NZ Farm Forestry Association

22 April 2022

Submission

Managing exotic afforestation incentives

With reference to the discussion document on proposals to change forestry settings in the New Zealand Emissions trading Scheme [MPI Discussion Paper No: 2022/02] and the associated Interim Regulatory Impact Statement [ISBN No: 978-1-99-102634-7 March 2022].

SUBMITTER

The NZ Farm Forestry Association Incorporated was formed in 1957. Its current membership is 1,300 spread across New Zealand in 25 branches, and eight Action Groups focussed on the growing and processing of specific tree species. We estimate our members own or manage up to 100,000 ha of forest, and influence the management of a similar area. These forests consist of exotics such as radiata pine, cypress, eucalypt, poplar and redwood; and managed indigenous forests.

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EXECUTIVE SUMMARY

The NZ FFA would like to thank MPI and MFE for providing the comprehensive background discussion document and for the opportunity to submit on this important matter. We agree that it is appropriate to review the emissions reduction policies at this time, and especially the role of forestry in achieving carbon dioxide removals.

We are very concerned however that the proposed changes will negatively impact not only many of our 1,300 members but also approximately 12,000 other small scale forest growers.

The consultation process has been given a very limited timeframe and we ask that more time is taken to avoid unintended consequences. We note the National Emissions Reduction Plan has not yet been released and may not be released before 31 May. Had it been released prior to this consultation it would have provided a useful framework in which to consider the proposed changes.

The context of our submission is the need for urgency to address global warming and the need for pragmatism in the face of inaction. Fundamentally we submit that offsetting emissions by

sequestering carbon with fast growing exotic tree species is needed immediately and at scale. By committing to a programme of planting offset forests that create significant carbon sinks for the next 50 years, New Zealand will buy time and international credibility. We accept that some pastoral land will need to be converted to Permanent Carbon Forests to achieve the enforced timeline. However, inaction may lead to the ultimate devastation of our pastoral and forest industries.

This submission addresses several matters of clarification in the rationale for changes to regulations regarding Permanent Carbon forests. These are summarised as:

1. Table 3, page 14 of the consultation document shows carbon removals from forestry for the first three budget periods, 2022 to 2035. These imply that if exotic forests are excluded from the Permanent Forest category, fewer trees will be planted and carbon removals will more or less track the Commission's "demonstration pathway." However the 'pathway' is simply a model affected by many uncertain factors, not least of which is the rate of planting of new exotic production forests under 'Averaging.' New production forests would store exactly the same amount of carbon between now and 2050 as new Permanent Exotic Forests, because it is only after 2050 that trees in the production forests would be big enough to harvest.
2. Permanent exotic forests will involve the least land use change to achieve the offset targets. We have compared options to achieve similar levels of removals and calculated the area of land required to be planted for each.
3. We address the concerns you raise in the problem analysis associated with risk factors such as:
    a) **Oversupply of carbon credits**. This might be controlled through an adjustment in the monetisation of carbon credits via auctions and need not be a land use issue.
    b) **Environmental impacts**. In terms of the stability of long-term exotic forests, scientific evidence (and early experience in Kaingaroa) indicates these are self-thinning, and will reduce in stocking to a modest number of stems per hectare by age 40. We have referenced several examples of pine forests greater than 100 years old that demonstrate this. In addition, remote forest assessment using LiDAR and similar technologies makes the monitoring of such stands practical and affordable. Within many exotic forests indigenous forest species will and do establish as a significant understory, and can be managed to become the dominant forest.
    c) **Alternatives to clear felling**. Farm Forestry members are using long term sustainable forest systems based on proven European practices such as Continuous Cover and Target Diameter Harvesting. Permanent Exotic Forests managed under these systems should not be detrimental to the environment.
    d) **Displacement of productive land uses**. We contend that on at least 1.2 m ha of marginal hill country there are several exotic tree species that can produce at least three times the dry matter of pasture, per ha per annum. This is a competitive advantage NZ should use. The impact on employment and social values is acknowledged but can be managed.
    e) **Enhanced biodiversity**. We point out the significant body of scientific evidence which shows that exotic forests protect large numbers of endangered birds, reptiles, bats, and insect species. This is partly through habitat, and partly through their earnings which support predator control.

Our preferences for the outcomes of this consultation are (in order):

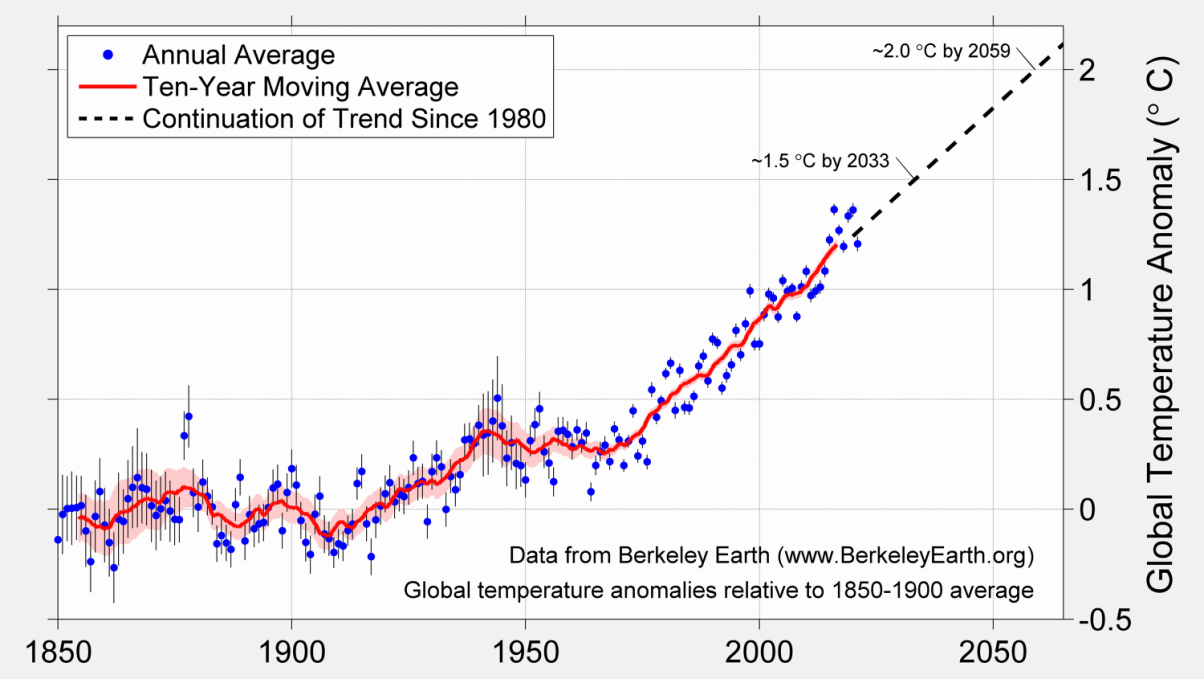
1. That no action is taken on the question of Permanent Exotic Forests until after the release of the National Emissions Reduction Plan when there has been more time to consider the implications and the science. Alternatively,

