Ministry for the Environment
Manatū Mō Te Taiao

PROPOSED
National Environmental Standard
>> for Plantation Forestry

DISCUSSION DOCUMENT



New Zealand Government

Acknowledgements

A number of policy advisory groups contributed to this work. Membership of these groups was drawn from local government, central government and the forestry sector.

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Overview

Plantation forestry is an important industry for New Zealand. It is widespread across the country with plantings of over 1,000 hectares in 60 districts. Local authority plans set the framework for establishing and managing plantation forestry in New Zealand. Provisions in plans are relevant to the environments, landscapes and values of the district or region in which they are developed. However, the forestry sector has found that operating across different districts and regions creates uncertainty for companies due to the variability of rules between plans.

The New Zealand Forest Owners Association (NZFOA) is seeking a nationally consistent framework for plantation forestry to better facilitate forestry establishment and operations, and the Ministry for the Environment has been scoping how this could be achieved. A number of policy advisory groups contributed to this work. Membership of these groups was drawn from local government, central government and the forestry sector, among others.

The scoping exercise involved reviewing a sample of regional council and territorial authority plans in relation to their plantation forestry provisions in order to understand the extent of the issue. The main findings of the review were that:

- there is variability in the way regional and district plans control forestry (eg, some councils have no rules for plantation forestry activities, while others have sophisticated rules to manage the effects on the environment of those activities)
- thresholds for when a resource consent is required for plantation forestry activities vary between regions and districts.

It should be noted here that some variation in plan provisions is necessary due to the variation in soils, water bodies, biodiversity and climatic conditions between regions and districts.

The problem addressed by this proposal

The main problem identified in this discussion document is inconsistency in the management framework for plantation forestry. This can result in:

- re-litigation of the same issues across the country
- inconsistent treatment of forestry operations
- operational inefficiency
- investment uncertainty.

Policy objective

- The policy objective of the proposal is:

> To provide a more consistent and appropriate plantation forestry management framework, while facilitating the sustainable management of natural and physical resources.

The proposed option

The proposed option for meeting the above objective is a national environmental standard for standardising rules relating to plantation forestry. The proposed standard would require local authorities to control plantation forestry activities in a more consistent manner, while retaining local and regional input in some circumstances.

This will be achieved by allocating an activity status to certain activities (permitted through to non-complying activities), while allowing local authorities to be more stringent where local variation is necessary. In these instances, local authorities will be able to use their judgement about what level of control is necessary.

Costs and benefits

A preliminary assessment of the costs and benefits of the proposed national environmental standard has been prepared by independent consultants. The cost–benefit analysis shows that while the site-specific impacts of the standard cannot be quantified at this preliminary stage, the nationwide impacts of the standard are expected to be positive.

Submissions

The Ministry for the Environment welcomes public feedback on the proposal through public submissions. Anyone can make a submission on the proposed standard.

Submissions must be received by the Ministry for the Environment no later than 5.00 pm Monday 18 October 2010. Further details on making a submission are included in section 7.

1 Introduction

1.1 Background

Plantation forestry is a significant land-use activity and industry in New Zealand. It is a major contributor to our gross domestic product and provides employment for many New Zealanders. Forestry plays a vital role in climate change mitigation via carbon sequestration, and brings about a range of environmental benefits, such as erosion control.

There are, however, aspects of plantation forestry that need to be carefully managed to avoid potential adverse effects on the environment generated by forestry activities. In particular, the harvesting phase of forestry carries a heightened risk of environmental impacts, such as sedimentation.

The nature of plantation forestry means there are extended periods of limited land-use activity (while trees are maturing), interspersed with periods of intense management activity, relating to the establishment, pruning and harvesting phases. The techniques and physical inputs required during these phases are influenced by New Zealand's varied soils, water bodies, biodiversity and climatic conditions.

Plantation forestry, like many land uses, is largely regulated by provisions in regional council and territorial authority plans, which are developed as a requirement under the Resource Management Act 1991 (RMA). Local authority plans currently have a varied approach to managing forestry. This inconsistency can cause problems for those in the forestry sector who operate across different regional and district jurisdictions, and across diverse landscapes and environments. The inconsistency within the current planning framework creates uncertainty for the forestry sector and potentially influences costs for, and investment in, the industry.

Given the importance of the forestry sector to the country, this discussion document, including the proposed national environmental standard (NES), aims to ensure that planning controls for plantation forestry are nationally consistent, while ensuring the appropriate management and protection of natural and physical resources.

The Ministry has undertaken a review of a selection of district and regional plans and a sample of resource consent conditions. This was the basis for discussion on options for dealing with the problem. The resulting proposed NES aims to fit within the current framework while providing a pragmatic and balanced approach to plantation forestry activities.

1.2 Purpose of this document

This discussion document has been prepared to:

- help you understand the proposal for an NES, and its potential costs and benefits
- help you prepare questions and feedback
- guide you in making a submission.

The document sets out resource management issues that arise as a result of inconsistency in how plantation forestry activities are currently managed, and considers a variety of options, including an NES, for resolving these issues.

The proposals in this document are equally important to local authorities, because they are intended to support their respective functions under sections 30 and 31 of the RMA. They are also relevant to those interested in plantation forestry activities, such as iwi, non-government organisations and members of the public.

1.3 Structure of this document

The remainder of this introductory section provides an overview of how environmental standards operate, what they are intended to achieve, and the process the Ministry follows in developing new standards. The section also describes the current management approach and the various plantation forestry activities that could be included in an NES for plantation forestry.

Section 2 describes the problem and outlines the policy objective. Section 3 describes and assesses the available options for achieving the policy objective, and section 4 sets out the preferred option, which is the proposed National Environmental Standard for Plantation Forestry.

Section 5 outlines how the proposed standard could be implemented. Section 6 provides a summary of the preliminary assessment of the costs and benefits of the proposed standard. Finally, section 7 outlines the submission process.

The appendices provide additional information on the legislative framework, planning for plantation forestry, possible approaches for some of the options, an evaluation of the options and the classification of erosion susceptibility. There is also a glossary of the relevant terms used in this document.

Supporting reports not contained in this document

This discussion document is supported by the following technical documents.

Review of 12 Regional Council and 4 Unitary Authority RMA Plan Provisions Relating to Plantation Forestry (Brown & Pemberton Planning Group, 2010a). This report, prepared by an independent consultant for the Ministry for the Environment, provides a summary of the rules and controls relating to plantation forestry in the regional planning documents prepared by 12 regional councils and four unitary councils under the RMA.

Review of 23 District Council RMA Plan Provisions Relating to Plantation Forestry (Brown & Pemberton Planning Group, 2010b). This report provides a summary of the rules and controls relating to plantation forestry in the district plans prepared by 22 district councils under the RMA. The 22 district councils with the highest plantation forestry hectarage were selected for the review.

Preliminary Cost–Benefit Analysis of the Proposed NES for Plantation Forestry (Covec, 2010). This report, prepared by an independent consultant for the Ministry for the Environment, is the preliminary cost–benefit analysis of the proposed National Environmental Standard for Plantation Forestry. A summary of the report's findings is contained in section 6 of this document. The full report is available on our website at www.mfe.govt.nz/laws/standards/forestry.

1.4 What is a national environmental standard?

National environmental standards (NES) are legally enforceable regulations made under sections 43 to 44 of the RMA. Standards can be numerical limits, narrative statements, or methodologies that are in a legally enforceable form. These may include standards relating to the use and subdivision of land, the discharge of contaminants, or noise. Standards cannot contain guidance material, although the Ministry has produced users' guides to assist those working with NES. A standard can also indicate whether there is a requirement for a resource consent to be notified.

NES may:

- prohibit or allow an activity, or state that an activity is permitted
- specify that a resource consent is required, the classes of activity (controlled, restricted discretionary, discretionary or non-complying) and the matters over which control is reserved or discretion is restricted
- restrict the making of a rule or the granting of a resource consent to matters specified in the standard
- require a person to obtain a certificate from a specified person, stating that an activity complies with a term or condition imposed by an NES.

1.5 The process for developing national environmental standards

An outline of the process for developing an NES is shown in figure 1. As part of the scoping process, a reference group was formed to investigate the possibility of an NES. The reference group included officials from central and local government, the forestry sector, and other interest groups such as iwi representatives.

Further detailed analysis was completed with representatives from local government, the forestry sector, Crown research institutes and private consultants. This discussion document, the final outcome of the scoping process, forms part of the submission process.

The process for developing an NES differs from the statutory plan and resource consent processes as there are no express requirements for hearings, and no appeal provisions or First Schedule consultations. The RMA does require the Minister for the Environment to provide an opportunity for the public and iwi authorities to comment on the proposed subject matter of the standard. The RMA also requires the Minister to give reasons for considering the standard is consistent with the purpose of the Act.

The submission period is your opportunity to make a submission on the proposed standard. A six-week submission period is provided to enable any formal approval or ratification of submissions that is required by councils, committees or boards. During this time the Ministry will hold workshops around the country to make presentations and answer questions about the proposal. Details on how to make a submission are given in section 7.

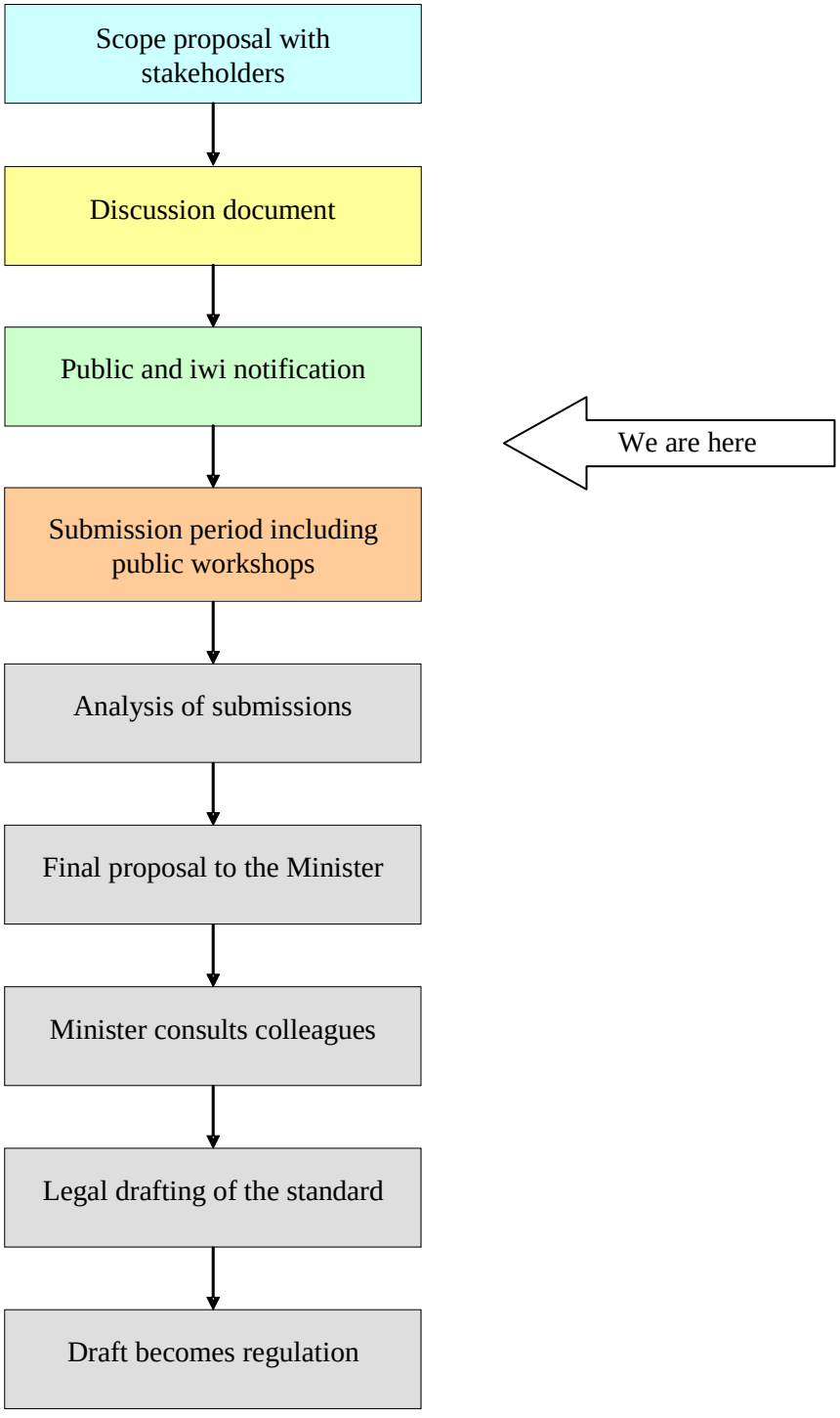
To help you formulate a submission, questions are posed throughout the document on aspects of the proposed standard. However, you are welcome to provide feedback on any aspect of the proposed NES, as well as other options.

If the Minister recommends an NES following consultation on this document, a regulatory impact assessment[1] will be required. This discussion document contains, and invites comment on, the substantive elements of a regulatory impact assessment.

At the end of the submission process, the Ministry for the Environment will prepare a report and recommendations on the proposed subject matter of any standard, along with a formal evaluation of the alternatives, costs and benefits under section 32 of the RMA. The report and recommendations must be publicly notified. The Minister will then consider the report and recommendations and the section 32 evaluation before deciding whether to recommend to the Governor-General that the NES be made by order in council.

[1] A regulatory impact assessment (RIA) is a policy tool widely used in OECD countries. An RIA examines and measures the likely benefits, costs and effects of new or changed legislation and regulations. An RIA is used to define problems and to ensure that government action is justified and appropriate.

Figure 1: The process for developing a national environmental standard



1.6 Plantation forestry in the context of environmental management and the RMA

The scope of the proposal set out in this document is limited to eight plantation forestry activities associated with the establishment of forests and the subsequent harvesting of trees.

In order to assess and comment on this proposal, it is important to understand the wider context of current environmental management and the RMA. This section describes the management framework for plantation forestry by:

- highlighting the economic and environmental outcomes of plantation forestry
- discussing the importance of local and regional decision-making
- outlining the current process for managing plantation forestry under the RMA, including the role of local and central government.

1.6.1 Plantation forestry in New Zealand

Plantation forests are widespread in New Zealand and have important economic and environmental benefits for the country, including:

- being a key contributor to our economy in terms of exports and employment
- being a supplier of a renewable resource to local and international markets
- playing a vital role in carbon sequestration for the country and our obligations under the Kyoto Protocol targets, including being a key player in the New Zealand Emissions Trading Scheme
- providing environmental benefits such as stabilisation of marginal land or land susceptible to erosion.

