

National direction for plantation and exotic carbon afforestation

Scion has 75 years of experience in forest science and innovation

Scion is a Crown Research Institute with the core purpose to “enhance New Zealand’s prosperity, well-being and environment through trees – kia piki te ora, te tāiao me te whai rawa o Aotearoa mā to ngāhere”. We have 75 years of experience in biology of forests and other terrestrial vegetation. Our Strategy to 2030 aims to help New Zealand transition to a circular bioeconomy through three impact areas that aim to:

- Grow healthy, resilient forests that are planted primarily for their standing forest benefits;
- Develop products, manufacturing, high-value trees and healthy, resilient forests that capture an increasing share of the global high-end market for timber; and
- Develop products, processes, manufacturing, trees, other biomaterials and healthy, resilient forests to replace petrochemicals and non-sustainable materials.

Within those three impact areas, we are delivering coordinated research portfolios including those focussing on

- Establishing indigenous forests
- Restoration, protection & mauri o Te Waonui a Tāne, with mātauranga-led approaches to bring maximum value to standing indigenous forests
- Designing forests - Mahi Tahi Whaihua, designing forests to meet a need. The forests can be indigenous, exotic, or novel fusions of both to meet delivery of portfolios of ecosystem functions.
- Indigenous trees for distinct value wood products, with research that bundles the intrinsic, cultural, economic, and environmental value of our unique indigenous trees and lands. It is about developing business opportunities that are Māori-led and science-sector supported to deliver new benefits to regions. The scope of this portfolio spans co-innovation pathways, protocols, and benefit-sharing to unlock the potential of specialty indigenous supply chains and products.
- Tree microbiome, biotechnology, breeding and propagation to increase productivity and resilience to abiotic and biotic threats; biosecurity to protect our forests from new and existing pests and diseases; and forest management and environmental stewardship to enable increased productivity within sustainability limits. The portfolio also includes harvesting and construction research to optimise the value from volume and ensure safe practice.

We also have a Rural Fire Research Group that is New Zealand's only provider of specialist rural and forest fire research. Our rural fire research increases knowledge of fuels and fire behaviour, with a strong focus on the development and improvement of the New Zealand Fire Danger Rating System. This system assists rural fire managers to

assess risk, predict the spread of fires, and manage the safety of firefighters and the public. It also allows for the safe and effective use of fire as a land management tool for applications such as crop burning and land clearing.

Forests are essential for New Zealand's climate change response

New Zealand's climate change response must prioritize stopping emissions at source. This means strategically managing forests, rather than relying on them as the primary tool to meet our 2050 emissions reduction targets. Forests and forestry will play a vital role in meeting the country's emissions budgets and targets, and the Climate Change Commission's advice to government assumes that New Zealand will establish nearly 700,000 ha of new forests by 2035. Unless New Zealand can significantly reduce its gross emissions, afforestation will continue to play an important and growing role in our climate change response.

Those forests also have a vital role to play in New Zealand's transition to a low-carbon, circular bioeconomy. As well as assisting in our efforts to address climate change, we also need diverse and sustainable forests long into the future to support our demand for building materials, innovative bioproducts, biofuels, and natural landscapes

Establishing significant new forests requires land-use change: either proactively re-establishing forest in places where forests have been cleared for agriculture and other economic use; or working with processes of natural succession to allow forests to establish and grow in areas where previous land-use has become less economically viable.

National environmental standards should aim to mitigate the effects of activities on the environment

All forests will change the environment in some way, and most will need to be actively managed to mitigate adverse effects of afforestation on the environment, and to reduce risks to biodiversity, biosecurity, and to social and economic wellbeing.

The NES-PF is an important tool that provides a good basis for avoiding, remedying, or mitigating the potential adverse environmental effects of the establishment and subsequent economic use of forests. Scion's research appreciates and promotes a wide range of other benefits from forests, in addition to the role that forests can play as an integral part of New Zealand's climate change response.