2. That Permanent Exotic Forests are allowed provided appropriate forest management guidelines are included in the regulations. Failing that,
3. That legislation allows for exceptions to be developed as in Option 3a of the consultation document. Or at the least,
4. That a category is created under averaging that for allows 40 year rotations or greater, suitable for long-lived exotic species.

CORE SUBMISSION

1. The need for urgency.

As reported by the recent IPCC Sixth Assessment Report (1 October 2021) time is running out to address the impacts people are having on the global climate. There are many forecasts of the rate of change, but below is a simple illustration suggesting that it is inevitable we will pass 1.5°C of warming and that we need to urgently address the risk of passing 2.0°C.



We contend that in New Zealand, emissions from cows and transport will not be moderated in the near future because of the economic and social costs. We need to move quickly to achieve any effective change by using forests for offsetting. We contend this is by far the cheapest option available to this country at the moment.

2. Oversupply of carbon credits

Table 3 on page 14 of the Consultation Document suggests that the impact of not allowing the Permanent option should be minor.

Table 3: Carbon removals from forestry for the first three budget periods (millions of tonnes of carbon dioxide credited towards meeting budget)

Budget period	2022-2025	2026-2030	2031-2035
Commission's demonstration pathway *(2021 Commission projections)*	28	50	69
Status quo *(2022 carbon price pathway)*[26]	24	51	107
After exotic forests removed from permanent forest category *(2021 Government projections)*	24	48	66

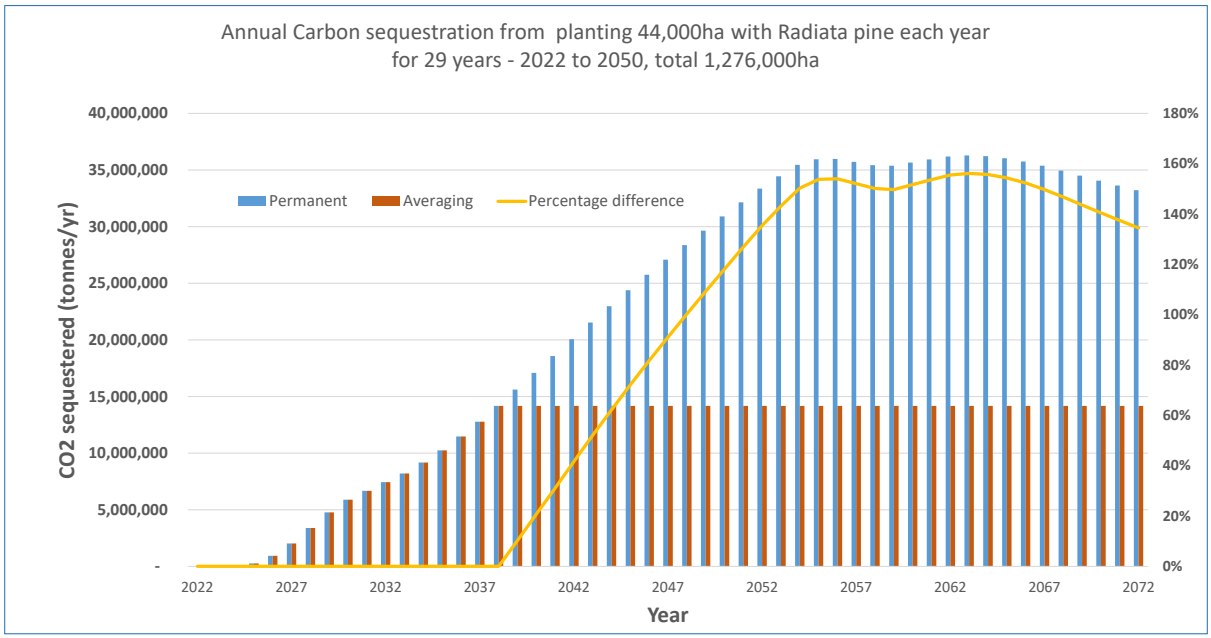
However, this assumes that if Permanent Exotic Forests are excluded fewer trees will be planted, and this may not be the case. The Commission's "demonstration pathway" is simply a model affected by many uncertain factors, not least of which is the rate of planting. Under a steady rate of afforestation both Averaging and Permanent Exotic Forests would store the same carbon between now and 2050 because it is only after that, when the new production forests were mature, that harvesting would commence.

From that point onwards the Permanent Exotic Forests would hold more carbon than the same area of new production forests. Indeed, we estimate that in steady state, the new production forests would have to be 2½ times as big to store the same amount of carbon as the Permanent Exotic Forests.

That of course ignores the climate benefits of using the harvest of the production forests to displace fossil fuels and more carbon-intensive materials such as concrete, steel and plastic.

If we chose to plant only indigenous forests, we would need three times the area of the Permanent Exotic Forests to achieve the same removals by 2052.

Although the carbon storage to 2050 would be similar under either Averaging or Permanent Exotic Forests, the issuing of carbon credits would not be similar because forests under 'Averaging' would earn credits for only 16 years. We have modelled the MFE scenario of planting 44,000 ha of radiata pine for the next 29 years, indicating the difference in credits.