The environmental benefits of forestry plantings are described in more detail in section 1.7. Section 2.1 and Appendix 2 discuss the role of plantation forestry in New Zealand, including its contribution to climate change mitigation and the Emissions Trading Scheme.

However, forestry is an intensive land use, and the activity does have environmental effects. It has a long timeframe and effects are predominantly concentrated around the harvesting and earthworks phases of the operations cycle (after 25 years plus of growth). Ideally, the environmental effects that may arise out of harvesting a plantation forest will be considered and addressed at the time the forest is planted.

Some of the detrimental effects of forestry (eg, the clearance of indigenous forests) have reduced due to the introduction of national agreements, Acts and industry-led codes to prevent further clearance of natural indigenous forests and improve practice. See Appendix 1 for more detail on controls.

The nature and degree of adverse environmental effects depend on a number of factors, including site features, machinery used and techniques employed. Potential effects on the environment can include sedimentation of water bodies and slope instability. More detail about the adverse environmental effects of individual plantation forestry activities and current management is given in section 1.7.

1.6.2 Management of plantation forests and the RMA

The RMA sets the regulatory framework for land-use management in New Zealand, and provides for the preparation of plans and rules by regional councils and territorial authorities. The intent of the regulatory framework is to address the adverse effects of land-use activities and promote the sustainable management of New Zealand's natural and physical resources (see Appendix 1 for more detail about the RMA and relevant legislation).

Plantation forestry is one of New Zealand's major land-use activities, covering 6.6 per cent of the nation's land area. As with other land-use activities (such as cropping, dairying and horticulture), forestry has the potential to cause disturbance to water bodies, soil conditions and ecosystems. In giving effect to the RMA, local authorities have requirements to manage the effects of land-use activities within their region or district. The role of local authorities is outlined below in section 1.6.4.

Local authority plans may contain specific rules relating to plantation management, or more general provisions on activities such as the construction of culverts in rural land areas. Plan rules are developed via a statutory process involving consultation and community involvement, including input from iwi authorities and sector groups, such as the forestry industry. The plan development process, including submission and hearing processes, can take several years to complete.

Regional and district plan rules establish whether resource consent is required for plantation forestry activities. Rules for plantation forestry vary across New Zealand as a result of the plan development process. Some plans may have a permissive approach to plantation forestry and consent is not required, while other councils apply more restrictive controls requiring resource consent for certain activities. An explanation of the different activity types is given in section 4.1. The terms and conditions of consent can vary significantly around the country because they are determined by local factors such as habitats of indigenous species or geology.

1.6.3 The importance of local and regional decision-making

It is difficult to create an all-encompassing, entirely consistent national framework for plantation forestry due to the wide variety of receiving environments around the country. Adequately recognising and protecting every receiving environment is extremely difficult at a national level. For this reason it is important to retain a degree of local and regional decision-making. This issue is discussed further in section 2.3.

1.6.4 Role of local government

New Zealand's local government agencies have responsibility for the regulatory management of plantation forestry within their areas. The specific functions of regional councils, unitary authorities and territorial authorities are outlined under sections 30 and 31 of the RMA, but following is a brief overview.

- **Regional councils**
  There are 16 regional councils, including four unitary authorities. They are responsible for, among other things, controlling the use of land for the purpose of soil conservation and enhancing water quality, maintaining the quality of water, maintaining and enhancing ecosystems, avoiding and mitigating natural hazards, and managing hazardous substances.

Regional councils are required to prepare regional policy statements and may prepare regional plans, which may include provisions for managing plantation forestry.

- **Territorial authorities**
  There are 73 district and city councils, which have responsibilities to control the effects of land use (including hazardous substances, natural hazards and indigenous biodiversity), noise and the effects of activities on the surfaces of lakes and rivers. Territorial authorities prepare district plans and issue resource consents that may include provisions controlling plantation forestry activities.

1.6.5 Role of central government

The principal role played by central government in forestry management is at the policy formation, market access and infrastructure levels. The government negotiates access arrangements with our trading partners, formulates the regulatory framework for resource management, invests in biosecurity and biodiversity protection, and provides funding for education, science, statistics collection and infrastructure development. Following are some of the key central government agencies' roles in plantation forestry.

- **Department of Conservation (DOC)**
  DOC is charged with conserving the natural and historical heritage of New Zealand. There are various pieces of legislation that establish the principles for managing land, including the Conservation Act, National Parks Act, Wildlife Act and Reserves Act. DOC's core functions include managing and preserving natural and historical resources while advocating and promoting conservation. DOC manages, for conservation, approximately 5 million hectares of indigenous forest (78 per cent of all indigenous forests in New Zealand) and limited areas of exotic plantation forest.

- **Ministry for the Environment**
  The Ministry for the Environment is the Government's principal adviser on the environment and on international matters that affect the environment. The Ministry provides national direction on the environment through standards, policy statements and strategies.

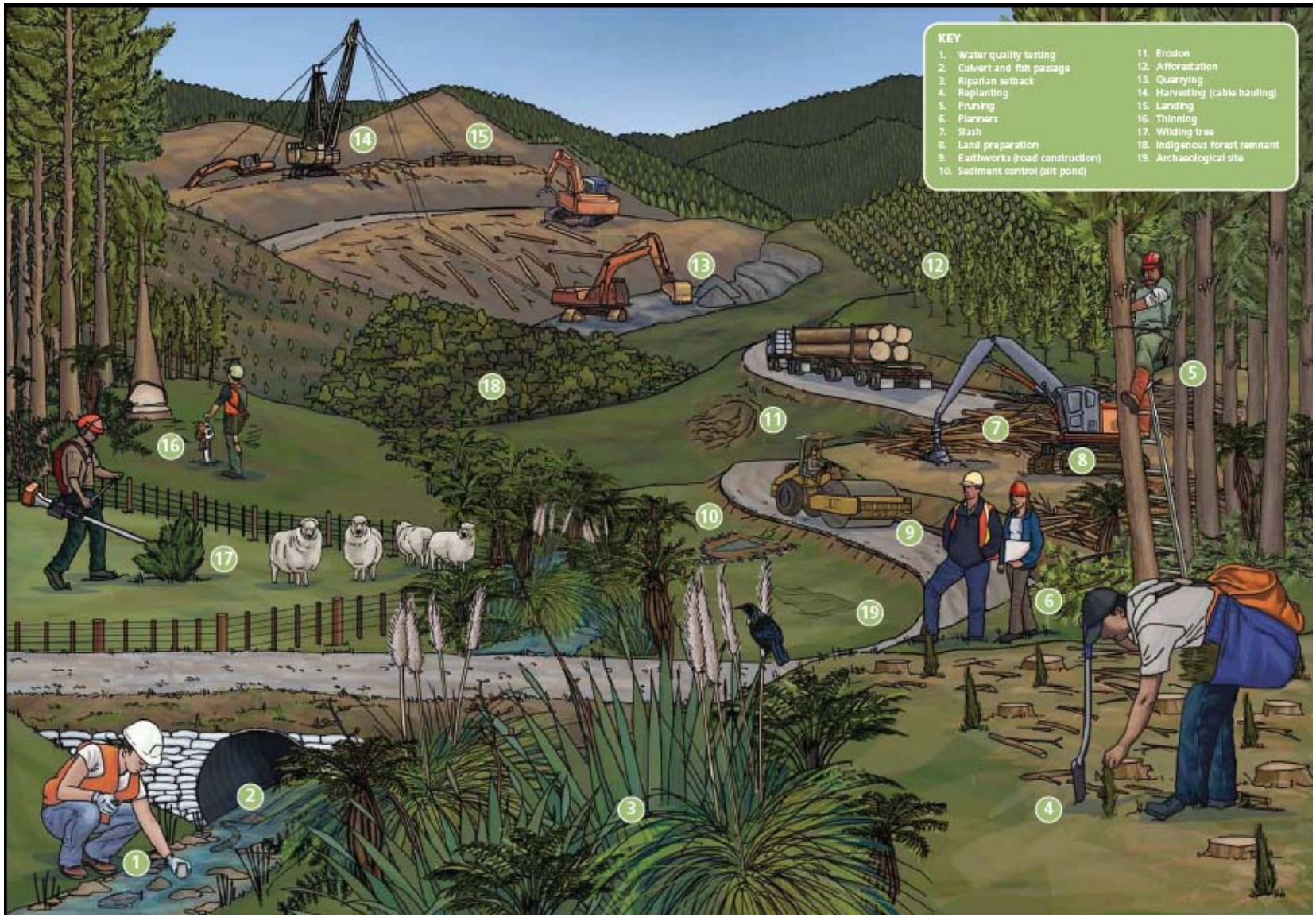
- **Ministry of Agriculture and Forestry (MAF)**
  MAF is the Government's primary adviser on the economic and environmental performance of the forestry sector. MAF also leads New Zealand's biosecurity system and has lead roles in international forestry matters.

- **Ministry of Economic Development (MED)**
  MED's role is to foster economic development and prosperity, which includes helping New Zealand firms use environmental integrity for economic benefit.

1.7 Plantation forestry activities and associated effects

The typical plantation forestry cycle has a lengthy timeframe, covering 25–50 years from planting to harvesting depending on tree species, climate and soil. During this period some plantation forestry activities (as illustrated in figure 2) require careful management due to their intensive nature and the potential sensitivity of the environments in which they are carried out.

Figure 2: Plantation forestry activities and effects



Following is a brief description of the main plantation forestry activities.

1.7.1 Land preparation, including mechanical land preparation

Land preparation is usually carried out prior to afforestation or replanting (generally after harvesting). Mechanical land preparation addresses site factors such as poor drainage, frost sensitivity, weed competition, heavy slash deposits, and compacted or naturally dense soil. Failure to prepare the land may lead to limited tree growth or crop mortality.

There are several types of mechanical land preparation, including:

- mechanical cultivation (ripping and/or mounding) and spot cultivation to improve the physical condition of the soil
- mechanical raking, mulching, windrowing and blading, to clear residual slash and create planting sites
- roller crushing of weeds or woody debris to prepare sites for planting.

Some land preparation activities may use heavy machinery, which, if not operated correctly, can cause adverse environmental effects. These effects may include soil erosion, and impacts on habitats, natural character, cultural sites and water quality due to sediment run-off to water bodies.

As observed in the Brown and Pemberton plan reviews (2010a, 2010b), land preparation is generally currently managed through regional plan permitted activity rules with associated conditions, including slope thresholds and setback distances. It also falls within general rules for soil disturbance, or as a district plan permitted activity as part of plantation forestry activities.

1.7.2 Afforestation and replanting

Afforestation includes all new forest planting activities, while replanting covers the planting of sites following harvesting of a previous crop. Planting is usually done manually, although where site conditions permit (low gradient, level terrain), mechanical tree planters may be used.

Establishing plantation forests can have many environmental benefits. Prior to harvest, forests can help mitigate the effects of climate change (further described in section 2.1.2), and can also have localised benefits including:

- the maintenance of water quality through providing shade, riparian cover and lower nutrient regimes than other productive land uses
- amelioration of peak flood flows during high rainfall events
- control of sedimentation in water bodies
- control of soil erosion: about 10 per cent of New Zealand is classed as severely erodible land and conversion of erodible pasture land to plantation forestry is an effective method for controlling erosion (Ministry for the Environment, 2007).

Case study: Afforestation of erodible land in the East Cape

New Zealand has a large amount of land at risk from accelerated erosion. In particular, the East Cape region has some of the most erodible land in the world (Hammond, 1995). Severe erosion in the region – including large-scale gully erosion, earth-flow erosion and deep-seated slumps – causes long-term damage to the productivity of rural land and lowers water quality from heavy sedimentation (MAF, nd).

Afforestation is one method used to prevent accelerated erosion. It is effective because it reduces soil water levels and binds the soil together with roots (Hammond, 1995). Overall, water run-off is reduced and erosion is slowed.

The East Coast Forestry Project is an afforestation scheme which aims to encourage sustainable land management on severely eroding lands in the Gisborne District by encouraging the establishment of planted forests as well as the retention of indigenous forest. So far 33,000 hectares have been established in erosion control treatments, and a further 5000 hectares have been approved for establishment over the next few years (MAF, nd).

In addition, plantation forests can provide important recreational values for outdoor pursuits, including mountain and trail biking, walking and hunting.

Some of the possible detrimental effects of afforestation and replanting are:

- wilding tree spread (see section 1.7.8)
- water yield – changes in land use in a catchment from pasture to forestry can alter the amount of water available instream. For example, an analysis of paired catchments showed that annual stream flow yield from pine-forested catchment and native forest was 63 per cent and 73 per cent of that from pasture (Rowe et al, 2002). Afforestation by radiata pine has also been shown to increase the number of zero-flow days in regions where streams are ephemeral, increase the number of times the flow is below a given low flow threshold, and decrease the minimum seven-day low flow (Rowe et al, 2002).

Generally, afforestation and replanting are permitted activities within the main rural zone in district plans, subject to setbacks or shading controls. Regional plans tend to have more controls over afforestation and replanting, including setback distances from water bodies and replanting requirements following harvesting (Brown & Pemberton Planning Group, 2010a, 2010b).

1.7.3 Pruning and thinning to waste

Pruning and thinning to waste are manual operations done from the ground. Machinery (other than chainsaws and workers' transport) is not usually required.

Whether trees are pruned is determined by what the final felled logs are intended for. About 60 per cent (944,000 hectares) of the New Zealand radiata pine plantation forests is, or is expected to be, pruned to a height of at least 4 metres (MAF, 2009c).

Pruning involves cutting branches from younger trees and is usually carried out in two or three separate operations: at age four to five, at around age six to seven, and (sometimes) at age eight.

Thinning is the cutting down of selected trees in the forest to reduce competition for sunlight, water and soil nutrients, allowing the remaining trees to grow more quickly to maturity. The cut trees are generally left on the ground to break down and return nutrients to the remaining crop. This is often called “thinning to waste”.

Pruning and thinning to waste, if carried out appropriately, can have low environmental effects, limited to minor nuisance issues such as branches dropping onto fences or into water bodies. In order to ensure such activities are carried out with minimal effects, it is necessary to control where pruning materials are deposited. Setbacks from waterways can avoid pruning and thinning debris from entering sensitive environments. Accumulations of branches within water bodies can cause problems, but the size of material means that in most cases it can be easily removed.