In our submission to the government's proposals for changes to permanent forests in the New Zealand Emissions Trading Scheme, we highlighted the opportunity for the NES-PF to be expanded to include other forest types. We welcome the opportunity to contribute to policy development on forest management, using our 75-years of experience in forest and forestry research. Our submission emphasizes four key points:

- We support a science-, mātauranga-, and evidence-based approach to the assessment of environmental effects of forest establishment, growth, and harvesting, and measures to avoid, remedy, or mitigate any adverse environmental effects.
- That approach recognises that some environmental effects of forest establishment and growth will be similar irrespective of which species are planted, and for which purpose. That includes forests established with indigenous as well as exotic tree species.
- It also recognises that some effects are more species-specific (e.g. relating to the risk of fire or wilding tree spread), and that some of those effects are also relevant to indigenous as well as exotic tree species.
- The intentions of forest owners change over time. Some forests that are

currently being established to maximise long-term carbon uptake and storage may eventually be harvested for timber or other biomaterials and may or may not be replanted. Other exotic forests established for carbon uptake and storage may be instead managed to transition to indigenous forest that provides a range of other ecosystem services, particularly those relating to enhancing and preserving indigenous biodiversity.

Recognising the importance of current interest in exotic carbon forestry for its carbon market returns, we support the need to change the NES-PF to include exotic carbon forests. However, our view of current and future forests, aligned with our research mission, indicates a wider interest in ensuring environmental standards for all forest types.

A focus on effects should apply to all forest types, irrespective of why forests have been established...

The establishment of a new forest category – the proposed Exotic Carbon Forest category - does not support an effects-based approach. We instead support an approach that does not create a new category of forests, and adopts the approach set out in Table 2 of the consultation document, whereby the core principles of the current NES-PF should apply to all afforestation.

...particularly as intentions of forest owners change over time.

As the consultation document notes, the most recent MPI Afforestation and Deforestation Intentions Survey found that intentions from 2023 to 2030 are more uncertain than in the near term. Beyond that period, it is difficult to know for sure whether forest owners' intentions will stay the same as when forests were originally planted or purchased. Over the next 50 years, a forest planted today may be owned by someone different, or the original owner may change their mind. This is especially so given the influence of fluctuations in NZU price and potential changes over time to NZ ETS policy settings. A single National Environmental Standard should therefore apply regardless of the intention for the forest, since the environmental effects of the forest will remain the same even if the intention for its establishment and use changes.

National Environmental Standards should be consistent for all types and purposes of forest.

Recognising that the way that a forest is managed can have a greater impact on its effect on the environment than the intended use of that forest, a better approach to considering the effects of forests than referring to “exotic carbon forests” that are not intended to be harvested may instead be to focus on forests that are being actively managed for non-timber values.

The Scion workstream related to such forests describes these as “healthy, resilient forests that are planted primarily for their standing forest benefits”. Such a categorisation would align more closely with an effects-based approach and is more inclusive of the diverse range of potential forest management approaches that we are hoping to see enabled through the Emissions Reduction Plan, and the Forestry and Wood Processing ITP. This would include forests transitioning from predominantly exotic to predominantly indigenous species. A focus on environmental effects rather than intended purpose of the forest would better enable this.

The NES-PF should also reflect New Zealand's evolving timber and forestry industry by incorporating indigenous plantation forests

Since the NES-PF covers the full range of species of non-indigenous forests, we suggest that it may also be worth broadening the NES to incorporate standards for indigenous plantation forests – both those planted for production and for long-term standing

forest benefit.

In line with the Forestry and Wood Processing ITP goal to diversify our productive forests, the NES-PF should allow for a diverse range of productive forests that includes indigenous species. There is increasing interest in indigenous species for both high-value wood, and for carbon capture, with growing demand for more detailed species-level information on native trees in the ETS lookup tables.

The Industry Transformation Plan notes that “[w]hile radiata pine is the mainstay of the small grower estate, there has been strong interest from small growers in trialling and establishing a broader range of commercial species, including ... managed indigenous forests”.