3. Environmental impacts - forest collapse

The problem analysis provided in your discussion document raised concerns about forest instability and long term collapse.

It is well known in plant biology that almost all plants obey a self-thinning rule. That is, as plants get larger there is natural competition and induced mortality amongst the smaller individuals. In forestry it is known as Reineke's stand density rule[1] that basically observes for a broad range of tree species there is a maximum stand density level.

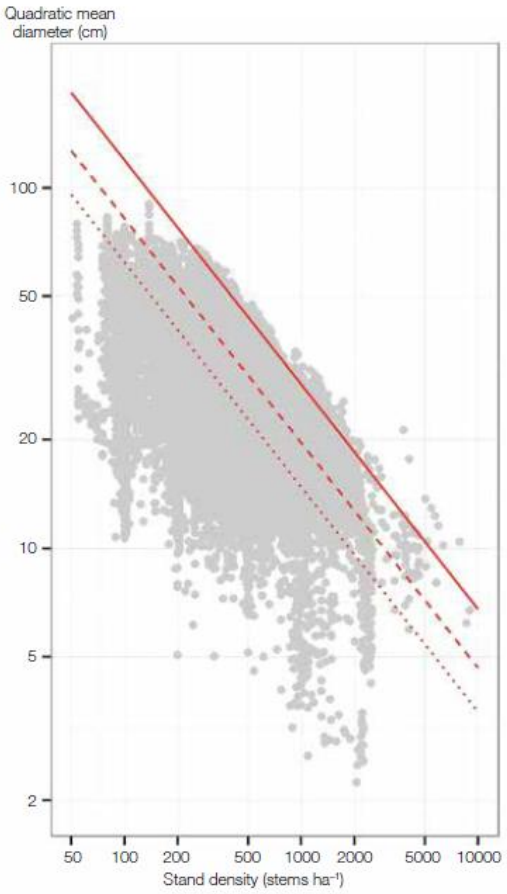


Figure 4: Relationship between the size and number of trees for radiata pine. The points represent data from almost 27,000 growth plots. The solid red line indicates the maximum SDI for this species of 1,200, while the dashed and dotted lines correspond to 55% and 35%, respectively, of this maximum value

The graph[2] on the left gives the relationship for 27,000 measured growth plots of radiata pine. Basically, it shows that as the trees get bigger the subdominant ones die.

It is noticeable that there are no plots with large diameters and high stocking (top right quarter). Despite using a very large national data set, there are no stands of large diameter radiata pine where more than 300 stems per hectare survive. The dominant trees take over in radiata, just as they do in every forest, be it of single or mixed species.

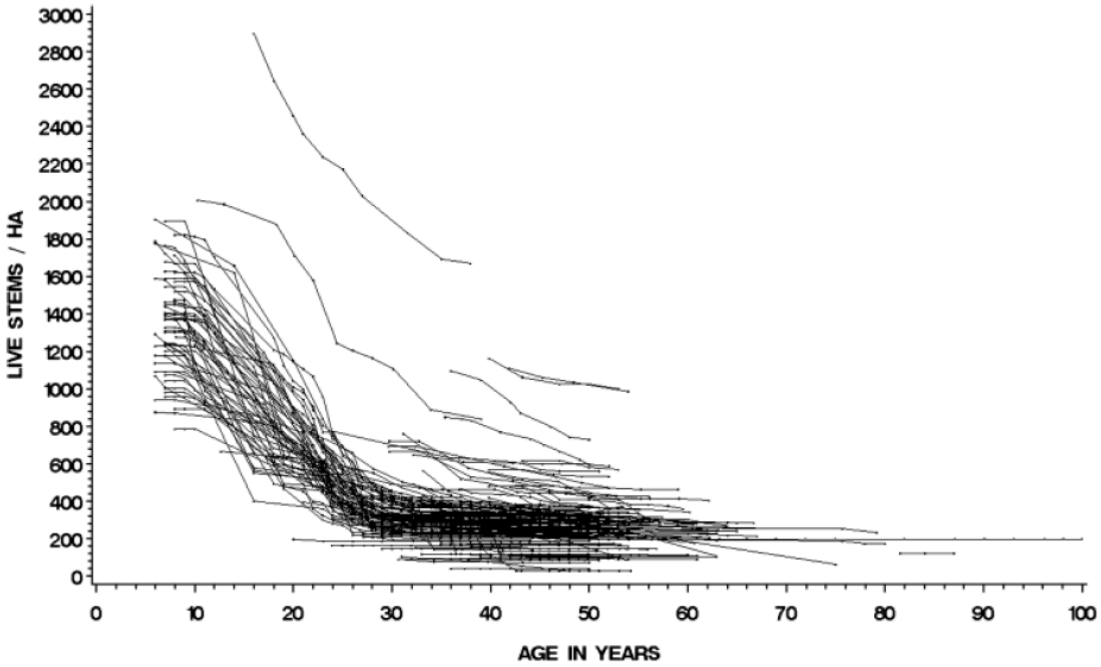
The graph[3] below of tree stocking by age shows the same relationship, and clearly indicates that in radiata forests by age 40 the stocking will fall to below approximately 300 stems per hectare. Generally, we have found that by age 100, stands are reduced to approximately 100 stems per hectare.

These graphs are derived from repeated measurement of permanent plots and clearly show that radiata pine forests generally do not collapse from old age or natural disasters. Instead they reduce in stand density and improve in health through the steady attrition of weaker trees, hence they remain standing well past 100 years of age.

