thinning to waste.

- That said, lower stocking rates of high GF pines (500sph) appears not to have increased the landslide risk. Published study.
- Lower final stocking rates (if thinned early) should produce shorter fatter stems that are less prone to blowdown, but need to be harvested before the stems get too large. Not suitable for extended rotation times.
- One might impose restrictions on tracking/earthworks on steepest slopes (and/or impose additional safeguards to prevent sediment moving offsite. E.g. bunding/sediment traps at foot of slope or similar. But NES-CF and best practise guidelines do set specifications for length of high batters and other factors. We prefer NES-CF to prevail.
- Use of coppicing timber crop species such as poplars, acacia, oak, redwoods and eucalypts where root plates stay alive after harvesting. Cypress and Douglas Fir, whilst not able to coppice, will also keep an intact root structure longer than radiata pine.
- Extend rotation length, thereby reducing the proportion of time under no- canopy conditions. This option not usually liked by the big companies as it increases the risk of an adverse weather events damaging stands of trees, but with carbon averaging under ETS and possible future restrictions on the percent of a catchment area that could be harvested, it may have some attraction. Extended rotation times (longer than 35 years) suits Cypresses, Eucalypts, Douglas Fir, Oaks, and Redwoods.
- Alternative harvesting strategies. E.g. small coup, strip harvest, selection harvesting (can technically use winch assisted harvesting for Target Diameter Harvesting of pine in mixed age stands).
- Close to nature (Pro Silva) or Continuous Cover Canopy regimes (technically difficult on steep slopes without extensive track networks, but routinely done in Europe). Our permanent forest category allows for removal of up to 30% canopy cover per hectare.
- The definition of highest risk erodible forest land might be adjusted by increasing the slope angle (to above 30degrees) and taking into account underlying lithology. (Whatever criteria is used should be technically peer reviewed by industry recognised experts and aligned to observed field data). We prefer the existing NES-CF to prevail (and ESC allowed for by NES-CF).

Effect of Scale:

- NES-CF already requires that all forests (as permitted activities) have a full cycle plan, planting to harvest and replanting, including a fully documents Erosion and Sedimentation Control plan, to be available on request, but GW require their version of an erosion control plan to be certified by a suitably qualified registered forestry consultant at an early stage and for the whole forestry cycle to be controlled and consented.
 - Preparation and consenting an Erosion plan perhaps 30 years ahead of soil disturbance is unreasonable. A lot can change in that time. NES-CF rules are sufficient.
 - The cost to prepare and certify an Erosion Plan will not be affordable at small scale and so many years ahead of any forestry income. Participants may not be eligible for, or to be registered in the ETS, so upfront costs are compounded. Many landowners will have the additional burden of preparing a freshwater plan for their livestock operations.
 - Costs of certification and prohibition of plantation forestry on steep slopes will be a huge disincentive for pastoral farmers wishing to use plantation forestry for offsetting for greenhouse gas emissions.

- The NES-freshwater part 2 provisions only apply to pastoral or arable land operations larger than 20ha.
 - We would like forests under 20ha to just follow normal NES-CF rules (permitted activities), and to be exempt from GW controlled activity consenting. GW can still be notified of harvesting or soil disturbance near water bodies as routinely allowed for in NES-CF.

Cost Benefit and Equity.

- Section 32 has attempted to do look at cost/benefits, but we think fails in logic and seriously underestimates financial impacts. The greater than 10% of land taken out of production forestry will have significant long-term impact and will undermine confidence in plantation forestry along with reducing the benefits that plantation forestry brings. Will the playing field be rejigged by the next plan review, and another 10% forestry land taken out of production?
- There would be a disproportionate effect on smaller forest holdings, including hill country pastoral farmers, and others typically managing a single rotation of plantation forest.
 - Many smaller and private forestry operators only operate one stand of trees and may harvest only once in the cycle of their forestry business. The costs of compliance will be punitive.
- GW planners talk about equitable processes to achieve the Target Attribute States (TAS). An equitable process should not be about everyone adjusting by an equal amount, it is about quantifying the problem, and minimising environmental risk by targeting the highest contributors of sediment.
- There is a stated desire for equitable treatment of forestry and pastoral farming (on similar land types). If forestry is required to be a controlled activity, then why not also pastoral farming. The literature indicates that pastoral farming activities are far more likely than forestry to release sediment and other contaminants to water bodies.