Thinning and pruning are generally controlled by territorial authorities and are usually permitted in the general rural zone without specific conditions (Brown & Pemberton Planning Group, 2010a, 2010b).

1.7.4 Harvesting

Harvesting is one of the final steps in the forestry rotation. Harvesting (or logging) usually involves felling trees, extracting them, processing them into logs, and loading the logs onto trucks for delivery to processing plants.

Clear felling is the most common type of harvesting in New Zealand, and involves cutting down the entire stand of trees. Trees are then extracted using methods suited to the topography, forest size, access and potential effects on the environment. Many clear-fell operations take place on steep terrain, where cable hauling is the most common extraction method employed.

Production thinning occurs during a rotation, and is a way of extracting an intermediate crop before final harvesting. The logs from production thinning are much smaller than those from the final crop. Production thinning is usually carried out on easier terrain and utilises ground-based extraction methods (NZFOA, 2007).

The challenges that can be posed by harvesting in difficult terrain can lead to adverse environmental effects if not managed properly. However, unavoidable impacts can be mitigated by best operational practices. Potential adverse environmental effects include:

- indigenous vegetation disturbance (see section 1.7.9)
- slash (woody debris from harvesting operations) (see section 1.7.10)
- soil erosion and sedimentation – poor practice at the time of logging can have a temporary but substantial impact on water quality (Hammond, 1995)
- riparian disturbance (see section 1.7.11).

Harvesting is one of the forestry activities that is currently subject to large variability of rules due to efforts to control the effects outlined above. The Brown & Pemberton Planning Group plan reviews (2010a, 2010b) established that both district and regional plans have rules for harvesting.

In the district plans reviewed, harvesting is generally a permitted activity subject to district-specific conditions, although more restrictive conditions or a different activity status apply in more sensitive areas (eg, riparian margins).

Likewise, harvesting is generally a permitted activity in regional plans, subject to region-specific conditions. More restrictive conditions, or a different activity status, apply for special and/or sensitive environments, such as land susceptible to erosion or specific catchments areas. Rules for slash management are usually part of wider soil disturbance or harvesting conditions (eg, no slash shall enter waterways). In addition, harvesting activities within riparian zones may be subject to both vegetation clearance/harvesting and soil/land disturbance rules in both regional and district plans.

1.7.5 Earthworks

Earthworks activities have the potential to cause significant adverse environmental effects. Earthworks for plantation forestry include the construction and maintenance of access roads, processing areas, landings, tracks, firebreaks and river crossings.

Earthworks usually have significant controls in plans because they can affect soil stability and water quality, and can disturb areas of cultural and environmental significance. Forests are often located on hilly terrain, so earthworks can present operational challenges and may cause adverse environmental effects if not managed properly (NZFOA, 2007).

Road construction and use have the potential to cause the most adverse effects on the environment because they are the greatest source of sediment to water bodies (Maclaren, 1996). Sedimentation can be minimised by practices such as benching roads, sediment traps and revegetation (eg, hydroseeding).

Both regional and district plans have provisions for earthworks and there is considerable variability between rules and conditions. The Brown & Pemberton Planning Group plan reviews (2010a, 2010b) established that generally 'main rural zone' earthworks are permitted in district plans, albeit subject to a range of conditions including land restoration, and maximum area/volume/depth. The threshold for conditions varies significantly. Earthworks in special areas such as land susceptible to erosion or significant natural areas are subject to more restrictive conditions and/or activity status. Regional plans apply a similar approach, usually permitting earthworks in general rural zones subject to varied conditions (eg, setback, volume, sediment controls), but applying more restrictive controls in special areas.

1.7.6 River crossings

River crossings are often essential to enable access for harvesting operations. They comprise both permanent and temporary structures that cross rivers and include bridges, culverts, fords, battery culverts, drift decks and log crossings (NZFOA, 2007).

River crossings can cause the following effects:

- sedimentation of the river during construction
- restriction or prevention of fish passage if not constructed properly
- the activation or acceleration of bed erosion by concentrating flows or velocities
- accumulation of debris around culvert openings and bridge abutments which can result in flooding (NZFOA, 2007).

The control of river crossings is largely managed by regional councils, whereas land-based components of river crossings are sometimes controlled at a district level. River crossings are

generally permitted, subject to conditions determined by factors such as the type of crossing, flood hazard, fish passage, size and length. The conditions and thresholds between plans vary, and if not met a resource consent is required. Some regions apply more restrictive controls in significant or outstanding landscapes (Brown & Pemberton Planning Group, 2010a, 2010b).

1.7.7 Quarrying

Quarrying refers to the extraction of rock, sand or gravel for the formation of forest roads, and especially those roads needed for transporting logs. Many large forests have dedicated quarries within the forest that may have been in use over numerous rotations. In smaller first-rotation forests, metal may be extracted from suitable sources encountered during road construction, resulting in numerous small extraction sites (referred to as borrow pits).

Quarrying can have similar effects as earthworks activities in relation to soil/slope stability, water quality, landscape, and effects on cultural sites. In addition, there may be noise, vibration, dust and vehicle issues associated with quarrying.

Territorial authorities and regional councils generally control quarrying activities via a resource consent. Some councils permit quarrying up to a maximum volume of earthworks. Regional councils also require a resource consent for large-scale quarrying for plantation forestry purposes (Brown & Pemberton Planning Group, 2010a, 2010b).

1.7.8 Wilding trees

An issue associated with plantation forestry can be natural regeneration or seedling spread from the planted trees occurring in areas not intended for forest production, including indigenous habitats such as tussock grasslands. This is called wilding tree spread, and can be a particular problem in some regions of New Zealand, including the eastern South Island, Central North Island and Coromandel Peninsula. Wilding trees can influence:

- landscape values
- conservation and biodiversity values
- existing land uses
- future land-use options
- catchment hydrology.

Clearing of wilding trees may also be a financial burden for private land owners, local authorities and central government.

The control of wilding trees is usually managed by territorial authorities, which have rules including restrictions on species and the location of afforestation. Regional councils may also deal with wilding pines via regional pest management strategies.

1.7.9 Indigenous vegetation disturbance

Indigenous vegetation disturbance is a component of plantation forestry in terms of:

- disturbance/clearance prior to forests being established (which is now rare, due to regulations and accords)

- vegetation that emerges as understory growth within plantation forests and is disturbed when the forest is harvested
- indigenous forest adjacent to plantation forest
- remnants of indigenous forest within plantation forests that may be disturbed during an forestry activity.

District plans generally protect indigenous vegetation but many provide exemptions; for instance, clearance of vegetation that has grown up on access ways or within the understorey of plantation forests.

The indigenous biodiversity of plantation forests in New Zealand

The importance of some plantation forests as habitat for indigenous biodiversity in New Zealand is now well documented (Seaton et al, 2009). A diverse range of species, including rare and threatened species, have been recorded in the native undergrowth of pines or other exotic plantation tree species (Pawson, 2005; Brockerhoff et al, 2008). The number and type of indigenous species are dependent on plantation age, proximity to indigenous remnants, pruning and thinning history, and a variety of site factors (eg, slope and aspect) (Norton, 1998). Plantation forests have been found to be beneficial for providing habitats, connections/corridors between indigenous forests, and buffers from adjacent non-forested land uses (Pawson, 2005; Brockerhoff et al, 2008).

There are a number of methods used to protect biodiversity within plantation forests. The Wildlife Act 1953 gives legal protection status to native wildlife, but there are also a number of voluntary measures for protection. The Forest Accord, signed in 1991, ensures signatories only establish new forests on non-indigenous forest land but also has provisions for protecting habitats within forests, including remnants and riparian vegetation (Pawson et al, 2010).

Forestry managers are increasingly working to protect rare species within their forests, aided by a number of initiatives led by various organisations, primarily driven by independent certification of sustainable forest management practices. These initiatives include the New Zealand Forest Owners Association's online threatened species guide, and the publication of *Forestry Management Guidelines for North Island Brown Kiwi in Exotic Plantation Forests*, led by BNZ Save the Kiwi, the Department of Conservation and Environment Bay of Plenty.

Following is a summary of some of the biodiversity in New Zealand plantation forests.

Birds

Some of New Zealand's threatened bird species find favourable habitats in plantation forests and may utilise plantation stands on a full-time basis, although such instances are limited (Norton, 1998). These species include kiwi, and karearea (falcon) (Kleinpaste, 1990). Other threatened species often utilise plantation forests to supplement food supplies but remain reliant on adjacent natural forest; for example, kaka, kea, kakariki, kokako and kereru (Innes et al, 1991; NZFOA, nd).

Frogs

The good shelter and high water quality in gullies in plantation forest are ideal habitat for Hochstetter's frogs. Monitoring in Carter Holt Harvey forests has shown that some frogs survive both wind throw and harvesting, and they have been found in regenerating stands after harvesting (Brockerhoff et al, 2005).

Bats

There are records of long-tailed bat colonies in plantation forests (Pawson et al, 2010).

Invertebrates

The critically endangered ground beetle *Holcaspis brevicula* has only ever been recorded from a pine forest at Eyrewell (Canterbury), and not from smaller remnants of nearby kanuka forest. Plantation forests can therefore act as a refuge for indigenous beetle species, especially where indigenous forest is rare (Berndt et al, nd).

Plants

The native wood rose (*Dactylanthus taylorii*) grows in a pine forest in north Taranaki. Iwitahi Orchid Reserve, a few-hectare stand of old-growth *Pinus nigra* in the Kaingaroa Forest, supports 36 species of native orchid, including the only known North Island population of *Chiloglottis valida*. A Larch, Corsican and Austrian pine forest near Hanmer Springs is also rich in native orchids.

A total of 202 native (and 70 introduced) plant species were found in 60 small study plots in Rotoehu and Kaingaroa Forests (near Rotorua), Hochstetter Forest (on the West Coast) and Eyrewell Forest (in Canterbury). Another study found 65 indigenous plant species in six plots in the Puruki catchment in the central North Island, seven years after clearfelling a stand originally planted into pasture. Plantations as young as six years may have healthy fern populations, often with levels of diversity similar to adjacent native forest. Tree ferns with densities of up to 2500 per hectare have been found in mature central North Island pine plantations. Although these levels of indigenous species richness are not as high as in native forest, which boasts epiphytes and longer-lived climax species, it is much higher than in pasture, where native plants are normally found at very low levels, if at all.

Plantation forests have been established in areas where threatened plants previously existed. Some threatened species occur in indigenous remnants in plantation forests, such as kaka beak (*Clianthus maximus*). Some threatened plant species have survived in plantations, such as *Pittosporum turneri*, *Melicytus flexuosus*, *Carmichaelia kirkii*, and *Hypolepis dicksonioides*. Pine plantations have also created habitat suitable for threatened plant species, such as the orchids (*Caladenia atradenia* and *Calochilus robertsonii)*, and the wood rose (*Dactylanthus taylorii*) (Ecroyd, nd).

In general, however, exotic plant species dominate in younger stands in plantations, and indigenous species in older stands. The indigenous flora of plantations comprises mainly indigenous forest-floor and shrub species, which can reach a composition and abundance in older plantations comparable to indigenous forest (Norton, 1998).

Water bodies

Streams and rivers running through plantation forests provide habitats for many native fish. Trees can improve bank stability, help to absorb nutrients from run-off before they reach the stream, and provide shade that controls stream temperature and the growth of nuisance plants. Several endangered species, such as giant kokopu and short-jawed kokopu, have been found in streams running through plantation forests. Mature forests can enhance stream indigenous biodiversity compared with other land uses, and mid-rotation pine forest can have similar stream habitat and biodiversity as indigenous forest.

1.7.10 Slash

Slash is the woody debris, such as branches and uprooted stumps, from harvesting and thinning operations. Slash needs to be managed particularly on cutovers and in areas adjacent to waterways. Collapsed slash accumulations can trigger mass movement of soil and debris, causing significant damage (NZFOA, 2007). Slash entering water bodies can have detrimental effects on water flow, water quality, aquatic life, property and infrastructure.

Slash can also be beneficial for returning nutrients to soil and for providing a surface cover that reduces erosion and sediment damage. Research has also shown that some slash left in water bodies can be beneficial to aquatic habitats by providing cover and shade, and regulating water temperature (NZFOA, 2007).

Slash is currently generally managed by regional councils, allowing it as a permitted activity subject to conditions. Conditions include the requirement that no slash enter waterways, or setting a maximum size limit for slash in waterways.

1.7.11 Riparian disturbance

Riparian areas are zones connected with, or immediately adjacent to, the banks of a water body (stream, river, lake or wetland). Riparian areas can form an important buffer, which can mitigate the effects of plantation forestry activities on water bodies.

Environmental effects, such as sedimentation from the disturbance of vegetation and soil in the riparian area (from plantation forestry activities) potentially have a negative impact on water quality and habitats. A riparian setback, where no forestry activity can occur, can be an effective method of reducing adverse effects on the water body.

It is also important to control matters such as the refuelling of vehicles, and weed and algae spread eg, dydimo, within riparian areas to avoid effects on water bodies.

Riparian disturbance is controlled by both territorial authorities and regional councils, as noted in the Brown & Pemberton Planning Group plan reviews (2010a, 2010b). Both usually have controls on riparian disturbance regarding earthworks/soil disturbance or vegetation disturbance. The most common condition for permitted activities is a setback requirement, but thresholds vary depending on factors such as water body type.

2 The Problem and the Objective

2.1 What is the problem?

The current management framework for plantation forestry, as outlined in section 1.6, creates a number of issues for the forestry sector.

The overarching issue is inconsistency in regional and district plan rules under the RMA. Inconsistency is resource draining for many in the forestry sector and creates uncertainty for the sector as a whole. In particular it results in:

- re-litigation of the same issues across the country
- inconsistent treatment of forestry operations
- operational inefficiency
- investment uncertainty.

Although some variability between plans is inevitable and justified, due to the varied soils, water bodies, biodiversity and climatic conditions across New Zealand, there are opportunities for reducing inconsistency where effects from particular activities are similar and well understood. An example is where there is inconsistency between plans where the receiving environment is similar (eg, one forest extending over two or more councils areas, but with each council having different rules).

The New Zealand Forest Owners Association (NZFOA), which represents many owners of New Zealand's commercial forests, is seeking a nationally consistent management framework. The NZFOA hope that this will better facilitate the establishment of new plantation forests and ability to undertake forestry activities due to improved certainty about the management framework.