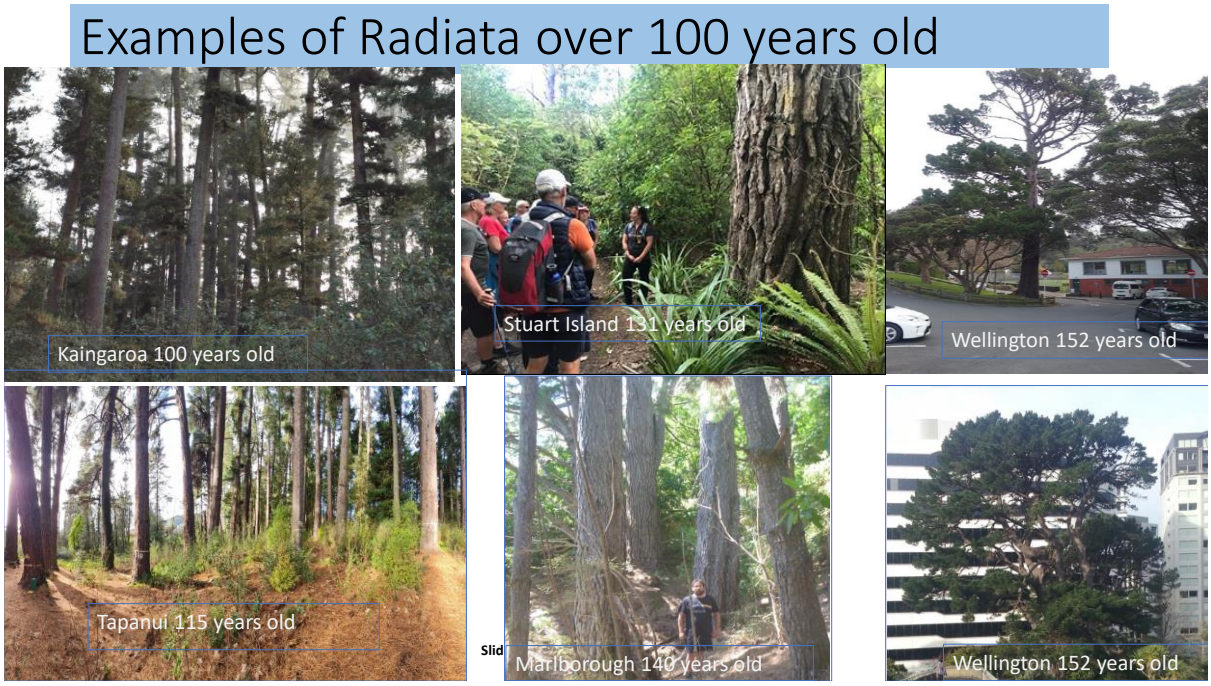
[1] Reineke, L.H. 1933. Perfecting a stand density index for even-aged forests. Journal of Agricultural Research, Washington, D.C. Vol 46, No. 7

[2] Moore, J. Clinton, P. 2015. Enhancing the productivity of radiata pine forestry within environmental limits. NZ Journal of Forestry, Vol 60, No. 3.

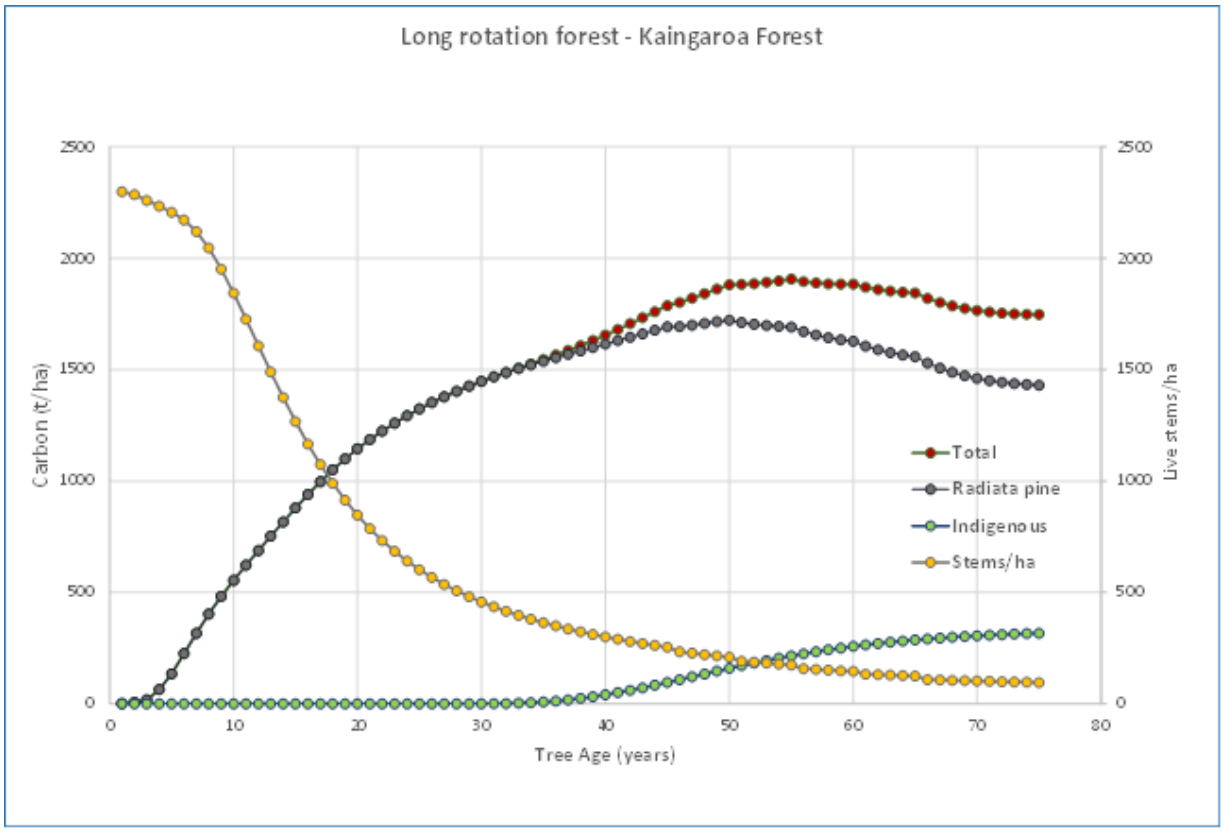
[3] Woolons, R. C. and Manley, B. R. 2012. Examining growth dynamics of Pinus radiata plantations at old ages in New Zealand. Forestry. Vol 85, No. 1, 2012



The following photographs show some of the oldest examples of radiata currently surviving in NZ.