Alternatives to Regulating Plantation Forestry as a Controlled Activity

- There is no doubt that regular forestry activities create soil disturbance and that some of this sediment leaks off site into water bodies. However, the majority of published evidence shows that Plantation Forestry is much better than pastoral farming in highly erodible zones.
- Whilst some of our sensitive harbours and estuaries are silting up, we don't know the relative contributions from Wellington area forestry vs natural or other land activities.
- We say that the case put forward by GW is weak, based on a false premise (that steepest forestry land will deliver most of the sediment) and some of the evidence (visual clarity and sediment yields) is factually incorrect.
- A revised NES-CF with significantly tighter environmental controls has only just been implemented. GW have no way of knowing that this won't work. Their only criterion is to maintain or improve visual clarity, but there appears to be serious errors in the assigned TAS values.
- As far as Plantation Forestry is concerned, the gravity of the situation does not warrant overriding the NES-CF
- We don't really know if the original NES-PF implemented in 2018 had any effect, other than it was said that noncompliance with the NES was an issue. Available data suggests

that deposited Fine sediment in some forestry catchments has improved since 2013-2015.

- A lack of policing of harvesting operations by local bodies in the past does not make a case to tighten regulations. If there has been non-compliance with existing regulations, why has there not been enforcement. Tightening the rules before enforcement is nonsensical.

Other Elements of the Proposed Plan Change

- Greater Wellington and Whaitua concerns that forestry operations are increasing, and that sediment may get worse does not take into account the following:
 - A lot of earthworks are one off and done near the end of the first forest cycle. The timber crop pays for the sometimes very expensive earthworks and roading.
 - Future forestry cycles will then require far less earthworks, but forestry roads still need to be maintained.
 - Improvements in harvesting technology over time. Manual tree falling is now greatly reduced. (manual falling is usually downhill, tops break out, stream banks get damaged). Airship assisted harvesting is being considered for the future.
 - Improved tools (lidar etc) to help identify and manage sensitive areas.
- Stan Braaksma (ex GW soil conservator) advises to identify sensitive erosion prone areas and to micromanage them. He believes that it is not justified to prohibit harvest without supporting evidence.

Specific Sections in the Plan that we Wish to be Changed.

Plan provision	Decision Sought
Submission from the National body of NZFFA	Wellington Branch NZFFA supports the submissions from the National body of NZFFA
Consistency with Government Policy	The new government has announced intentions to review the NPS-FM and related legislation. This plan change needs to maintain consistency with revised objectives.
maps 90, 93 Highest erosion risk land (plantation forestry)	This is relative risk. It does not address the objective risk of sediment reaching water bodies. The maps should not be used as a criterion to prohibit plantation forestry but might be used for other purposes.
Page 56; Method M44: Supporting the health of rural waterbodies Wellington Regional Council, working with primary sector organisations, will undertake a programme(s) to support the health of waterbodies, including rivers, streams, estuaries and harbours, impacted by rural activities, including to: (a) investigate financial support and rates relief options for accelerating retirement/revegetation of pastoral and plantation forestry land uses	Wellington NZFFA Supports this method.
Objective WH.02, b. the hydrology of rivers and erosion processes, including bank stability are improved and sources of sediment are reduced to a more natural level, and...	Natural level for sediment was defined in NPS-FM as that that existed in NZ prehuman. Was that just after the last Taupo eruption or soon after the last Ice age? Use of baseline data or some other agreed TAS rather than natural state would be more realistic. GW and others need to find a better way of defining natural levels.
Table 8.4 TAS for rivers.	The Suspended Fine Sediment/Visual Clarity/black disc test (as a surrogate or indicator measure for suspended solids) for Mangaroa River does not take into account that Black Stream (natural brown water), drains into the Mangaroa river upstream from the test site. Where natural sources of