For instance, Scion’s partners in the Totara Industry Pilot believe that “native forestry can bring together all the advantages of conservation, timber production, environmental, socio-economic and cultural enrichment.” The NES-PF should look ahead to a future that includes greater use of indigenous species for both standing forest benefits as well as timber production.

Perhaps even more significantly, in addition to the need to future-proof the NES-PF to envisage a future where more indigenous tree species are planted as production forests, there is a need for greater detail regarding the management of forests in transition, as well as forests which may intend to mix exotic and indigenous species in the long term.

Currently there is insufficient research to understand whether there are differing environmental effects (or benefits) of plantation forests at varying stages of the transition from exotic to indigenous, or of forests that are intended to remain mixed species.

Experimental frameworks and the planting of experimental forests are needed now to ensure that there is data available in coming years that will help us to answer these questions. Under our impact area focused on forests and landscapes, Scion is already considering these issues and planning ahead for research that responds to future needs.

Scion is well placed to assist with research and expertise regarding the changes that will be needed across the supply chain to support thriving industries in new species, such as lowering seedling costs, genetic research, and developing new processing infrastructure and products.

A National Environmental Standard could include better management of clearance of indigenous vegetation

There are no national level policies preventing the clearance of indigenous forest on private land at present, and regulations under the relevant regional and local plans vary widely. The sustainable management plans required under the Forests Act for indigenous timber production forests do not provide for a consistent approach to managing the environmental effects of plantation forestry in our view. More certainty could be provided to the forestry industry by including standards for indigenous plantation forests in the NES-PF.

The core plantation forestry activities which have potential environmental effects that are covered under the existing NES-PF (afforestation, pruning and thinning-to-waste, earthworks, river crossings, forest quarrying, harvesting, mechanical land preparation and replanting) could all be applicable to transitional and continuous canopy cover forests also. Further, none of these activities are specific to exotic species, reinforcing our proposal that is worth considering the coverage of indigenous plantation forestry in the same standard.

Management approaches are likely to need adapt to regularly throughout transition of forests from exotic to indigenous and more information is needed to inform forest

owners and managers about the best techniques to manage risks like wildfire and pests, and to optimise carbon capture as well as to improve other ecosystem benefits.

Likewise, differing management approaches may be needed for varying composition of planted indigenous forests.

Responses to specific questions from the consultation document

Part A: Managing the Environmental (Biophysical) Effects of Exotic Carbon Forestry

With respect to the problem statement in QA1, Scion broadly agrees that there is the need to provide greater certainty around forest management for forests not currently covered by the NES-PF. We note that the problem statement highlights uncertainty about future environmental issues that could arise in the longer term “as forests transition to indigenous forest or reach the end of their natural lifespan”. We are concerned that the underlined wording may misrepresent the current state of knowledge of growth of exotic forest in New Zealand. We don’t have enough evidence to determine what a “natural lifespan” of exotic forests might be in New Zealand. All forests change as the trees within them age so the concept of a forest’s “lifespan” has little meaning in the way that it is used here. For instance, there are stands of *Pinus radiata* in New Zealand that are close to 100 years old. While the rate at which those trees are growing has slowed, and the forests are becoming more open as individual trees die or are blown over, it is not possible to say that those forests have reached “the end of their natural lifespan”. So while it is true that most *Pinus radiata* forests planted for timber production have a ‘lifespan’ or rotation length of less than 30 years, this is determined by the economics of forestry production rather than the biology of the trees themselves.

Well-managed permanent forests can deliver environmental benefit as they age. Scion has expertise that can contribute to developing forestry management guidelines that prolong lifespan and maximise carbon capture, including kaitiaki and mauri aspirations of Māori. In line with our position that it makes sense to permanent forests under the same framework as production forests, we agree that the NES-PF is an appropriate instrument to manage the environmental effects of forests that have been established for non-timber benefits.

PART B: Controlling the location of plantation and exotic afforestation to manage social, cultural and economic effects

Scion broadly agrees with the problem statement set out on page 29. However, appendix D does not fully capture the social, cultural and economic effects of plantation and exotic carbon afforestation at a community level, particularly for rural populations and for wellbeing.