There are two stands in Kaingaroa forest planted in 1922 and 1923 that have permanent sample plots established for recording growth. This provides robust forecasts up to age 100. Using the Radiata pine Calculator V4.0 Pro we have developed the following graph of the forecast carbon removals up to age 75 (the limit of the model). We assumed the current indigenous understory began growing at stand age 40 years, at the rate indicated in the MPI Lookup tables.



While this modelling needs further validation, it does help to indicate the stand dynamics and why species transition may occur in Permanent exotic forests.

4. Alternatives to clear felling

NZ FFA members have been practicing alternatives to clear-fell harvesting for decades. Continuous Cover forestry, involving the selective thinning of the stand[4] while maintaining ecosystem services[5] and erosion control, is used at many locations. Target Diameter Harvesting is similar in that only trees above a certain size are removed each year, creating space for younger ones to grow while maintaining canopy closure and root mass. This type of management suits forests of high value and slower growing species planted on remote sites. The Permanent Exotic Forest category and the cash flow from stock change that it provides, would be a strong incentive for the wider establishment of high value exotics managed in this way. The timbers they provide are valuable on the export market and import substitution. Encouragement for greater planting at scale is essential to support the start-up of small scale domestic processing.

5. Displacement of productive land uses

For marginal hill country (especially LUC 7 and 8 in the North Island) we contend that pastoral farming is a suboptimal land use and that plantation forests with exotic species are more productive. Most commercial plantation species are adapted to take advantage of low fertility soils and use a symbiotic relationship with mycorrhizal fungi to extract nutrients for their growth. Based on decades

[4] Livesey, C. and Livesey, H. 2021. Transitioning from pine to mixed species continuous cover forest. NZ Tree Grower. May 2021.

[5] Bloomberg, M. 2021. Why alternatives to clear felling should be considered seriously. NZ Tree Grower. May 2021.

of tree growth measurements we have a strong science-based understanding of the national productivity of 4 or 5 of these major species.

Using dry matter production as a universal biological unit we find records of pasture production for Sheep and Beef farms to be 10 – 11 tonnes per hectare per annum for improved pasture on flat land, but only 4 – 5 tonnes for steep hill country[6]. In the following table we compare the productivity of tree crops and pasture on Land Use Capability classes 6, 7 and 8.

Species	Stem volume/ha/yr (m3)	Wood Density (kg/m3)	Dry matter kg/ha/yr	Carbon t/ha/yr
Radiata pine	28	410	11,480	32
Redwood	35	350	12,250	40
Eucalyptus	20	520	10,415	23
Indigenous	7.5	550	4,141	8.6
Pasture*			4,650	

* Nth Island Hill Country - LUC 6-8

Generally, pasture productivity on hill country is about 40% of that of exotic tree crops. This fundamentally drives the relative economics of these different land uses, and even without carbon, helps explain why forestry will financially outperform sheep and beef farms on this class of land. It also shows why exotics outperform indigenous for carbon removals. The exceptional growth rate of exotic forest species in NZ is a comparative advantage few countries in the world have to address greenhouse gas emissions.

In the North Island steep mudstone hill country, the risk of accelerated erosion with high intensity rainfall events suggests that at least 1.2 m hectares need rapid afforestation and permanent cover. This urgent action to mitigate the effects of climate change aligns with the suggestion that Permanent Exotic Forests are part of the solution.

6. Enhanced biodiversity

Science reports that a rich biodiversity exists in the understory of most exotic plantations and that in older Permanent Exotic Forests indigenous tree species will develop as exotics reduce. With greater access giving better pest control, exotic forests have been found to outperform the indigenous habitat. This is best summed up by an overview article[7`] that reports at least 118 threated indigenous plant, birds, bats and insect species have been found in a mix of exotic and native ecosystems that make up plantation habitants. Numerous examples are reported by NZ FFA members[8] where bird life and bats have been found to be widespread in exotic forests.

[6] P Journeaux, Agfirst Consultant, pers comm

[7] Harnett, M. 2015. Bats, birds and biodiversity in planted forests. Pure advantage, NZ, https://pureadvantage.org/

[8] Ledgard, N. Henley, D. Brockerhoff, E. 2022. Birds and exotic trees in the Mackenzie Basin. NZ Tree Grower, Feb 2022.

Extensive earlier work on this by Bockie reported "Tall forest on Little Barrier Island carried 532-680 pairs of natives (birds) per 100 ha …… pine forests at Kaingaroa also supported high numbers of native birds. It was found that mature radiata pine forest supported up to 652 pairs of native species/100ha – more than any native forest on the mainland. If introduced birds are included, the mature radiate forests at Kaingaroa supported 1203 breeding pairs/100ha – the densest forest bird populations recorded in NZ so far – except for the 71 bellbirds/ha on one of the Poor Knights islands."[9] More recent work[10] by Brockerhoff and Pawson (Scion) reported on extensive monitoring of birds, insects and plants in exotic forests. Brockerhoff found "a total of 202 native and 70 introduced plant species in only 60 small study plots. Pawson reported "found over 350 species of native beetle alone" in exotic forests.

QUESTIONS ASKED IN THE DISCUSSION DOCUMENT

Section 6 – What is the problem?

Question 1. Do you agree with our description of the problem? Why/Why not?

We do **not** agree with your description of the problem.

While there are definitely some issues associated with widespread permanent exotic afforestation, in our view the document does not accurately describe these. Our criticisms are outlined below.

Issue 1: It will drive land use change and displace productive land uses that provide wider economic and employment benefits

While some permanent afforestation could displace productive land uses that provide wider economic and employment benefits, **it is wrong to imply that all permanent afforestation will have this effect**.

Firstly, there are currently 9.6 million hectares of land occupied by sheep and beef farms. The Climate Change Commission suggests that 350,000 hectares should be planted in new exotic forests, which would amount to less than 4% of the total. Given that these farms are typically on hill country many are likely to have significant marginal areas unsuitable for crops, dairy or sheep and beef farming.

Secondly, those unsuitable areas could usefully be planted in forestry to stabilise the land, improve returns and provide shelter for stock. Experience has shown that in many cases planting up such areas had little or no effect on the carrying capacity of the farm[11] and in fact often improved the overall economics of the business, turning a marginal farm into a profitable one.