Plan provision	Decision Sought
	<p>brown water exist, GW are allowed to set a different TAS. GW, please confirm that you have done so. Note that Total Suspended Solids and suspended fine sediment and deposited fine sediment results are high quality, so are at odds with the Visual Clarity result. (see table supplied in earlier discussion)</p> <p>Also, please check that Wainuiomata/Black Creek has an appropriate TAS set for visual clarity</p>
<p>Policy WH.P4 and Table 8.5 Te Awa Kairangi rural streams and rural mainstems Mangaroa River at Te Marua 2040 10,965 -51</p>	<p>The target for Mangaroa is based on inappropriate TAS. The clarity required is affected by the naturally occurring input from a major peat swamp. A different TAS needs to be set.</p> <p>Also challenge the value shown for Wainuiomata urban stream/Black Creek. This may also be subject to Natural Brown Water and needing a revised TAS.</p> <p>Alter the TAS</p>
<p>Policy WH.P26: Managing livestock access to small rivers In addition to national stock exclusion regulations and the region-wide stock access requirements of Rule R98, Rule R99 or Rule R100 in this Plan, restrict livestock access to a river in the Mākara Stream and Mangaroa River catchments where the baseline state for the relevant part Freshwater Management Unit is below the national bottom line for visual clarity</p>	<p>As previously mentioned, the clarity test for Mangaroa River is inappropriate, as it is affected by stream from a major peat swamp. Request Move water monitoring site to above confluence with Black Stream or reset TAS value and /or remove mention of Mangaroa River.</p> <p>Alter the TAS</p>
<p>Policy WH.P28: Achieving reductions in sediment discharges from plantation forestry Reduce discharges of sediment from plantation forestry by: 79 (a) identifying highest erosion risk land (plantation forestry), and (b) improving management of plantation forestry by requiring erosion and sediment management plans to be prepared and complied with, and (c) requiring that on highest erosion risk land (plantation forestry), plantation forestry is not</p>	<p>We think that this policy is misguided. Wellington, Hutt Valley and Porirua hills are greywacke with very low risk of shallow landslide. (10-16 times less prone to landslide than some tertiary soils in Hawkes Bay, see referenced papers). No evidence supplied that steepest slopes per se are a significant source of sediment after forest harvest. We think that earthworks before and during harvest are a much more likely source of sediment.</p>

Plan provision	Decision Sought
<p>established or continued beyond the harvest of existing plantation forest</p> <p>(also for Policy (P.P26)</p>	<p>Withdrawing plantation forestry from the relatively steepest slopes could have perverse unintended consequences and could actually increase the risk of sediment loss. There are alternative ways to mitigate the risk of sediment loss from steep land including restricting earthwork and/or mechanical land preparation, use of alternative forestry species, and alternative forest management techniques. NES-CF needs to be given a fair trial</p> <p>Request Policy WH.P28 to be deleted.</p>
<p>Policy WH.P30: Discharge standard for earthworks The discharge of sediment from earthworks over an area greater than 3,000m² shall: (a) not exceed 100g/m³ at the point of discharge where the discharge is to a surface water body, coastal water, stormwater network or to an</p> <p>Same for Policy P.P28: Discharge standard for earthworks sites</p>	<p>Note, this rule does not apply to forestry.</p> <p>The peak discharge limit is too low, and barely colours the water. A vehicle driving on a gravel roadway, even with small scale sediment traps in place by a culvert (as per NES-CF), would fail this test. Walking tracks in the Orongorongo Valley fail this test. (see photo)</p> <p>We note that the discharge limit only applies to discretionary activity rules.</p> <p>Please raise discharge limits to 1000g/m³</p>
<p>Rule WH.R19: Vegetation clearance – discretionary activity Vegetation clearance on highest erosion risk land (woody vegetation) and any associated discharge of sediment to a surface water body that does not comply with one or more of the conditions of Rule WH.R17 or Rule WH.R18 is a discretionary activity. Note Rules WH.R20, WH.R21 and WH.R22 prevail over the following</p> <p>Regulations of the Resource Management (National Environmental Standards for Freshwater) Regulations 2020:</p> <p>Same for Rule P.R18:</p>	<p>We presume these are typographical errors and should refer to NES-Commercial Forestry or NES-Plantation Forestry</p>
<p>Rule WH.R20: Plantation forestry – controlled activity Afforestation,</p>	<p>Section A, the land is not high erosion risk land (pasture)...</p>