The environmental conservation benefits provided by planted forests (e.g., avoided erosion, avoided nutrient leaching) are valuable to human wellbeing. Well managed planted exotic forests can provide significant recreational opportunities, such as for hunting, hiking and mountain biking. While these are noted as economic opportunities, the non-market value of recreation in supporting physical and mental health has not been sufficiently reflected.

Mountain bike trails in planted forests in Whakarewarewa forest near Rotorua are a major contributor to the mountain biking economy which provided approximately \$140m to the Rotorua Lakes economy and which also provided approximately 1,153 jobs in the year 2021. Whakarewarewa forest’s mountain biking and walking trails have also been found to provide forest users with recreational value that is more than

twice the annual timber revenue

Part C: Improving wildfire risk management in all forests

Scion agrees that wildfire risk management plans (WRMPs) should be included in the NES-PF. Forests, particularly those planted at high stem densities, represent significant concentrations of fuel that are capable of creating extreme wildfire conditions beyond those typically seen in grasslands or other types of land cover. Such fires can exceed the capacity of firefighters to engage safely. Intense crown fires also produce more numerous and more substantial embers, which can travel and ignite spot fires several kilometres away. Therefore, plantation forests create risks above those of most other land uses that extend far beyond their property boundaries to impact on others.

Periodic review of WRMPs will be necessary, particularly in the case of permanent forests, to account for contextual changes that may affect wildfire risk in the years and decades following planting. Changes in climate, power or transport infrastructure, and nearby housing or urban development may all influence both the risk of wildfire and the suite of available responses. For example, a new housing development near a forest may increase the likelihood of ignition by introducing new power infrastructure and exposing the forest to more human activities. In the case of forests transitioning from exotic towards indigenous, the wildfire risk will change in relation to the species composition and density of understory vegetation. In addition, our understanding of wildfire risk and best practices for wildfire risk reduction continues to evolve. Review is necessary to incorporate new knowledge, consider changing contexts and adapt planning to suit.

We have no particular view on whether a five-year period is the appropriate frequency for review but would suggest that reviews be required at the following times:

- 1) when land use of areas surrounding forests changes;
- 2) during key successional class stages/species changes; and
- 3) after disturbance events.

While we support, in principle, the use of WRMPs, some forest owners may not have experience with wildfire risk management or the expertise necessary to produce a useful plan. Integrating WRMPs with farm planning and providing standardized templates could help simplify the process and reduce the regulatory burden placed on land users. However, the availability of expert advice to support small forest owners is limited. It is important to ensure that information is available and accessible to forest owners. It may be prudent to stage the requirement for WRMPs over time by forest size to allow for the development of guidance, training of farm advisors and extension programmes from central government, councils, and/or industry groups to support owners of smaller forests. Further, it would be worth MPI regularly reviewing whether the plans are achieving the desired fire risk reduction as intended.

Part D: Other issues

Wilding conifer risk management

Scion agrees with the proposal to update the wilding risk calculator in line with the recommendations made by the TAG and would be pleased to be involved in providing input into this process in our areas of expertise.

Scion also supports the proposal for reassessment of the wilding risk at replanting but our view is that this should not just be based on applying the wilding risk calculator. Ideally a risk assessment at replanting should also include any evidence (or non-evidence) of wilding spread and its severity during the previous rotation (if the same species is replanted) and whether or not prior mitigation measures were successful.

Indigenous vegetation

With respect to the proposal to change the definition of indigenous vegetation, we note that the proposed definition in the draft National Policy Statement on Indigenous Biodiversity would narrow the range of what species should be considered indigenous within a given area from those native to New Zealand to those native to the particular ecological district.

Climate change is predicted to shift the suitable climatic ranges for many native species. Species and ecosystems may migrate over time in response to these climate shifts and, in some cases, it may be necessary to translocate at risk species into other areas. There is a risk that defining indigeneity by ecological districts may create unintended consequences for native species undergoing climate migration.

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