Although it would be ideal to harvest trees in these areas and provide another income stream for the farmer, in many cases this is not practical. Factors such as distance from mills and ports, the steep nature of the country and the small size of the forested areas mean that the cost of extracting and transporting the logs may exceed what the buyer is willing to pay.

[9] Brockie, R. 1992. A living forest. David Bateman publisher. NZ
[10] Pawson, S. and Brockerhoff, E. 2006. Pine forest natives. NZ Geographic. No. 72, March – April 2005.
[11] Hocking, D. 2010. Eucalypts in the sand country. NZ Tree Grower, August 2010.

In these circumstances, the only cost-effective solution is to leave the trees in the ground, which is effectively permanent afforestation.

This farm forestry model offers Permanent Exotic Forests without displacing productive land uses.

In summary, under farm forestry it is unlikely that permanent exotic afforestation will displace productive land uses that provide wider economic benefits. In fact, it is likely to supplement farm income and lead to better targeted land use.

Issue 2: It may make it harder to achieve our long-term climate change targets

This concern seems to be based on the assumptions that:

- Permanent Exotic Forests will generate an enormous supply of carbon credits; which
- Will cost investors less than the cost of finding ways to reduce their emissions; and
- Other market instruments cannot be applied to regulate price and quantity.

At the moment we are a long way from meeting our afforestation targets and it seems premature to close off an effective instrument for achieving the necessary sequestration.

In addition the consultation document points out that there will only be a limited amount of land planted as permanent forests and therefore a finite supply of credits, leading to increasing prices, which should be manageable through the auction process.

Furthermore we reject the argument that agricultural emissions may not fall as required if Permanent Exotic Forests result in less land being converted to forests. Reductions in agricultural emissions should be driven by direct pressures on that sector, not by afforestation.

We believe it is unlikely that investment in permanent exotic afforestation will make it harder to achieve our long-term climate change targets.

Issue 3: widespread permanent exotic afforestation has environmental impacts

There are two problems with the way in which this concern has been expressed:

1. The term “widespread” is subjective and implies that a very large percentage of farms are being converted to forestry ;and
2. It implies that permanent forestry will have a negative impact on the environment.

First, the consultation document clearly states that less than 4% of all the land currently occupied by sheep and beef farms is likely be converted to permanent forestry. This is hardly “widespread” and, as mentioned previously, is probably poor-quality land on existing farms that is unprofitable for grazing.

Second, as the consultation document states “permanent exotic forests have environmental benefits over and above some competing land uses.” More bluntly, afforestation of any kind will bring significant benefits compared to using this poor-quality land for sheep and beef farming. Compared to grazing, permanent exotic afforestation is positively benign.

Regarding the relative environmental benefits of exotic and indigenous permanent forests, the paper seems to assume (with no justification given) that:

1. Permanent indigenous forests will be well managed but permanent exotic forests will not; and

2. There are long term environmental risks associated with all exotic forests which do not apply to indigenous forests.

In our view, both of these assumptions are wrong. There appears to be no evidence for either of them and indeed, the higher cash flows from permanent exotic forests should fund better protection and environmental control than those from indigenous forests.

The requirement for management of indigenous and exotic permanent forests is best achieved by regulation, applied equally to both.

Furthermore, it is clearly incorrect to assume that all exotic species pose environmental risks. The perceived risks are:

1. **Wilding**. While some conifer species pose a wilding risk, the vast majority of conifers do not and it is managed via the Wilding risk assessment in the NES-PF notification process.
2. **Instability**. All trees planted on steep, erosion prone land have some risk of topple with saturated soils through heavy rain and high winds. However, on most sites the evidence after many cyclones is trees stabilise the land once strong root networks are established.
3. **Fire**. Exotic trees are no more susceptible to fire than indigenous trees and in some cases, because of better management and access, are less likely to develop into a major fire. Kaingaroa forest is 130,000 ha, now 100 years old and has few large fires.
4. **Disease**. Pests and diseases pose risks to both indigenous and exotic forests, but with climate change, indigenous trees currently appear to be more at risk of disease than exotics.
5. **Succession**. As we point out above, the self-thinning nature of exotics allow for the transition to natives in the long term.
6. **Health and safety risks with harvest of steep permanent forests.** Permanent forests are not intended to be harvested, but if they were in the distant future, the harvesting tools and technology would be far better developed than it is now. The Health & Safety rules in forestry are now draconian and no contractor would risk the huge fines that can now be meted out. Most steep class 7 & 8 land is Red Zoned in the NES_PF hence resource consents are needed and deal with risks.

In summary, we believe that there is no environmental "issue" associated with permanent exotic afforestation. We believe that all permanent exotic and indigenous afforestation has significant environmental benefits.

Question 2. Do you have evidence you can share that supports or contradicts this problem definition? Or that demonstrate other problems?

Most of the points we wish to make appear earlier in this submission.

We would like to add, in the problem definition under "Issue 3" it is suggested that exotic forests will support less biodiversity than indigenous forests. This comparison is not relevant. The correct comparison of biodiversity is between Permanent Exotic Forests and the land use they displace. Since we are considering planting up the pastoral farms, Permanent Exotic Forests will be significantly richer in biodiversity than the English pasture species they replace.

As for sediment, New Zealand currently contributes 1.7% of all sediment to the world's oceans, or approximately 190 million tons per year. https://niwa.co.nz/freshwater-and-estuaries/freshwater-and-estuaries-update/freshwater-update-79-november-2018/reducing-sedimentation.

NIWA suggests that sedimentation has increased 10-fold since deforestation of catchments. There is also good research to suggest that exotics can significantly reduce sediment loss: https://www.worldcat.org/title/pakuratahi-land-use-study-a-12-year-paired-catchment-study-of-the-environmental-effects-of-pinus-radiata-forestry/oclc/156307064.

If we want to control sediment loss we must increase forest cover. Permanent Exotic Forests will help. Planting indigenous forests is both slow and expensive and farmers have shown little willingness to do so.