Plan provision	Decision Sought
<p>harvesting, earthworks, vegetation clearance or mechanical land preparation for plantation forestry, and any associated discharge of sediment to a surface water body, is a controlled activity providing the following conditions are met. the most recent Wellington Regional Council monitoring record demonstrates that the measure of visual clarity for the relevant catchment does not exceed the target attribute state at any monitoring site within the relevant part Freshwater Management Unit set out in Table 8.4</p>	<p>Why should high erosion risk pasture not go straight into plantation forestry?. It is only the highest risk slopes that were proposed to prohibit plantation forestry. Request “high erosion risk pasture to be deleted”.</p> <p>Part b</p> <p>NES-CF controls forestry on woodlots greater than 1 ha, but there are significant overhead costs to prepare an erosion and sediment control plan, even if no steep erosion prone land is involved or proximity to water bodies. We propose that forests less than 20ha and not in red zoned land, are excluded from GW controlled activity.</p> <p>Part c.</p> <p>The discharge limit of 100g/m3 is impractical for forestry, particularly if landslides are involved. It is unreasonable to expect recently cleared slopes to produce no more sediment in water that that emerging from an intact canopy catchment upstream, even if sophisticated sediment controls are in place. Request that Part C clause to be removed and best practise guidelines be used to control sediment.</p> <p>Part d.</p> <p>As previously mentioned, the visual clarity of Mangaroa River at the sampling point is affected by peat colour from Black Stream. The visual clarity is therefore an invalid surrogate measure for suspended solids. The TAS is therefore inappropriate if this sampling point continues. Request GW to review and reset the TAS allowing for a natural brown water input.</p>

Plan provision	Decision Sought
	<p>It is unreasonable to penalise a forest operation for visual clarity test results that are outside their control (see earlier comments). It is not clear what might be the effect of escalating plantation forestry to a discretionary activity.</p> <p>Request that this clause be deleted</p> <p>Matters of control (1).</p> <p>Agree that sediment discharged from forestry activities should be minimised, but forest activities with potential to release sediment are not the same every year (especially for small forests). Around GW area, it is unlikely that whole catchments will be harvested concurrently.</p> <p>Request that average sediment load between forest lifecycles do not increase</p> <p>Matters of control (2):</p> <p>We are very concerned that GW officials might dictate area, location and methods used. Apart from setbacks and erosion susceptibility, that clause could potentially prohibit forestry from otherwise suitable land and create health and safety concerns. It would allow the GW officials to override the forest harvesting contractor on matters of health and safety, or demand that the contractor use equipment and methods not available to them or unsuited to the site. Should a forest have been established on inaccessible land, that is the forest owner’s risk, besides which there may be future changes to harvesting technology that solve access issues.</p> <p>Request this clause to be deleted.</p>
<p>Rule WH.R22 and P.R21: Afforestation, earthworks and mechanical land</p>	<p>This clause is too far reaching and is fundamentally misguided. It appears</p>

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<p>preparation for plantation forestry on highest erosion risk land – prohibited activity</p>	<p>to be based on the assumption that surficial erosion and shallow landslide from the relatively most erosion prone slopes after harvest are the major cause of sediment loss into water bodies. No evidence is supplied to support that. Please read our preceding paper on why this is unnecessary.</p> <p>Note, technically “afforestation” is not the same as “replanting”.</p> <p>We prefer the NES-CF to prevail</p> <p>Failing that: We request that the word afforestation is removed until more research data is available, and to change the clause title to not indicate that plantation forestry is prohibited</p> <ul style="list-style-type: none"> • Other methods that might mitigate the risk of sediment loss to water bodies include: <ul style="list-style-type: none"> ○ Sowing a protective cover crop as soon as practicable after harvest (e.g. re-grassing) ○ Use of coppicing species such as Redwoods where the roots stay alive. ○ Use of small coup or strip harvesting rather than clearfell. ○ Adopting Close to Nature forestry principles (also known as Continuous Cover Forestry) ○ Avoiding use of skidders or restricting earthworks on the steepest slopes • Request policy review and engagement with forest industry and forest experts to resolve this. • There needs to be a working threshold relating to use of highest risk erosion prone land. The grid resolution is only 5m (= 25m²). That is not a practical unit for management.