There are particular concerns around the impacts that inconsistency is having on the ability of forestry activities to be undertaken in a timely and cost-effective manner such as to attract investment. As noted in MAF's *A Forestry Sector Study April 2009*, factors that influence investment decisions in forest growing are operational costs, capital costs, the size of margins and the return on capital, and environmental performance requirements and legislation (MAF, 2009a.). The unpredictability of obtaining resource consents under the RMA, and generally higher environmental performance requirements and legislation than in some competing countries, are considered threats to forestry investment (MAF, 2009a).

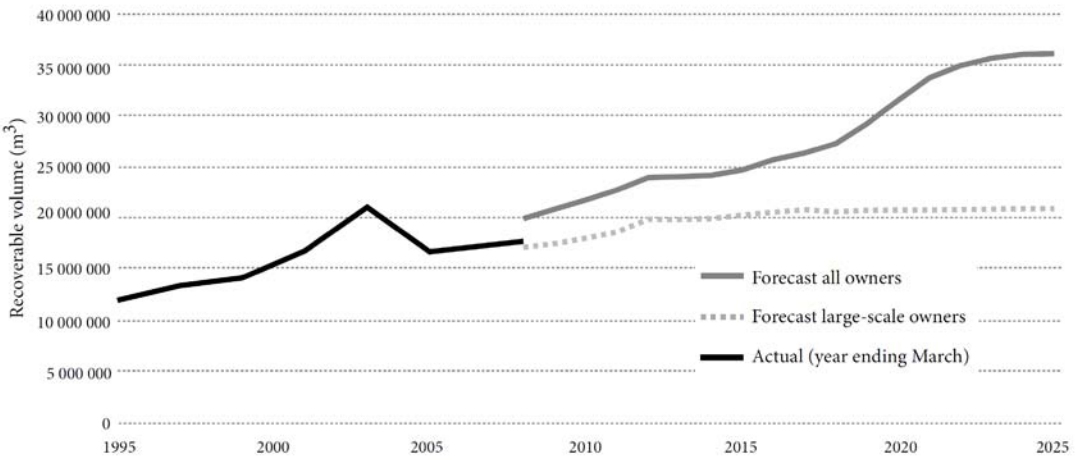
Overall, there is concern that the current regulatory framework is creating a barrier to forestry development and impeding investment in a sector that creates many economic and environmental benefits for the country, including the following.

2.1.1 An important contributor to New Zealand's GDP

Forestry is a significant employer and revenue generator. Timber harvested from plantation forests amounts to around 20 million cubic metres per year (MAF, 2009d). A significant proportion of this is exported as logs and chips (6.6 million cubic metres in 2007/08), but the majority is used in the production of sawn timber, panel products, pulp, paper and paperboard (MAF, 2009d).

Around 6000 people are directly employed in the sector, with a further 14,000 employed in related forestry activities (Statistics NZ, 2009). Forestry contributes approximately $5.1 billion (in 2007/08) to New Zealand's gross domestic product, or 3.8 per cent of the New Zealand total GDP (MAF, 2009d). The contribution of the industry is projected to increase steadily over the next 15 years, with the annual harvest increasing to over 35 million cubic metres in 2025, as illustrated in figure 3 (MAF, 2010c).

Figure 3: Historical harvesting and forecast wood availability (radiata pine only)



Source: MAF, 2010c

In total, plantation forests represent 7 per cent of land cover in New Zealand, covering a total of 1.75 million hectares (MAF, 2009a). Large-scale exotic plantations make up the majority of the area of forestry plantations in New Zealand, although trees in farm wood lots, syndicates and investment blocks also contribute to the total area of plantation forests.

2.1.2 An important player in climate change mitigation

New Zealand has commitments to international climate change agreements, including being a signatory to the Kyoto Protocol. The Protocol is a legally binding agreement, which entered into force on 16 February 2005 and has been ratified by 184 parties (UNFCCC, nd). Under the Protocol, developed countries are committed to reducing greenhouse gas emissions (MAF, 2010a).

New Zealand's target is to reduce its greenhouse gas emissions to the level they were in 1990, or take responsibility for excess emissions. The forest estate included in the New Zealand Emissions Trading Scheme (NZ ETS) will create a carbon reservoir, helping New Zealand to meet its obligations under the Kyoto Protocol. This will be supported by new planting initiatives and harvesting strategies. New Zealand's forests therefore play an important role in meeting this target (MAF, 2010a).

The international Kyoto Protocol rules provide credits for the growth of forests planted after 31 December 1989. New Zealand is likely to meet its obligations in part because of the approximately 600,000 hectares of forests planted in the 1990s (MAF, 2010a). However, emissions resulting from the subsequent harvest of these forests may mean that meeting the agreed targets could be problematic in the future (Ministry for the Environment, 2009).

Post-1989 forest owners who have chosen to be participants in the NZ ETS are entitled to credits for the carbon stored in their trees as they grow, but are also liable for any decrease in the carbon stored in the forests as a result of fire or harvesting. Owners of pre-1990 forest land will incur liabilities if the land is deforested.

The amount of carbon stored in a forest varies depending on the age, the species and the site. An average radiata pine forest absorbs approximately 800 tonnes of carbon dioxide equivalent per hectare over 30 years, equivalent to approximately 2.5 tonnes per tree (MAF, 2010b).

Refer to Appendix 2 for further information on the NZ ETS.

2.1.3 Delivering environmental benefits

Plantation forestry can deliver environmental benefits such as the stabilisation of slopes susceptible to erosion. The key benefits are described in section 1.7.

2.2 Analysis of the problem: inconsistency

2.2.1 Re-litigation of the same issues across the country

Consultation and participation in the RMA process are critical, but are viewed as costly and time consuming by the forestry sector (MAF, 2009a). Forestry companies spend considerable amounts of staff and consultant time, and incur substantial legal costs, submitting on plan development processes, including plan changes or variations. This is particularly onerous for forestry companies that have forestry operations spanning different regions or districts. In these cases they need to get involved in multiple plan processes and any subsequent litigation.

Assuming a typical submission process costs $10,000, submissions on five plan changes a year over a 20-year period (which is less than the typical life of a crop) generates costs in the order of $500,000 (Covec, 2010). Forestry companies report that the same topics are re-litigated over and over again in different parts of the country. The costs of a typical dispute are around $10,000–$20,000, although some costs can be substantially higher (Covec, 2010). Some in the forestry sector consider this to be a poor use of resources (both for forestry companies and for councils).

The 2009 amendments to the RMA simplified many processes under the RMA, in particular plan-making and resource consent processes. These changes focused on improving the speed and reducing the costs of these processes. The amendments are likely to reduce some of the costs and the time involved in these processes, but are unlikely to specifically align the content of plans as they relate to plantation forestry.

Example: Re-litigation

According to the forestry sector, issues that have been re-litigated in almost every district plan include afforestation and replanting setbacks, noise provisions, the zoning of existing forests in outstanding landscapes and subsequent regulatory effects, quarrying rules, and (in some districts) the status of plantation forestry and the impacts of rules governing indigenous vegetation disturbance.

With regional plans, the key issues litigated typically involve provisions controlling earthworks, harvesting, riparian zones and river crossings.

Definitions of plantation forestry and associated activities, and duplication of historic heritage functions, have also been repeatedly addressed at both the regional and district plan level. This is accentuated by the fact that some companies span different districts and regions, as follows:

Forest manager	Regions	Unitary authorities	Local authorities
Timberlands	3	0	5
Hancock Forest Management New Zealand Ltd	6	2	16
Matariki (Rayonier)	9	1	15
PF Olsen's Ltd	12	3	41

Source: Hancock Forest Management (NZ) Ltd

2.2.2 Inconsistent treatment of forestry operations

There are three components here.

Cross-boundary issues

The forestry sector has experienced cases where similar (or the same) proposals are treated inconsistently by different councils in terms of the activity status they are afforded (ie, whether consent is needed). This is particularly an issue where forests are located across district or regional boundaries (eg, the same forestry operation can be 'permitted' under one district plan and 'restricted discretionary' overall in an adjacent district). Presently, local authorities are required to manage cross-boundary issues themselves, through applying techniques such as having similar provisions in plans or having joint administration arrangements.

Example: Cross-boundary issues

Kinleith forest is one of New Zealand's largest and oldest production forests, with the first stands planted in the early 1920s, and now covers 92,000 hectares. Forest harvesting is in either second or third rotation areas, with some fourth rotation currently being planted. Kinleith forest is managed as one management unit and has relatively contiguous soil types, climatic conditions and social environments, but it covers two regions (Waikato and Bay of Plenty) and three districts (South Waikato, Taupo and Rotorua). As a result, the forest manager must understand and comply with five different sets of rules governing the same forest management practices.

The following are some examples supplied by the forestry sector of the difference in rule approaches for the different parts of the forest.

- Harvesting is a permitted activity in both Waikato and Bay of Plenty regions on the topography encountered, but is subject to different permitted activity conditions.
- Earthworks are permitted activities in the Waikato region, with the exception of "high risk erosion areas" (riparian zones and slopes over 25 degrees). In the Bay of Plenty region the status of earthworks varies from permitted to discretionary based on a slope, area and volume criteria. Again, where permitted, the permitted activity conditions vary.
- Environment Bay of Plenty provides the opportunity to become an "Accredited Operator", in which case harvesting and earthworks operations are permitted. Environment Waikato does not offer this option.
- Smaller stream crossings are permitted in both the Waikato and Bay of Plenty regions, but the criteria are different – based on catchment size in the Waikato region (up to 100 ha) and on design culvert size in the Bay of Plenty region (up to 1200 mm diameter when designed to pass a 1-in-20-year return period storm event). Both have permitted activity conditions, and again these are different.
- Quarrying requires a consent in the South Waikato and Rotorua districts regardless of the volume of material extracted, the effects or location. The Taupo District Plan has no specific rules relating to quarrying, but the activity is required to meet other general effects rules relating to noise, dust, etc.
- The approach to the management of activities such as impacts on indigenous vegetation and significant natural landscapes is different in each district and region.

To add to this complexity, the district and regional boundaries do not correlate, and some of the district boundaries cut across catchments and do not follow any topographical or road boundary. This makes it difficult to know the location of the district boundary on the ground without a GPS unit.

Source: Hancock Forest Management (NZ) Ltd.

Duplication of function

In the development of district and regional plans there has been some blurring of territorial authority and regional council functions (under section 9 of the RMA), which has led to the duplication of functions. While there are mechanisms in place to address duplication, such as the use of regional policy statements to clearly set out roles, such arrangements can still lead to delays and confusion.

Example: Duplication of function

Where district plans seek to place controls on activities that are also covered under regional plans, the inevitable result is a duplication of effort concerning the same activities and effects. Typically this occurs where district councils seek to control earthworks or harvesting activities, which are almost always covered under regional plans.

As an example, the Matamata Piako District Plan contains rules that control harvesting in some rural zones. The Regional Council, Environment Waikato, also has rules covering harvesting activity. As a result, the harvesting of the Te Aroha forests located on the foothills of the Kaimai Range, requires three separate resource consents:

- an earthworks consent from Environment Waikato
- a harvesting consent from Environment Waikato
- a harvesting consent from Matamata Piako District Council.

Source: Hancock Forest Management (NZ) Ltd

Inconsistent regulation of land uses

The forestry sector has concerns about resource consents being required for forestry activities and not for other production land uses (such as agriculture), when the effects from forestry are similar or less than those from other lands uses (see the comparative land-use study in the box below). Higher regulatory hurdles and higher monitoring costs imposed on forestry activities affect the forestry sector's ability to bid for hill country pastoral land.

Case study: Pakuratahi Land Use Study

A comparative land-use study (the Pakuratahi Land Use Study, by Eyles and Fahey, 2006) collected information for 12 years from two adjacent catchments: one in radiata pine plantation forest and the other in pasture (MAF, 2009d).

Following are some of the key findings from the study.

- In the pre-harvest period, annual water yields from the plantation forest catchment were 6 per cent lower than the pastoral catchment.
- Over two years post-harvesting, annual water yields were on average 22 per cent greater in the forested catchment than the pastoral catchment.
- Seven years after harvesting, the difference in the annual water yields had declined to 5 per cent.
- The pasture catchment yielded three to four times more suspended sediment than the mature plantation forest catchment over the 12-year period.
- During tree harvesting, sediment yields increased two to three times above those from the pasture catchment.
- With oversowing and rapid replanting, sediment yields returned to pre-harvest levels within two to three years.
- Streams draining pasture and mature forest had similar levels of turbidity, nitrate-nitrogen, total phosphorus and dissolved phosphorus.
- Tree harvesting did not cause any statistically significant increase in the concentration of any of the parameters mentioned above.
- Immediately after harvesting, stream invertebrate communities changed to being dominated by more impact-tolerant taxa.

(MAF, 2009d).

Although there is inconsistency in the forestry sector rules between districts and regions, the industry has observed that many of the conditions attached to resource consents are generic, and that similar conditions are repeatedly being applied to forestry operations throughout a region. This indicates that resource consent conditions are not necessarily being tailored on a case-by-case basis. This raises the question of how much additional value is being gained by companies going through a separate consenting process when the final conditions are often similar.

The typical cost of internal staff time and other expenses incurred in preparing a resource consent application is around $5,000, but may range up to $20,000 per application. Also, a typical application fee levied by councils may be in the vicinity of $1,500 for simple applications, but can be significantly higher for more complex applications (eg, $10,000) (Covec, 2010). In light of this, there is an argument for some of the requirements set out in resource consents to be reflected in appropriate rules (and terms and conditions) within plans instead. Such a move would need to take into account logistics such as the ability of councils to monitor forestry operations.

Example: Repetition of consent conditions

Hancock Forest Management currently holds 15 separate resource consents for earthworks and winter ground-based harvesting in one region. Despite each being individually considered through a separate consenting process, there is no material difference in the conditions of these consents beyond minor variations to the wording of individual conditions.

All 15 consents have identical, or very similarly worded, conditions that cover:

- providing the council with an annual plan
- providing notification of earthworks commencement
- complying with consent application and Northland Regional Council Soil and Water Section 32 standards
- protecting archaeological sites
- refuelling
- harvest tracking in winter
- minimising sediment generation from earthworks
- revegetation of earthworks
- protection of indigenous vegetation and wetland.

Additional conditions covered in some, but not all, consents cover:

- temporary crossings
- slash management
- monitoring requirements
- notification of neighbouring property.

All other conditions were generally worded and not specific to the particular forest.

Source: Hancock Forest Management (NZ) Ltd.