Carbon credits from Permanent Exotic Forestry will give farmers the cashflow to reduce erosions and sediment loss with better water runoff management.

Section 7 – Objectives and assessment criteria

Question 3. Do you agree with our criteria for managing permanent exotic afforestation? If not, what would you change and why?

The goals expressed here are good objectives for forestry to succeed in New Zealand and Permanent Exotic Forests in the NZ ETS fit perfectly within these objectives.

The only item that Permanent forests (**both indigenous and exotic**) don't meet here is "supporting regional economies and jobs". This can be solved for exotic forests by selective harvesting with continuous cover forestry which creates skilled jobs with regional benefits. It will allow these permanent forests to contribute positively to the future economy of the country, whereas the equivalent indigenous permanent forests might not. Māori have economic aspirations for their land and have already expressed interest in the likely benefits that Permanent Exotic Forests offer them. The same economics apply to farmers grappling with reducing agricultural emissions.

One of the assessment criteria implies that only indigenous forests support indigenous biodiversity. This is incorrect. As noted earlier, science reports that a rich biodiversity develops in the understory of exotic plantations and that on most sites, Permanent Exotic Forests will develop an understory of indigenous species. This is best summed up by an overview article[12]` that reports at least 118 threatened indigenous plant, birds, bats and insect species have been found in a mix of exotic and native ecosystems that make up plantation habitants. Numerous examples are reported by NZ FFA members[13] where bird life and bats have been found to be widespread in exotic forests.

Furthermore, as noted in our response to Question 2, the correct comparison of biodiversity is not between forest species but between Permanent Exotic Forests and the pastoral land use they displace. Permanent Exotic Forests will be significantly richer in indigenous biodiversity than the grasses they replace.

Removing Permanent Exotic Forests from the ETS will hinder the opportunities farmers have to react to climate change. If not addressed, climate change is likely to affect all rural economies to a far greater extent than the conversion of 4% of marginal land to forestry.

The loss of 4% of marginal grazing land to forests of any species will increase indigenous biodiversity.

[12] Harnett, M. 2015. Bats, birds and biodiversity in planted forests. Pure advantage, NZ, https://pureadvantage.org/

[13] Ledgard, N. Henley, D. Brockerhoff, E. 2022. Birds and exotic trees in the Mackenzie Basin. NZ Tree Grower, Feb 2022.

Section 8 – Options to manage permanent exotic forestry in the NZ ETS

Question – designing the options to manage permanent afforestation

We prefer option 1. Until more is known on the impact of the options we think it's prudent to keep the status quo. This has been a very rushed consultation and it would be useful to gain a better understanding of some long-term consequences before making a choice.

4. Should we provide for exceptions allowing exotic species to register in the permanent forest category under certain conditions?

If there are political reasons that force a change now, we would accept Option 3a and would like to be part of the process that sets out the exceptions to be covered by regulation.

5. Are there particular circumstances that you support introducing exceptions for (for example, exceptions for certain species of exotics)? Why?

We support the suggestion that the "plant and leave" regime should not be allowed, and part of an exception could be a requirement for the active management of any carbon forest. The standard of management could be developed by an advisory group, and if it reflected "best practice" the NZ FFA would accept it. Key elements would be access roading, fire management infrastructure, regular forest health assessment and pest control, and agreement to allow drone access for audit purposes.

• What are the likely impacts, risks and costs of allowing exceptions in these circumstances?

The forest growing costs would be increased, but risks would be reduced and the forest would be more resilient against the effects of climate change.

• If we allow exceptions for exotic species under certain conditions, should we place additional conditions on the granting of this exception? What could these be?

This is covered above.

6. Are there alternative ways we can recognise and encourage these forests, either within, or outside the ETS?

It is important to encourage "trees ON farms" rather than "trees OR farms." We prefer many smaller permanent forests to a few larger ones, as that will reduce the impact of land use change, spread the risk of loss and improve the chances of protecting sensitive land.

However, despite the higher carbon prices, it is still difficult for most farmers to afford establishing and managing even a small forest. A farmer hoping to plant 10% of a 400-500 ha farm would be faced with a bill of $150,000 in the first year. Carbon revenues would not contribute much until tree age 6 and banks are reluctant to lend for planting, especially since there is no way of guaranteeing a planted forest will even be accepted into the ETS.

This financial hurdle might be overcome with a grant or loan scheme, and an improved system for assessing eligible land and accepting forests into the scheme. The present system is under-resourced, cumbersome and uncertain.

Question – options to manage permanent afforestation

7. Of these options, what is your preferred approach? Why? Are there other options you prefer that we haven't considered?

Our preferred approach is Option 1: status quo, but as stated previously the real problem is created by having just two options from 2023, 'Averaging' or 'Permanent' forests. If the 'stock change' approach was allowed to continue in certain circumstances it would better

cater for different species and management systems, and mean the 'permanent' classification was less relevant.

In a recent report the IPCC advised "governments would also need to bolster efforts to plant more trees and develop technologies that could remove some of the CO2 already in the atmosphere after more than a century of industrial activity." "It's now or never," Co-chairman Jim Skea said.

Given the urgency expressed in this latest report it seems at best incongruous and at worst inexcusable for New Zealand to now introduce rules to limit afforestation.

Question - timeframes

8. Do you agree with our preferred approach – acting before 1 January2023? Why? If not what is your preference?

While it makes sense to align changes with the proposed introduction of averaging and permanent forests, there does not seem to be sufficient time before then to develop the necessary framework for allowing exceptions to a ban on exotics in permanent forests.

Question - comparing Option 3a and Option 3b

If we choose to introduce exceptions

9. Do you support exceptions by regulations [option3a] or exceptions after a moratorium [option 3b]? Why?

We support option 3a, exceptions by regulation. We feel this option would create less uncertainty than a moratorium. The enabling Act would establish the criteria by which exceptions would be allowed and would presumably indicate when regulations would be brought in. With a moratorium, there would be speculation on when it would end and under what circumstances, which could lead to inefficient investment.

10. If we choose to introduce exceptions by regulations, what conditions or criteria should be placed on the Minister in choosing to pursue these?