Plan provision	Decision Sought
	<ul style="list-style-type: none"> ○ Request that land areas with contiguous “pixels” need to be larger than 1000m² for the regulations to apply.
<p>Fresh water action plan page 255: Develop and implement a forestry good practice programme alongside strategic compliance for effective forestry regulation</p>	<p>Wellington Branch NZFFA is happy to support this strategy</p>
<p>Schedule 33</p>	<ul style="list-style-type: none"> ● Objective clause Bb is unrealistic. Attempting avoid an increase in risk of loss of sediment to water relative to the risk of loss that exists from the land in a natural state, Natural state being defined in the NPS-FW as that that about 1000 years ago. <ul style="list-style-type: none"> ○ Request clause Bb to be deleted
<p>Schedule 34 Objectives: 2, avoid an increase in risk of loss of sediment to water relative to the risk of loss that exists from the land in a natural state, and 3. achieve the discharge standard in Rule WH.R20(c) or Rule P.R19(c) for any discharge of water and sediment from plantation forestry into a surface water body, an</p>	<p>These 2 objectives are laudable but unrealistic in practise. The natural state is not able to be measured at a forest or small catchment level. Erosion rates (and sediment) from natural environments are said to be increasing. Increased intensity of storm events and feral animals have a bearing on sediment loss. Major sediment contributions come from landslides on an irregular and intermittent basis, perhaps longer than a 10 year repeat event. Typical forestry harvests occur on about a 30 year cycle, and major earthworks are a one-off event. It is unreasonable to treat peak sediment loadings as if they occurred at the same rate every year.</p> <p>In our opinion, without sediment control measures of the sophistication and scale used for state highway roading, forestry harvest could not achieve these standards (<100g/m³), even on gentle slopes. The same</p>

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	<p>expectation is not asked of pastoral or arable land uses.</p> <p>There are many studies that show, on more highly erodible land than Wellington, that a full forestry cycle including earthworks and harvest, releases substantially less sediment than pastoral farming (without earthworks).</p> <p>Specifying arbitrary limits and unrealistic standards for compliance threatens to put hill country forestry out of business.</p> <ul style="list-style-type: none"> • Forest harvest Managers would welcome input from GW on design of sediment control structures that are practical and affordable and that can be assessed alongside existing Best Practise Guidelines. • Objectives B2 and B3 are not practically achievable. We request that they be deleted. Failing that, Request peak discharge standard to be raised from 100g/m³ to 1000 g/m³ and for forestry sediment discharge to be time averaged over the life cycle of the forest. We don't see why practitioners/operations can't be audited to see whether they follow best practise industry guidelines.
<p>Schedule 34: Plantation Forestry Erosion and Sediment Management Plan,</p>	<ul style="list-style-type: none"> • Schedule 34 , including the preparation of Certified Erosion Control Plans and documenting plans for a full forestry cycle. • This might be able to be complied with by large corporate forestry operators with professional forestry advisors, but does not suit small holdings, especially if highest risk or erosion prone land does not exist in their forest. Many

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<p>part B.4 provide for plantation forestry on highest erosion risk land (Plantation forestry) to progressively reduce and cease beyond the next harvest. This land is to be restored and revegetated with appropriate permanent woody species</p>	<p>small-scale forest owners do not engage professional forestry advisors.</p> <ul style="list-style-type: none"> • There is no justification provided that the NES-CF will not deliver satisfactory outcomes and hence justify these regulations. • We request that schedule 34 be withdrawn. • Failing that: As mentioned elsewhere, there are other ways to mitigate sediment loss from steepest slopes within forestry, and we don't agree that banning forestry steepest slopes will address the issue. Plan 1 amendment could address alternative species, alternative harvest techniques, variations on permanent forest where partial harvesting is allowed. • Request that this clause be re-written to not exclude afforestation/ plantation forestry from steep land. • In addition: We request that woodlots covered by NES-CF and less than 20ha and not containing red zoned land be exempt from GW controlled activity (or just follow NES-CF). This would be similar to the exemption of farming activities under NES-fresh water regulations 2020. • Transition period: There needs to be an exemption from registering a full cycle plan and certified erosion control plan where: <ul style="list-style-type: none"> ○ small remnants of forest remain to be harvested, but where there is no intention to continue with replanting (Possibly where forestry is considered to be no longer a viable business). For example, for harvest operations to wind up within 30 years

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	<ul style="list-style-type: none">○ or where forest operations are less than 20ha