2.2.3 Operational inefficiency

At an operational level, inconsistency generates confusion for on-the-ground crew, who have different rule requirements for the same operation in the different blocks they operate in – or even in different parts of the same forest – when they cross regional or district boundaries. This leads to inefficiencies. Ensuring contractors know the different rules for the same activity involves extra supervision and training. Based on estimates made by the forestry industry, briefing and training regarding applicable rules requires the equivalent of up to three full-time equivalents (FTE), plus overheads across the sector. This is estimated to cost approximately $250,000 per year.

2.2.4 Investment uncertainty

Investment in plantation forestry is capital intensive and occurs over a long period of time. This inherent longevity has implications for investor confidence, and hence forestry investment. On average it takes 25–50 years from planting to harvesting for radiata pine. In some cases, infrastructure installed to facilitate the first rotation (roads, landings and river crossings) are only economically justified based on a second harvest 25–50 years out.

The nature of the current management regime creates uncertainty for the forestry sector. Because district and regional plans are being reviewed on a continual basis throughout forestry rotation periods, there is the potential for inconsistency to cause restrictions or time delays on future harvesting well after the initial investment has been made.

This is relevant to the forestry sector as the timing of harvesting can have a significant impact on returns to forest owners. For instance, it is not uncommon for the price of logs to change by $5 per tonne over the course of a year (ie, 5 per cent or 10 per cent fluctuation). This can alter the return on a 100-hectare forest block, which could generate approximately 50,000 tonnes, by around $250,000 (Covec, 2010). With forestry contributing 3.8 per cent of New Zealand's total GDP, changes in investor attitudes can have substantial implications for the country.

2.3 The importance of retaining local and regional decision-making

Although the problem of inconsistency has been raised by the forestry sector, this issue is not unique to the forestry industry. The nature of the RMA means that decision-making is made closest to the community of interest. That is, if effects generated by an activity are felt only locally, then decisions are most appropriately made locally. This devolved decision-making inevitably generates different rules in different localities.

Given this, some inconsistency is clearly warranted because it reflects specific local or regional differences and, in particular, different receiving environments. This is especially relevant at a regional level, as water-related issues are particularly variable across the country.

The scoping process has highlighted the fact that some local authorities do have concerns about local decision-making being reduced or the management framework becoming too permissive in their area. The dynamic and unique nature of receiving environments means that appropriate levels of controls cannot always be appropriately determined at a national level because effects are variable depending on the location. A failure to retain local and regional council influence in such cases risks not addressing environmental issues properly and removing community input where it is needed.

For this reason, a decision was taken early in the NES scoping process to apply a principle of 'appropriate scope' to any alternatives being considered to address the problem. This recognises that intervention is best suited where effects are well known and can be managed in more than one location. The aim of this principle is to retain local and regional decision-making (in terms of both rule setting and consenting), where effects cannot be appropriately assessed at a national level. As a result, *absolute* consistency is not appropriate as a policy objective, and it is likely that the best option will only partially address consistency issues.

It is also a priority that any alterations to the existing planning framework fit with the way plans currently function, do not significantly change the overall approach to plantation forestry, and make the most effective use of tried and tested 'best practice'. A principle of promoting sustainable management under the RMA is also vital so that an appropriate amount of control over plantation forestry is retained.

2.4 Problem summary

The problem to be addressed is best summed up as follows.

The New Zealand forestry sector currently operates under a planning framework within which different territorial authority and regional councils apply different rules. This has consequences for the forestry sector in terms of investment certainty and operational efficiency, and is a potential barrier for the environmental and economic benefits that plantation forestry generates at a national level.

Questions:

1. **Do you agree with the problem statement? Have the main problems been defined accurately?**
2. **Are there any other issues that have not been considered?**
3. **What is the scale of the problem? Does inconsistency between plans or lack of long-term certainty have more impact?**

2.5 The policy objective

The policy objective of the proposal is to address the problems identified in the preceding section by:

> Bringing about a more *consistent* and *appropriate* plantation forestry management framework, while facilitating the sustainable management of natural and physical resources.

Note that, for the purposes of this objective:

- *consistent* means having a management framework that brings about certainty to the forestry sector for when a resource consent is needed, facilitates efficient forestry operations, and is free from unnecessary variation or contradiction.

- *appropriate* means an approach that:
  - does not significantly tighten or loosen the management of forestry overall (fits with the way plans currently function)
  - recognises and accommodates different receiving environments and local values
  - promotes best practice.

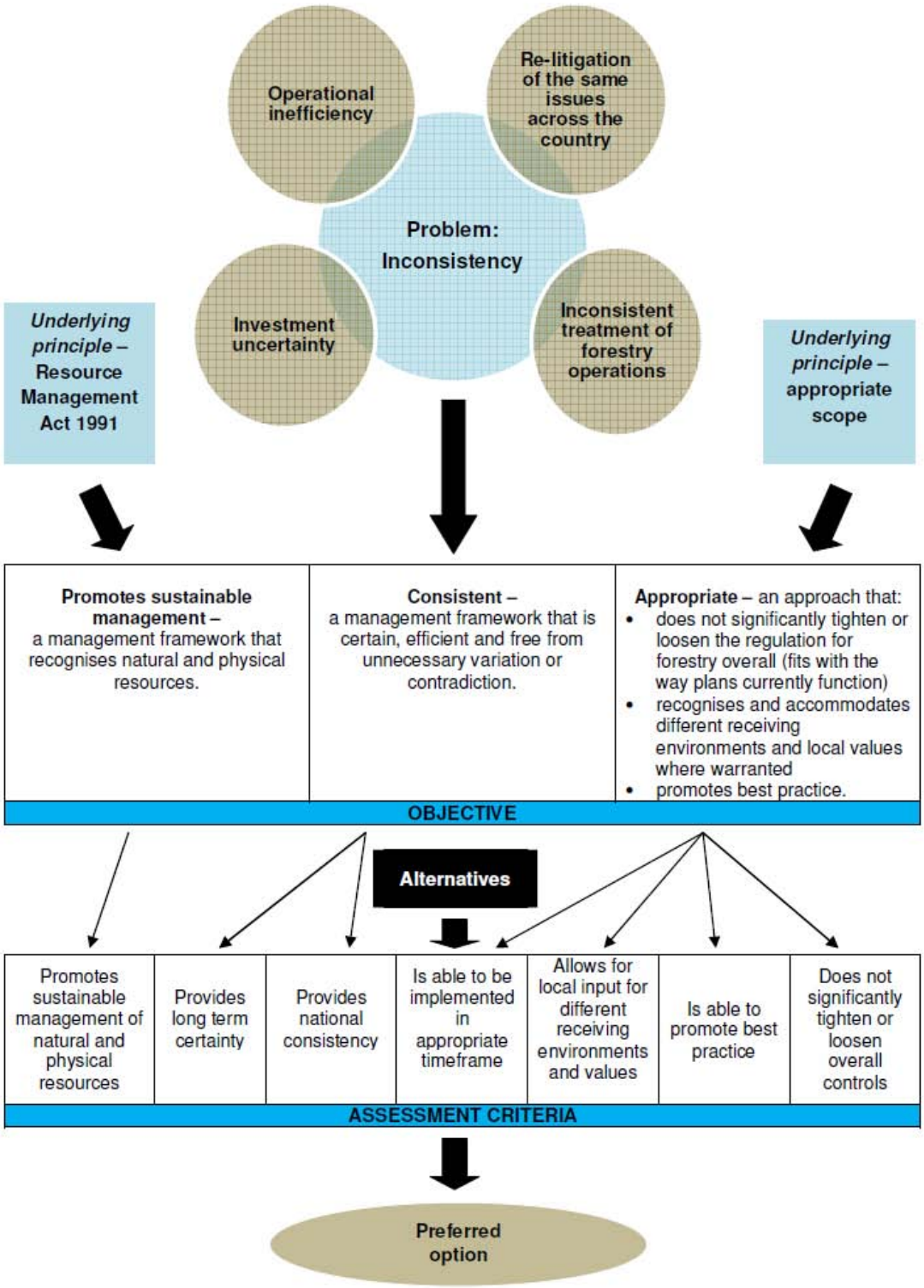
The intention of the policy objective is to retain the overall level of control that district and regional council plans have. In other words, the intention is not to make the framework more permissive or more restrictive, but to bring about consistency where possible. An underlying principle is that effects that occur locally will still be dealt with at a local level. Some effects that have regional, national or international implications may also still be best dealt with by local authorities.

Question:

4. Do you agree with this objective?

This objective was used to generate assessment criteria that alternative options (outlined in section 3) were assessed against. Figure 4 outlines this process.

Figure 4: Process for assessing alternatives against the objective



3 What are the options?

This section looks at a range of regulatory and non-regulatory options and assesses their appropriateness for addressing the problems discussed in section 2, and for achieving the policy objective set out in section 2.5. The options considered are to:

- provide non-regulatory national guidance
- use standards (apart from a national environmental standard) – including industry, Standards New Zealand or international standards – or accredited operators
- encourage memorandums of understanding
- direct plan changes under the RMA
- develop a national policy statement under the RMA
- develop a national environmental standard under the RMA.

3.1 Status quo

To understand the extent of inconsistency in plans and analyse the problem, the Ministry commissioned an independent consultant to review provisions in regional and district plans for plantation forestry.

3.1.1 District plans

The review of 23 district plans concluded that "while almost all plans provide for plantation forestry, there is significant variability in permitted activity conditions and the way in which district councils control associated forestry activities" (Brown & Pemberton Planning Group, 2010b). This variability has a significant impact on how plantation forestry is being regulated overall. For instance, the nature (eg, the stringency) of terms and conditions is pivotal in determining whether an activity qualifies as a permitted activity or requires resource consent.

The report also found that there is variability in the way "associated forestry activities" such as earthworks, indigenous vegetation removal, mechanical land preparation and wilding tree controls are dealt with across local and regional plans.

These activities are intrinsically linked with the plantation forestry cycle and therefore influence the land use overall.

3.1.2 Regional plans

A review of all regional plans found that there is a wide range of controls on plantation forestry depending on the council and the type of environment the activity is located in (Brown & Pemberton Planning Group, 2010a). Although regional councils generally seem to be controlling the same activities, there is variation in the details of these controls.

The status quo has drawbacks in terms of the inconsistency it generates, but it also has some benefits (see section 2.3).

3.2 A non-regulatory national guideline approach

Guidelines are one mechanism used by local and central government to guide and support the forestry sector and local government. They may be developed in collaboration with or independently of the sector. Many local authorities have developed guidelines for carrying out land-use activities in environments specific to their region/district. Current examples are given in table 1.

Table 1: Examples of guidelines for land-use activities

Local government	Guidance document
Auckland Regional Council	*Forestry Operations in the Auckland Region: A Guide to Erosion and Sediment Control*
Environment Bay of Plenty	*Erosion and Sediment Control Guidelines for Forestry Operations*
Environment Waikato	*Design Guidelines for Earthworks, Tracking and Crossings: A Practitioner's Technical Guide to Minor Effects Based Activities*
	Erosion and Sediment Control: Guidelines for Soil Disturbing Activities
	Erosion and Sediment Control Plan Preparation Guidelines
Greater Wellington Regional Council	*Erosion and Sediment Control Guidelines for the Wellington Region*
Central government	
Department of Conservation	*Fish Passage at Culverts: A Review with Possible Solutions for New Zealand Indigenous Species*
	Caring for Archaeological Sites: Practical Guidelines for Protecting and Managing Archaeological Sites in New Zealand
Ministry for the Environment	*Quality Planning website best-practice guidance, including:* • *earthworks* • *indigenous biodiversity* • *quarrying.*

Currently there is no overarching national guideline for local authorities on plantation forestry activities. However, the consolidation of existing guidelines could improve the management of plantation forestry activities.

Case study: Forest Practices Code 2000 (Tasmania)

In Tasmania, plantation forestry is regulated under the Forest Practices Act 1985, through the provision of a Forest Practices Code, which prescribes the manner in which forest practices are to be conducted (Forest Practices Board, 2000). The Code provides a set of practice guidelines for the protection of environmental values (including soils, water quality and cultural heritage) during forestry operations.

The policies and practices within the Code have been developed as a result of ongoing research and practical experience by land owners, contractors and the forestry sector. The Code is regularly reviewed, and revised versions incorporate research, field experience and public submissions (Forest Practices Board, 2000).

The Code covers all stages of forestry operation, from planning through to harvest, with additional guidelines for conservation of natural and cultural values, and the management of fuel, oils, rubbish and emissions. Illustrations and methodologies assist forestry manager and operators with implementation.

A possible approach for a non-regulatory national plantation forestry guideline is outlined in Appendix 3. A national guideline is easily updatable and would help improve practice by:

- providing a one-stop technical reference for environmental management and best-practice examples
- increasing national consistency in how plantation forestry activities are undertaken in differing receiving environments
- retaining local knowledge and input into plan rules.

Although credible guidelines are generally followed among local government and the forestry sector, their non-statutory status ultimately limits their ability to achieve the objective of a consistent and appropriate approach because:

- guidelines are voluntary and councils are not required to implement them
- councils may vary from this approach and choose to adopt alternatives
- the transition to a guideline approach may be lengthy; for example, because of the planning cycle there may be a lengthy transition time between the publishing and uptake of the guidance
- it is difficult to prepare best-practice examples that apply across all the varied environments in New Zealand.

For the above reasons this approach is not considered the most appropriate way to achieve the objective.

3.3 Other standards (apart from an NES)

Standards are agreed specifications for products, processes, services or performance.

Standards are formally developed to provide a means of compliance and a solution to dealing with issues or problems in an industry. There are several types of standards available.

3.3.1 Industry standards

A national industry standard for plantation forestry is already available and is being promoted by the industry. This is the *New Zealand Environmental Code of Practice for Plantation Forestry (ECoP)* developed by the New Zealand Forest Owners Association (NZFOA), which is widely recognised by the New Zealand forestry sector. It incorporates 'best environmental practice' for all key forest operations, such as harvesting and establishment. This is advantageous because it provides a key reference tool for everyone working within the sector and can easily be updated to incorporate new information and approaches.

Several regional plans refer to best management practices. For example, the Greater Wellington Regional Council requires that where ground-based methods are used for vegetation disturbance (land susceptible to erosion), best management practices as described in the *New Zealand Forest Code of Practice (LIRO 1990, revised 1993)* are adopted (Brown & Pemberton Planning Group, 2010b).

In 2009 an NZFOA survey of its members to gauge how many forestry contractors operating on NZFOA members land have access to the ECoP was completed. The results are shown in table 2.