We recommend the following criteria:

- That if the long-term stated intention is for an exotic forest to convert to indigenous, the exotic species and forest management plan must offer a credible transition. Seed sources and rainfall must be sufficient to enable an indigenous understory to establish.
- Consistent with the NES-PF, any exotic species chosen for permanent forestry must not cause an unmanageable wilding risk.
- Similarly, that species must provide a proven environmental benefit such as erosion control, and have a proven record of sustained growth beyond fifty years.
- Finally, that species must be wind-firm once mature and not present an undue fire risk.

11. If we choose a moratorium – how long should it be? Why?

We do not favour a moratorium but a period of 1 - 2 years should be sufficient to make decisions on whether exceptions will be allowed and under what circumstances.

12. Do you think a different type of moratorium (whether it requires a decision to be ended/continued) would have different impacts? Or do you prefer a different approach?

We have no opinion on this question.

Section 9 – Implementing changes to the permanent forest category

Question - Implementing changes to the permanent forest category. Defining 'indigenous forest', and managing forests which change over time

13-16 Indigenous forests

There do not seem to be any easy answers to these questions. We suggest you use the Field Measurement Approach to require each owner to prove the rate of carbon sequestration in their permanent forest before issuing carbon credits; and for smaller permanent forests, develop conservative lookup tables with broad definitions of 'indigenous'.

17-19 Penalties, and PFSI forests

There was insufficient time to canvas our members for answers to these particular questions.

Section 10. Averaging accounting for remote and marginal land

Question – long rotation category under averaging accounting

We support Option 2, to create a 'long rotation' category under averaging accounting for radiata pine. However we are very concerned about treating radiata differently from other species.

As a matter of risk management, this country needs to reduce its dependency on radiata as a commercial species. To that end, significant investment, funded by industry and government, has been undertaken in researching and improving commercial alternatives such as cypresses, redwoods, and durable eucalypts.

There is no reason to treat these species differently from radiata. The same reasoning applies and they too should have a 'long rotation' category under averaging.

As an example, several varieties of eucalypts are grown commercially in New Zealand but each has quite different characteristics and growth rates. Some definitely need to be grown for longer periods than others in order to achieve the desired sizes and timber properties. There is no reason to assume they are all the same.

By excluding alternative species from the option of a 'long rotation period,' we diminish the incentives to plant them. This is unnecessary as the proposed regulations could simply cover all types of forests, with slightly different parameters where required.

Knowing that some farmers dislike radiata pine, and that much of the necessary afforestation is going to take place on farmland, it makes sense to encourage farmers to plant these alternative commercial species. Allowing them the flexibility of a 'long rotation' category under averaging should help.

20. Should the Government create a long rotation category under averaging accounting for radiata?

We support the creation of a long rotation category under averaging accounting for Pinus radiata forests which are not profitable to harvest at age 28

21. What do you think the impacts of that would be?

We believe that the introduction of a long rotation category would offer landowners more flexibility and encourage them to afforest more erosion depleted sites.

22. Do you think forests in this category are likely to be harvested?

We believe that in the long term these forests are likely to be harvested, as carbon income will cease under averaging and hopefully off setting carbon sequestration become unnecessary. Timber prices and the costs of harvesting in the future are of course unknown but technology and R & D should reduce relative costs.

There could be reasons why such forests could not be harvested, for example due to constraints introduced by :

- Government such as new biodiversity or health and safety rules
- Territorial authorities such as assignment of SNA status to a part of the land or forest
- Adverse events such as fire, pests or a natural disaster like a land slide.

We are opposed to any measure that would force a forest owner to harvest the forest at a particular time, because it is impossible to foresee the regulatory environment that might apply then as well as timber prices and the costs of harvesting. Also, forests are intergenerational and we do not wish to burden our children.

Importantly, as pointed out earlier, there is a financial incentive for the forest owner to harvest earlier rather than later. Should the need for more regulation arise in the future, then the Government of the time will be able to introduce suitable measures which will be better than any guess made today.

23. What criteria should be in place to restrict the 'long rotation' category to radiata?

As stated above, we disagree with limiting this category to radiata forests. Also, we believe that the question needs to focus on the forecast profitability of harvesting. If a forest became unprofitable to harvest after say 20 years due to changes in regulations or adverse events, then the forest owner should be able to extend the rotation until circumstances made it profitable again. An example is where a local sawmill closes, resulting in much higher transport costs for the tree grower.

If the question relates to what qualifies as a 'long rotation' forest, then the criteria could include a forest further than 100 km from a sawmill or port, or one in which the projected internal rate of return after 28 years was less than CPI plus 5%. You must understand that forestry – as a long-term investment – needs to generate higher rates of return than short or medium term investments that generally have lower risks.

24. Do you think a long rotation category aligns with the proposed changes to the permanent activity?

If the Government decides to proceed with changes to 'permanent' forests – despite our submission that it should not - then we support the introduction of 'long rotation' forests.

We have the opportunity to increase carbon removals with a relatively small impact on pastoral farming, and the introduction of 'long rotation' forests will help. There is little reason to assume that 'long rotation' forests will become permanent, as it should be more profitable for the owner to harvest when conditions allow.

25. Are there alternative options to a ‘long rotation’ forest category that could be more effective at addressing stakeholder concerns?

As above, it is important to make long rotation rules relative to the species growth habit. Better data of older age stand development needs to be collected and analysed to help make these recommendations.

The proposed approach for a long rotation forest is to issue carbon credits to the forest owner until year 21, with any credits from year 16 to 21 surrendered if harvest occurs before age 40. We have a number of questions about this:

- Would the surrender be proportionate to the number of years the forest was harvested before age 40?
- How would an adverse event that destroyed the forest at age 35 be handled?
- Events may conspire against harvesting a small forest at age 28-30. In those circumstances would it be possible switch from a standard forest under averaging to a long rotation forest?

An alternative option to what is proposed would be to allow long rotation forests to use stock change accounting. This would simplify the administration and avoid the introduction of new complex rules. It would also accommodate the inclusion of forest types other than radiata pine.

Thank you again for this opportunity