Table 2: Summary of results of NZFOA survey of contractors

	Number of contractors	Have a copy of ECoP Part 1	Copy of appropriate best environmental practices (BEPs)	Copy of appropriate company rules
Forestry contractors	117	53%	36%	42%
Harvesting contractors	223	61%	35%	28%
Roading & earthworks contractors	73	42%	33%	34%
Agrichemical & fertiliser contractors	29	34%	34%	41%
Other contractors	55	2%	5%	67%

Note: ECoP = Environmental Code of Practice

3.3.2 Standards New Zealand standards

The majority of New Zealand's standards are developed by Standards New Zealand in partnership with Standards Australia. They use a robust, transparent development process, including expert input and consultation with stakeholders. The benefit of Standards New Zealand standards is that they are flexible and can be developed in a similar format to a national environmental standard (ie, with a 'number' or a 'method' that is easily translated in the field).

3.3.3 International standards

There are a number of international plantation forestry certification schemes, such as the Forestry Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification Schemes (PEFC), that have standards. Forestry scheme standards provide certification of commercial forest and/or accreditation of forestry operators.

Forestry Stewardship Council (FSC)

The FSC is an independent, non-governmental, not-for-profit organisation established to promote the responsible management of the world's forests (FSC, nd). FSC is one of the most well-recognised forestry schemes, with over 125 million hectares of forest worldwide certified to FSC standards, distributed in over 80 countries (FSC, nd). In New Zealand, FSC certifications already apply to around 55 per cent of New Zealand's planted forest estate, including some indigenous forests (MAF, 2009a).

The *FSC Principles and Criteria* describe how the forests have to be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. The principles and criteria can be summarised as follows:

- prohibit the conversion of forests or any other natural habitat
- respect international workers' rights
- prohibit the use of hazardous chemicals
- respect human rights, with particular attention to indigenous peoples
- no corruption – follow all applicable laws
- identification and appropriate management of areas that need special protection (eg, cultural or sacred sites, habitats of endangered animals or plants) (FSC, nd).

Standards have been developed based on these principles and criteria, including chain of custody and forest management standards, which may, depending on the standard, include rules for environmental and economic management, long-term employment and recreational use (FSC, nd).

A New Zealand Standard for Certification of Plantation Forest Management in New Zealand, in accordance with FSC, is currently being developed (NZFOA, 2010).

3.3.4 Accredited operator standard

Regional councils may have provisions in regional plans for accredited operators and apply plantation forestry rules more leniently if a forestry operator is accredited. Environment Bay of Plenty Regional Council, through its own accreditation scheme, has a specific permitted activity rule (9.2.4 [3]) for forest harvesting and forestry earthworks by accredited forestry operators. This rule specifies threshold limits for forestry earthworks, within which no consent is required (Brown & Pemberton Planning Group, 2010a). A possible approach for a national accredited operator standard is outlined in Appendix 3.

Other standards (apart from a national environmental standard) as outlined above are not considered the most appropriate way to achieve the objective. The status of standards limits their ability to ensure a consistent approach for the following reasons.

- They are voluntary, and local authorities and/or the forestry sector retain discretion about whether to implement them. As indicated in table 2, not all forestry contractors have access to the current environmental code of practice (ECoP) or best environmental practices (BEPS).
- Standards can only have an influence if they are adopted and referenced by local authorities in their RMA planning documents or in resource consent decision-making. It is also a time-consuming process to amend plans to reflect new standards.
- Standards reflecting best practice do not necessarily translate into regulation or plan rules well because they are often too uncertain and unenforceable.
- It is difficult to develop standards that apply to all environments and situations within New Zealand.

In addition:

- standards may be construed as being biased in favour of the forestry sector because they have been developed by the sector (industry standards only)

- the cost of creating standards often falls with the industry or sector involved (industry and Standards New Zealand standards)
- certification would be expensive for small forestry owners (international standards)
- there would need to be an accreditation system, such as a professional body, to support the accredited operator approach.

3.4 Memorandums of understanding (MOU)

An MOU is a written agreement, signed by the parties to it, confirming a relationship and/or understanding being entered into by those parties. Generally, an MOU is not a legally binding document.

In this context, the MOU could be between:

- local authorities and the forestry sector (eg, to agree on approaches); or
- a territorial authority and a regional council (eg, to agree on function matters).

MOUs have the advantage of being flexible to be updated and can evolve over time. However, this approach may not be appropriate for achieving the objective because:

- MOUs must be upheld between the parties, and involve time and cost commitments
- parties may require multiple MOUs, creating additional administration.

3.5 Minister-directed plan changes

Section 25A of the RMA enables the Minister for the Environment to direct a:

> (1) Regional council to prepare a change to its regional plan that addresses a resource management issue relating to its function under section 30.
>
> (2) Territorial council to prepare a change to its district plan that addresses a resource management issue relation to its function under section 31.

This option could be used to address plantation forestry issues in so far as they relate to a regional council's or territorial authority's RMA functions. It would have the advantage of requiring regional councils and territorial authorities to specifically address how they control plantation forestry activities. These plan changes could lead to improvements to how plantation forestry is controlled by councils.

A Minister-directed plan change is not considered the most appropriate option for achieving the objective for the following reasons.

- It would not necessarily ensure appropriate or consistent control. It is likely that the Minister would need to direct all plans to change, and they would still be required to go through the Schedule 1 process.[2] Even if the Minister was very specific about the issues to be addressed, the directions might still be interpreted and drafted differently by each council. In addition, the process of consulting, hearing and addressing appeals might significantly vary what was originally proposed.

[2] Schedule 1, Part 1, of the RMA sets out the requirements relating to preparing and changing policy statements and plans including consultation, notification, disputes resolution, hearings and appeals.

- It is a lengthy process, as all plan changes would be required to go through the Schedule 1 process. This option would also be an expensive and demanding process for stakeholders with a national-level interest in this issue.

3.6 A national policy statement (NPS)

Part 5 of the RMA provides for the Minister for the Environment to issue an NPS "to state objectives and policies on matters of national significance that are relevant to achieving the purpose of this Act". An NPS with specific objectives and policies on plantation forestry has the potential to provide considerable improvements to how plantation forestry activities are addressed by councils.

An NPS may be prepared on any matter where the Minister considers it useful for achieving the purpose of the RMA. The RMA sets out a range of matters the Minister may have regard to when deciding whether it is desirable to prepare an NPS. These matters are broad, and the proposed objective in this discussion document would fit within the broad criteria for an NPS.

A local authority is required to amend a plan, proposed plan, variation, regional policy statement or proposed regional policy statement to give effect to any provisions in a national policy statement that affect the particular planning document. An NPS can include directions that require local authorities to either include specific objectives and policies, or to change their objectives and policies to give effect to the NPS. If the NPS directs this, the local authority must make those changes without using the RMA Schedule 1 process as soon as practicable, or within a time specified, or by the time a specified event occurs. If the NPS does not expressly direct those changes, then the local authority is still required to make any changes to its planning documents to give effect to the NPS within the same time periods, but those changes must go through the RMA Schedule 1 process.

An NPS may, over time, achieve the objective. However, it may not be the most appropriate method because:

- its high-level nature means there is uncertainty in the way councils interpret and incorporate NPS into plans, which may not provide adequate national consistency
- an NPS could impose considerable costs on councils who are required to reflect the NPS in plans
- an NPS is generally a lengthy and complex process (eg, the NPS on Electricity Transmission allows four years for councils to give effect to its provisions in their plans).

3.7 A national environmental standard (NES)

The nature of a national environmental standard (NES) was discussed in detail in section 1.4. Essentially, an NES is a regulation that can control activities directly and independently of regional or district rules. An NES may also prescribe the way local authorities manage activities and resources, including classifying activities, prescribing methods or monitoring requirements.

An NES generally has three advantages over other options, in that it can:

- stipulate a clearer and more consistent approach
- provide for greater certainty in achieving the overall policy objective (especially in terms of resource consents)

- take effect immediately and replace existing local government planning provisions relating to forestry operations
- avoid the sometimes lengthy transition associated with the implementation of other options.

The disadvantages of the NES option are:

- it is a stand-alone regulation without objectives, policies or an overarching policy statement
- the activities and the effects of the activities it permits may set a precedent for other land uses, given the concept of the 'permitted baseline'
- it removes aspects of local decision-making.

3.8 Assessment criteria

A number of key criteria were developed to assess how effective the options are in meeting the purpose of the RMA and the objective. The preferred option should:

1. *provide national consistency* – provide a national approach that reduces the current inconsistencies in how plantation forestry is managed between councils
2. *promote the sustainable management of natural and physical resources* – encourage a management regime that ensures adverse environmental effects of plantation forestry are avoided, remedied or mitigated
3. *provide long-term certainty* – provide certainty that the forestry sector can carry out forestry activities under a consistent framework
4. *be able to be implemented in an appropriate timeframe* – allow for implementation of the desired outcome in the shortest timeframe
5. *allow for different receiving environments and local values* – allow for local input where districts/regions have unique environments that require tailored approaches to management
6. *be able to promote best practice* – reflect existing industry and council best practice
7. *not significantly tighten or loosen overall controls* – not apply a more lenient or more stringent approach to the status quo overall and fit with the way plans currently function.

A full assessment of the alternative options against these criteria is provided in Appendix 4.

3.9 Assessing the options

Having considered the available options, an NES is considered the most appropriate way of achieving the policy objective. The basis for this view is summarised in table 3. The criteria for the assessment presented in table 3 are derived from the policy objective (as described in section 2.5).

Table 3: Comparison of the different options in terms of their effectiveness in achieving the policy objective

	Alternative options						Preferred option
	Status quo	**Non-regulatory guidance**	**Other standards**	**MOU**	**Minister-directed plan change**	**NPS**	**NES**
Provides national consistency	×	~	~	×	×	~	✓
Promotes sustainable management	✓	~	~	~	✓	✓	~
Provides long-term certainty	×	×	~	~	×	×	~
Able to be implemented in appropriate timeframe	N/a	✓	~	✓	×	×	✓
Allows for local input for different receiving environments and values	✓	✓	✓	✓	✓	✓	✓
Able to promote best practice	✓	✓	✓	✓	✓	✓	~
Does not significantly tighten or loosen overall controls	N/a	×	~	×	~	✓	✓

Notes:

✓ Achieves the objective

× Does not achieve the objective

~ Partly achieves the objective

N/a Not applicable

Questions:

5. **Do you agree with the preferred option? Please give reasons.**
6. **Is there an alternative option that has not been considered?**
7. **Do you agree with the assessment criteria? Should any of the assessment criteria be afforded more priority?**
8. **To what extent do the options address the identified problems?**
9. **Are you aware of any other costs and benefits of the options?**
10. **Do you have any comment about which option would deliver the highest level of net benefit?**

4 The Proposed NES for Plantation Forestry

4.1 Overview of the proposed NES framework

The proposed NES achieves the policy objective through a national set of rules that allow (permit), control and restrict certain activities. The proposed NES for plantation forestry includes:

a) permitted activity status (no resource consent required) for afforestation in a rural zone (subject to conditions) on terrain with low or moderate susceptibility to erosion

b) permitted activity status (no resource consent required) for replanting in a rural zone (subject to conditions)

c) permitted activity status (no resource consent required) for mechanical land preparation in a rural zone (subject to conditions)

d) permitted activity status (no resource consent required) for harvesting in a rural zone (subject to conditions) on terrain with low or moderate susceptibility to erosion

e) permitted activity status (no resource consent required) for pruning and thinning to waste operations in a rural zone (subject to conditions)

f) permitted activity status (no resource consent required) for earthworks in a rural zone on terrain with low susceptibility to erosion

g) permitted activity status (no resource consent required) for forestry-related quarrying in a rural zone (subject to conditions)

h) permitted activity status (no resource consent required) for river crossings in a rural zone (subject to conditions)

i) controlled activity status (resource consent required) for harvesting in a rural zone on terrain with high susceptibility to erosion

j) controlled activity status (resource consent required) for earthworks in a rural zone on terrain with moderate susceptibility to erosion

k) restricted discretionary activity status (resource consent required) for afforestation in a rural zone on terrain with high susceptibility to erosion

l) restricted discretionary activity status (resource consent required) for earthworks in a rural zone on terrain with high susceptibility to erosion.

These are described in more detail later in this section.

An explanation of the activity types

Permitted: the activity does not require a resource consent provided that standards, terms or conditions specified are complied with.

Controlled: a resource consent is required. The consent authority must grant the consent, unless it has insufficient information, and can only impose conditions on the consent on matters over which it has reserved control.

Restricted discretionary: a resource consent is required. The consent authority may decline the consent, or grant it subject to conditions, but only on matters to which it has restricted its discretion.

Discretionary: a resource consent is required. The consent authority may decline the consent, or grant it with or without conditions.

Non-complying: a resource consent is required. The consent authority may decline the consent, or grant it with or without conditions. The consent authority must be satisfied that the requirements of section 104D of the RMA are met.

Prohibited: no application for a resource consent may be made for the activity and the consent authority must not grant consent for it.

4.1.1 Scope of the proposed NES

The proposed NES **does** apply to the following activities:

- afforestation
- replanting
- mechanical land preparation
- harvesting
- pruning and thinning to waste
- earthworks
- quarrying
- river crossings.

Note: for some of these activities a local authority can have more stringent rules.

The proposed NES **does not** apply to the following activities:

- agrichemical use
- burning
- gravel extraction from beds of rivers
- milling activities and processing of timber
- use and development of land that has the potential to be affected by contaminants in soil.

Local authorities would be able to impose additional controls to address any potential or actual effects on issues that are outside the scope of the proposed NES, or where there is an ability to be more stringent.

4.1.2 General discussion

The following general discussion touches on some of the more important aspects of the proposed NES and poses a number of questions for you to think about as you work through the full proposal.

How does this proposed standard relate to other relevant national environmental standards?

Existing national environmental standards

NPS and NES for Electricity Transmission: The NES for Electricity Transmission is relevant to how the proposed NES for Plantation Forestry deals with setbacks from infrastructure such as transmission lines. Where rules in the proposed NES for Plantation Forestry allow local authorities to be more stringent in relation to setbacks from infrastructure, setback distances would still be established by local authorities. Requirements set out in the NPS and NES for Electricity Transmission would apply as normal.

NES for Human Drinking Water Sources: The rules in the proposed NES for Plantation Forestry allow councils to be more stringent in relation to catchments for water supply identified in district or regional plans, leaving this issue to local authorities to deal with. Therefore, issues relating to water supply would still be dealt with by local authorities, and the requirements set out in the NES for Human Drinking Water Sources would apply as normal.

Proposed national environmental standards

Proposed NES for Assessing and Managing Contaminants in Soil: This proposed NES would manage contaminants in soil, focusing on land inhabited by humans. The rules in the proposed NES for Plantation Forestry exclude the "use and development of land potentially affected by soil contaminants" from its scope. Issues relating to contaminated land would still be dealt with by local authorities, and therefore any future requirements set out in the NES for assessing and managing contaminants in soil would apply.

Proposed NES on Ecological Flows and Water Levels: This proposed NES would set interim limits on the alteration of flows and/or water levels in those rivers, wetlands, and groundwater systems for which there are no limits set in a proposed or operative regional plan (or other statutory instrument). In cases where rules in the proposed NES for plantation forestry allow councils to be more stringent in relation to water yield, these issues would still be dealt with by local authorities. Therefore, any future requirements set out in the proposed NES on Ecological Flows and Water Levels on this issue would apply.

To see the details of any of proposed or existing standards, please go to: www.mfe.govt.nz/laws/standards/

How are rural zones dealt with?

Within the proposed NES, many activities are characterised by virtue of their being in a 'rural zone'. District and regional plans have a wide range of zones. For example, a review of 23 district plans in 2010 found that the plans provided approximately 200 different zone types (Brown & Pemberton Planning Group, 2010b).

There are many different types of rural zones included in plans (eg, rural production, countryside, rural 1, rural A). This raises the question of how this NES would apply to these numerous zones, which have varying descriptions. The definition of 'rural zone' in the proposed NES is: "land that a relevant operative or proposed district or regional plan classifies as primarily for rural activities". It is intended that this be a catch-all definition for all rural areas where forestry is likely to be located.

Questions:

11. **Can you see any problems with this definition?**
12. **Do you think that an NES would need to apply to other zones too? If so, please describe these other zones.**

What happens if a council decides to apply a more stringent rule or conditions for activities?

The proposed NES allows councils to be more stringent in some instances. It specifies where local authorities would be able to either:

- impose more stringent rules in plans, or more stringent conditions on resource consents; or
- (in relation to permitted activities) specify conditions that relate to effects not dealt with in the proposed NES.

Where councils apply more stringent rules, the overall status for the activity would change. Where different or more stringent conditions are applied to permitted activities, the overall status may or may not change.

Where the activity statuses for different activities under one proposal differ, the entire proposal may be assessed against the most stringent activity status. This is known as "bundling". Bundling applies to an NES as it does to local authority plans.

Why does the proposed NES have an 'ability to be more stringent' section?

The objective outlined in section 2.5 is: "to bring about a more consistent and appropriate management framework while promoting the sustainable management of natural and physical resources". This objective recognises that in some cases a national response to the problem is not appropriate. There are some instances where different rules are warranted because of differing receiving environments or specific local circumstances exist. In such cases, one rule will not fit all, and local input needs to be retained. Many of these aspects relate to overlay areas (eg, significant natural areas), which are already widely dealt with in plans.

In cases where rules are more appropriately formulated at a district or regional level, the proposed NES gives local authorities the ability to apply more stringent rules or more stringent conditions for activities.

Likewise, if the local authority already has an existing rule that is more stringent, this rule can be retained in some circumstances (ie, it falls within the 'ability to be more stringent' list). In this case, the local rule will prevail over the NES (s43B[1]).

There is no ability for a rule or a resource consent to be more lenient than an NES, as section 43B(3) of the RMA precludes this.

If an activity is permitted by the proposed NES, but certain effects of that permitted activity are not covered, what can a local authority do?

Generally, where the proposed NES allows an activity, it contains conditions dealing with effects that must be satisfied in order for the activity to be permitted. A regional or district plan can only set out permitted activity terms and conditions that deal with effects different from the effects dealt with in the proposed NES (section 43A[5]).

Questions:

13. **Are there any aspects listed in the ability to be more stringent list that should be removed? If you think an aspect should be removed, how do you suggest it should be dealt with?**

14. **Can you think of any circumstances in which councils should be able to be more stringent which we have not listed?**

How would the proposed NES affect the permitted baseline?

The 'permitted baseline' is a concept that enables decision-makers to disregard an adverse effect of an activity on the environment if a national environmental standard or the plan permits an activity with that effect (s104[2]).

The permitted baseline test can be used to assess the effects of proposals against activities that are allowed under an NES. The principle allows consent authorities to disregard any actual or potential effects of an activity in an application or submission that are permitted under an NES. This means that the effects that may arise from activities permitted by the proposed NES can be disregarded when decision-makers have other types of applications before them.

This is relevant to the proposed NES because there are a number of permitted activities to which this principle can apply. Where the NES deals with generic activities (eg, earthworks), this could have significant implications for how applications for other activities – even other land uses – are considered. For example, if earthworks and a river crossing for a road being built for a forestry operation are permitted under an NES, then a consenting authority may disregard effects that stem from this permitted activity when considering an earthworks application and a river crossing for a road on a farm.

Questions:

15. **Can you see any problems with the permitted baseline that may be established under this proposed NES framework?**

16. **Do you think the scope of the NES should only cover forestry-specific activities?**

What was considered when we were formulating proposed permitted activities?

Under section 43A(3) of the RMA, an activity that is permitted under an NES must not have "significant" adverse effects. This has been considered when deciding what to include as a permitted activity, what conditions are appropriate for activities, where councils are given the ability to have more stringent rules, and what is outside the scope of the proposed NES.

Question:

17. Do you think there are any permitted activities in the proposal where this significance test has not been met? Why?

How does this relate to a holistic planning approach?

A catchment approach to planning is sometimes applied when plans are formulated by councils. This includes consideration of cumulative effects from different land uses within a catchment.

Question:

18. Do you have views on how these proposed provisions might affect the ability of councils to consider cumulative effects or apply a catchment-based approach to plan-making?

What type of plantation forestry activities does the proposed NES cover?

It is proposed that the NES would apply to all plantation forestry, both exotic and indigenous, established for commercial purposes. It is intended that plantation forests of all sizes be subject to the NES, including small farm forestry operations.

Question:

19. Should the NES specify a size threshold for when the NES applies to plantation forestry? Is it appropriate for small farm forestry operations to be included within the NES?

What are the green, orange and red areas referred to in the document?

Appendix 5 describes the current system for classifying land susceptible to erosion. It is proposed that a more tailored approach to erosion susceptibility be prepared for plantation forestry activities as part of this process. The green, orange and red areas that are referred to throughout this document would be determined prior to regulation drafting, if the option of an NES goes ahead. Any conditions for controlled or restricted discretionary activities would also be determined at this time.

Question:

20. Do you think that a more tailored national approach to erosion susceptibility in relation to plantation forestry is needed?

Questions:

General questions to think about when working through the proposed NES.

21. Are there any gaps? Are there any stages in the forestry process that are missing?

22. Some of the conditions proposed for permitted activities reflect best practice and may not provide enough certainty at present. Do you think all of the conditions are clear, certain and enforceable? Can you suggest ways of making them more clear, certain and enforceable?

23. The objective of the NES is to get a 'balanced' approach (ie, not significantly tightening or loosening the status quo overall), overlaid with a best-practice approach. Have we got this right? Are the activity statuses proposed appropriate?

24. Is the split in the proposed rules between regional and district appropriate given functions under section 30 and section 31? Is there any unnecessary duplication that could be addressed?

25. Can you think of any circumstances in which the proposal would create problems for iwi management plan processes?

26. To what extent do you think this option addresses the identified problems?

The following sections outline the proposed policy for the NES for Plantation Forestry.

4.2 Afforestation

Able to be more stringent where:
Fire risk: Forestry poses a risk of fire to urban areas and areas of indigenous forest, national parks, reserves or conservation areas.
Flood hazard zones: Flood hazard zones are mapped in regional or district plans.
Geothermal and karst: Geothermal and karst protection areas are mapped or identified in a district plan.
Heritage values: There are areas of known cultural or heritage value identified through regional or district plans, iwi management plansor the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites.
Indigenous vegetation clearance: Indigenous vegetation is cleared as a result of afforestation.
Infrastructure: Network utility infrastructure is identified by district councils as needing setbacks for safety or function reasons.
Nationally significant water bodies: Setbacks from nationally significant wetlands, rivers or lakes are required.
Nuisance issues: There are nuisance issues, including dust, noise, vibration, vehicle movements and road damage.
Outstanding natural features and landscapes: Outstanding natural features and landscape areas are identified in district or regional plans.
Significant natural areas: Significant indigenous vegetation and significant habitats of indigenous fauna are identified in district or regional plans, including significant natural areas.
Water yield: Catchments are identified in a district or regional plan for the management of water yield (including ground water) for the purposes of achieving a desired flow or water supply.
Wilding trees: Areas have the potential for wilding tree spread.
Where these circumstances or issues apply in relation to afforestation, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard.*

Permitted activity: Afforestation in a rural zone (subject to conditions)	
Conditions: District	**Conditions: Regional**
Archaeological Afforestation not being carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures applying. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Works being carried out in accordance with the authorisation.	**Archaeological** Afforestation not being carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures applying. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Works being carried out in accordance with the authorisation.
Setbacks Trees not being planted within: • 10 m of an adjoining property under different ownership without written approval of the adjoining owner being obtained • 30 m of dwellings and other buildings • 30 m of urban/residential zones.	**Setbacks** The following minimum planting setback distances being applied: • 5 m minimum from perennial rivers and streams with a channel width less than 3 m • 5 m minimum from the 'landward extent of wetland vegetation' for wetlands .

• public road areas where: vegetation could shade a paved road between the hours of 10 am and 2 pm on the shortest day of the year. Exceptions for circumstances where: • topography already causes shading • the written consent of the relevant road-controlling authority is obtained, confirming that the road-controlling authority is satisfied that the vegetation does not pose a safety risk having had regard to: – the physical characteristics of the road – the degree of potential shading of the road – the nature and extent of the vegetation – the surrounding topography – potential weather effects on the road, including consideration of icing risk.	• 10 m minimum from perennial rivers and streams with a channel width greater than 3m • 10 m from lakes larger than 0.25 hectares • 20 m minimum from regionally significant wetlands, lakes or rivers • 30 m minimum from the Coastal Marine Area.
Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.	**Auditing** Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.
Default: Controlled (if one or more of the above conditions is breached, but requirements for the archaeological condition are met)	
Conditions: District	**Conditions: Regional**
Matters over which control is reserved: • shading/icing effects.	**Matters over which control is reserved:** • ecological effects.
	Restricted discretionary activity **Afforestation in red areas** Afforestation in a rural zone on terrain classed as having severe, very severe or extreme erosion susceptibility.
	Matters over which discretion applies: • location of afforestation • potential effects from future harvesting and earthworks activities (including ecological, geotechnical and slope stability effects).
Default: Non-complying activity: Afforestation in a rural zone when archaeological conditions are not met.	

4.2.1 Explanation

The proposed NES recognises the relationship between afforestation and subsequent steps in the forestry process. The establishment of plantation forests is arguably the most important step in the forestry cycle because it sets the scene for future harvesting activities. It is proposed that the NES be "front-loaded" so that future replanting, earthworks and harvesting are considered at an early stage, when plantation forests are first established.

4.2.2 Ability to be more stringent

In some cases the proposal provides the opportunity for councils to be more stringent based on specific circumstances in their district or region.

Fire risk areas

Fire risk is normally season and site-specific and depends on the nature of the surrounding receiving environment (eg, if there are houses or communities in close vicinity to a plantation forest). In such cases, it is intended that councils will be able to establish a more stringent, tailored rule or condition for a permitted activity.

Flood hazard zones

Establishing a plantation forest in areas identified as being susceptible to flooding may not always be appropriate. In some cases, low gradient areas, typically within stopbanks, are prone to regular flooding. It is difficult to determine the appropriateness of afforestation in such areas on a national scale. Therefore it is intended that councils will be able to establish a tailored rule or condition for the permitted activity, if required.

Geothermal and karst protection areas

Some regions (eg, the Waikato) have delicate geothermal areas that need careful land management to prevent damaging or destroying these areas. Because management regimes are likely to require unique techniques, councils are considered to be in the best position to establish rules that reflect the local situation.

There is also a potential for forestry operations to affect or be affected by karst land forms. Where karst protection areas are mapped or identified in plans, it is intended that councils will be able to impose more stringent rules in relation to this issue.

Heritage values

In cases where regional or district plans, iwi management plans or the Historic Places Act have identified areas or sites as having special historical or cultural value, it is intended that local authorities would have the ability to apply more stringent rules or conditions for permitted activities. Iwi management plans and the Historic Places Act are included because many areas of cultural significance are not identified in regional and district plans.

Indigenous vegetation clearance

In some cases there will be valuable indigenous vegetation that has not been specifically classified as ‘significant’ in plans. Setting levels for the clearance and conversion of such indigenous vegetation for plantation forestry activities is most appropriately determined at a local level, as values, including habitat values, vary from case to case.

Infrastructure

The varied nature of infrastructure facilities, coupled with unique local circumstances, means that safe and functional setback distances are best dealt with at a district level. Setbacks from infrastructure facilities at the time of afforestation need to anticipate future harvesting and earthworks requirements.

Nationally significant water bodies

It is anticipated that setbacks from nationally significant wetlands, rivers or lakes will be established at a council level, because the appropriate distance will depend on the water body in question.

Nuisance issues

Nuisance issues such as dust, noise and vibration are often site-specific and controls are best determined at a local level.

Outstanding natural features and landscapes

Particular areas are sensitive to the landscape and visual impacts of new plantation forests, subsequent harvesting and earthworks. It is proposed that councils be given the flexibility to apply more stringent rules in relation to outstanding natural features (including landforms) and landscape areas that are identified in plans.

Significant natural areas

Indigenous vegetation and habitats of indigenous fauna are sensitive to forestry activities such as harvesting. Also, in some cases plantation forests can be a refuge and habitat during a forest's growth period. Under the proposal, councils are given the opportunity to apply more stringent rules in their plans for natural areas identified in plans as being significant. This would allow councils to consider integrated species protection and the maintenance of ecological corridors, among other things.

Water yield

Afforestation can have an impact on water yield in water-sensitive catchments. Variability in natural processes means that each regional situation needs to be assessed in order to successfully set planning controls. For this reason, it is intended that councils will be able to impose more stringent rules where afforestation may affect water yield.

Wilding trees

The unintentional spreading of plantation tree species into areas not managed for forestry is an issue in some districts. There are different methods for controlling wilding trees, and these techniques are best considered at a local level. Wilding trees also include species that are planted for the protection of forests and spread (eg, sand acacia).

4.2.3 Terms and conditions for afforestation being a permitted activity

Archaeological matters

This condition addressing historic heritage is included in every activity section of the NES apart from thinning and pruning to waste. The condition aims to deal with duplication that is currently occurring between the RMA and the Historic Places Act 1993 by referring these issues to the

Historic Place Act. Where the condition cannot be met (ie, where authorisation under the Historic Places Act is not obtained), it defaults to a non-complying activity in all sections, apart from thinning and pruning to waste.

Setbacks

Setbacks from water bodies for afforestation and harvesting

Under this section, setback distances from water bodies aim to establish appropriate distances with future land preparation, harvesting and earthworks activities in mind. There are no setback conditions for new forests in the subsequent harvesting rules, because setbacks under afforestation already establish these distances at the planting (afforestation and replanting) stages.

It is intended that harvesting of existing forests (already established at the time of an NES taking effect) would not have setback requirements either. Existing forests have already been established under an existing regime. This may have been either via resource consent or a permitted activity rule. In some cases the forest may also have existing-use rights. Subsequent rotations of replanting and harvesting may have been considered as part of this process.

Irrespective of whether these issues were considered or not, there may be unintended adverse effects resulting from restricting the harvesting of existing forests. For instance, a setback requirement for harvesting could create a disincentive to harvest a narrow strip of trees, which would age and could pose a safety risk.

Other setbacks

It is proposed that setbacks be established at the afforestation stage to avoid effects of forestry on adjoining properties, including particular urban and residential zones and public roads. Because nuisance effects fall under the "ability to be more stringent" category, local authorities would have the opportunity to impose more stringent rules (or conditions for permitted activities) in relation to noise, dust or vibration, vehicle movements and road damage effects.

Auditing

It is proposed that an auditing condition be included. This condition puts the onus on plantation forest applicants to confirm that, upon completion of the works, permitted activity conditions have been adhered to. It is also proposed that this be made available to the relevant local authority upon request. This is a best-practice condition that fits with good forestry practice.

4.2.4 Restricted discretionary activity

Afforestation within a red area requires resource consent as a restricted discretionary activity (see Appendix 5 for a description of the red area and how areas would be established). It requires consideration of afforestation in erosion-susceptible areas via a normal council resource-consenting process. The scope of what councils could consider as part of this consenting process is also outlined.

4.2.5 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

4.2.6 Discussion

Implications of 'front-loading' the NES

One of the implications of considering the entire forestry cycle at the afforestation stage (eg, requiring a consent for afforestation in extreme erosion areas) is that total afforestation may reduce overall as a consequence. As described above in section 2.1, afforestation has an important functional role in the environment, the economy and the community. This is particularly evident on erodible land, where forests play a role in erosion and flood control.

Water bodies

The proposed wording includes nationally significant water bodies as a matter for which councils can be more stringent. This may generate problems because there is currently no agreed classification of nationally significant water bodies. It may also be appropriate for setbacks from regionally and locally significant water bodies to be determined on a case-by-case basis (and to be included in the more stringent list). For example, there is a cultural dimension to water bodies. Māori may have a particular relationship with a water body that has not been identified as nationally significant.

Wilding trees

The potential impacts of wilding trees are described in section 1.7.8. Many regional councils deal with this issue via pest management strategies. District councils also have different approaches to dealing with this issue in their plans.

Questions on afforestation:

27. **We would like your feedback on any potential negative effects of requiring a consent for afforestation in areas that are susceptible to erosion. Do you think having to get consent for afforestation in red areas would deter new forestry from being established in these areas?**

28. **Do you think restricted discretionary is an appropriate status for a consent? Would controlled or discretionary be more appropriate?**

29. **Should landscape be limited to 'outstanding' natural features and landscapes only, and should these have to be specifically mapped in council plans?**

30. **Do you think the proposed auditing requirement is appropriate? What advantages or disadvantages would this process have for forestry operators, councils or communities?**

Questions on water bodies:

31. **We would like your opinion on how water bodies should be treated for afforestation and all other plantation forestry activities. Do you think local authorities should be able to be more stringent for setbacks from *all* significant water bodies, whether they are locally, regionally or nationally significant?**

32. **We would like your opinion on water quality issues. Do you think local authorities should have the ability to be more stringent, when appropriate, to protect and improve the quality of a water body?**

33. **In relation to setbacks from water bodies, are there any circumstances where less stringent or more stringent setbacks would be appropriate? Why?**

Questions on wilding trees:

34. **Do you think the issue of wilding trees should be dealt with in the proposed NES? If so, how?**

35. **Are there any other pest issues that you think should be addressed?**

4.3 Replanting

Able to be more stringent where:
Heritage values: There are areas of known cultural or heritage value identified through regional or district plans, iwi management plans, or the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites. **Indigenous vegetation clearance:** Indigenous vegetation is cleared as a result of replanting. **Nationally significant water bodies:** Setbacks from nationally significant wetlands, rivers or lakes are required. **Nuisance issues:** There are nuisance issues, including dust, noise, vibration, vehicle movements and road damage.
Where these circumstances or issues apply in relation to replanting, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard.*

Permitted activity: Replanting in a rural zone (subject to conditions)	
Conditions: District	**Conditions: Regional**
Archaeological Replanting not being carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures applying. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work shall being carried out in accordance with the authorisation.	**Archaeological** Replanting not being carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993 is exposed or identified before or during plantation forestry activities, the following procedures applying. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work being carried out in accordance with the authorisation.
Understorey vegetation clearance as a result of replanting The clearance or conversion of indigenous vegetation being limited to vegetation that: • has grown up under (or may have overtopped) production species; or • is within an area of failed planting (within the last rotation); or • is within an area of regenerating cutover.	
	Setbacks for plantation forests The following minimum forestry planting setbacks being applied: • 5 m minimum from perennial rivers and streams with a channel width less than 3 m • 5 m minimum from the 'landward extent of wetland vegetation' for wetlands • 10 m minimum from perennial rivers and streams with a channel width greater than 3 m • 10 m lakes larger than 0.25 hectares • 20 m minimum from regionally significant wetlands, lakes or rivers • 30 m minimum from the Coastal Marine Area.

Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.	**Auditing** Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.
Default: Controlled activity (if one or more of the above conditions is breached but requirements for the archaeological condition are met)	
Conditions: District	**Conditions: Regional**
	Matters over which control is reserved: • ecological effects • location of replanting
Default: Non-complying activity: Replanting in a rural zone when archaeological conditions are not met.	

4.3.1 Explanation

Replanting covers the planting of sites following harvesting of a previous crop.

4.3.2 Ability to be more stringent

Heritage values

See explanation in Afforestation, section 4.2.

Indigenous vegetation clearance

See explanation in Afforestation, section 4.2.

Nationally significant water bodies

See explanation in Afforestation, section 4.2.

Nuisance issues

See explanation in Afforestation, section 4.2.

4.3.3 Terms and conditions for replanting being a permitted activity

Archaeological matters

See explanation in Afforestation, section 4.2.

Understorey vegetation clearance

There are some areas of indigenous vegetation, such as understorey vegetation, that are in close proximity to forestry operations. Damage to these areas is considered unavoidable in most cases. Local authorities can impose more stringent controls over the clearance of conversion of other indigenous vegetation.

Setbacks

Setbacks from water bodies for replanting

Replanting setbacks for new and existing forests are the same as afforestation setbacks. This will maintain setback distances throughout subsequent rotation periods.

Other setbacks

Other setbacks (apart from water-body setbacks) have intentionally not been included in this section. For new forests, these would be established at the afforestation stage. Not having setbacks for the replanting of existing forests recognises that most forests would be replanted under a resource consent or through existing-use rights. Under the proposed wording, local authorities could apply more stringent rules or conditions in relation to nuisance issues.

Auditing

See explanation in Afforestation, section 4.2.

4.3.4 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

4.3.4 Discussion

A continuous replanting cycle

One of the issues with plantation forestry is that after the initial rotation cycles the surrounding receiving environment may have altered considerably from when the forestry was first established. With a consenting process this can be dealt with by specifying the consent duration at the time of granting consent under section 123 of the RMA. In such cases, an applicant has a specific period in which to exercise a consent, beyond which a new application must be lodged. However, if afforestation and replanting are permitted activities, this is not an option.

Question on the replanting cycle:

36. Do you think a continuous replanting cycle could pose problems?

Setbacks

There is an argument that setbacks from water bodies should be less onerous for the replanting of forests already established at the time an NES takes effect. There is also a potential relationship between rules governing replanting and New Zealand Emissions Trading Scheme (NZ ETS) requirements under the Climate Change Response Act 2002. For example, in cases where setbacks become more onerous than the status quo, areas would not be able to regenerate into forests. These areas would potentially be classed as 'deforestation' for forests that are post-1989 and are signed up to the NZ ETS process for credits. Under the new NZ ETS process there is a liability for such deforestation.

Questions on setbacks:

37. **Do you have any comments on the relationship between setbacks and the NZ ETS process?**

38. **Do you think existing forests should have less onerous water-body setbacks for replanting?**

39. **Do you think replanting setbacks should be applied at a district plan level for existing forests?**

Questions on replanting:

40. **Do you think areas being replanted should be subject to more conditions? Should councils have the ability to be more stringent over a wider range of issues, as with afforestation?**

4.4 Mechanical land preparation

Able to be more stringent where:
Geothermal and karst: Geothermal and karst protection areas are mapped or identified in a district plan. **Heritage values:** There are areas of known cultural or heritage value identified through regional or district plans, iwi management plans or the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites. **Indigenous vegetation clearance**: Indigenous vegetation is cleared as a result of replanting. **Nationally significant water bodies:** There are setbacks from nationally significant wetlands, rivers or lakes. **Nuisance issues:** There are nuisance issues, including dust, noise, vibration, vehicle movements and road damage. **Significant natural areas:** Significant indigenous vegetation and significant habitats of indigenous fauna are identified in district or regional plans, including significant natural areas.
Where these circumstances or issues apply in relation to mechanical land preparation, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard.*

Permitted activity: Mechanical land preparation in a rural zone (subject to conditions)	
Conditions: District	**Conditions: Regional**
Archaeological Mechanical land preparation not being carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures apply. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work being carried out in accordance with the authorisation.	**Archaeological** Mechanical land preparation not being carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures apply. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work being carried out in accordance with the authorisation.
Understorey vegetation clearance as a result of mechanical land preparation The clearance or conversion of indigenous vegetation being limited to vegetation that: • has grown up under (or may have overtopped) production species; or • is within an area of failed planting (within the last rotation); or • is within an area of regenerating cutover.	
	Fuel No machinery refuelling or storing of fuel in locations where fuel might enter water bodies.

	Methods Mechanical land preparation (aside from roller crushing and downhill ripping) being carried out parallel to the contour where practical. *Advice note:* examples where it would not be practical to run parallel to the contour include situations such as: • where mechanical land preparation is required for frost protection or drainage reasons, requiring drainage paths to run down the slope to be effective • where topographical features, limited access points or protected areas (such as archaeological sites or reserves) make it impractical to run parallel to the contour • where machines cannot be safely operated across the slope. Where mechanical land preparation does not follow the contour, run-off control measures being provided to prevent sediment run-off to waterways. When downhill ripping is undertaken, individual sections of ripped soil not exceeding 50 m in length, and not being undertaken in soils where there is evidence of tunnel gully erosion.
	Setbacks The following minimum setback distances being applied for mechanical land preparation: • 5 m minimum from perennial rivers and streams with a channel width less than 3 m • 5 m minimum from the 'landward extent of wetland vegetation' for wetlands • 10 m minimum from perennial rivers and streams with a channel width greater than 3 m • 10 m minimum from lakes larger than 0.25 hectares • 20 m minimum from regionally significant wetlands, lakes or rivers • 30 m minimum from the Coastal Marine Area.
Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.	**Auditing** Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.
Default: Restricted discretionary activity (if one of more of the above conditions is breached but requirements for the archaeological condition are met)	
Conditions: District	**Conditions: Regional**
	Discretion restricted to: • ecological and aquatic effects (including effects on water quality) • location of work in relation to water bodies and wetlands • measures taken to address erosion and sediment run-off.
Default: Non-complying activity: Mechanical land preparation in a rural zone when archaeological conditions are not met.	

4.4.1 Explanation

Mechanical land preparation is associated with afforestation and replanting, where land is prepared in between rotations.

4.4.2 Ability to be more stringent

In some cases the proposal provides the opportunity for councils to be more stringent based on specific circumstances in their district or region.

Geothermal and karst protection areas

See explanation in Afforestation, section 4.2.

Heritage values

See explanation in Afforestation, section 4.2.

Indigenous vegetation clearance

See explanation in Afforestation, section 4.2.

Nationally significant water bodies

See explanation in Afforestation, section 4.2.

Nuisance issues

See explanation in Afforestation, section 4.2.

Significant natural areas

See explanation in Afforestation, section 4.2.

4.4.3 Terms and conditions for mechanical land preparation being a permitted activity

Archaeological matters

See explanation in Afforestation, section 4.2.

Understorey vegetation clearance

See explanation in Replanting, section 4.3.3

Fuel

This condition is included because fuel contaminants are at risk of entering water bodies where heavy machinery is being used.

Methods

The type of mechanical land preparation used varies based on circumstances like the nature of the forest operation, climate, availability of contractors and cost. There are some conditions that deal with the more intensive forms, such as downhill ripping.

Setbacks

Setbacks for earthworks and mechanical land preparation from water bodies

The setback distances for mechanical land preparation are the same as the setbacks for afforestation and earthworks. The setbacks anticipate that near water bodies most land preparation and earthworks for permanent tracks or landings should be able to occur within setback production areas, or more appropriate alternative locations found away from sensitive water bodies. Earthworks for temporary tracks have an exemption for topographical constraints (eg, where a temporary access track in steep country needs to be located within a flat riparian area). In these cases, normal sediment control requirements are in place.

Other setbacks

Other setbacks (apart from water body setbacks) have not been included. Setbacks in relation to nuisance issues would still be able to be applied by local authorities under the ability to be more stringent.

Auditing

See explanation in Afforestation, section 4.2.

4.4.4 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

Questions on mechanical land preparation

41. Are there any other adverse effects from mechanical land preparation that need to be addressed?

42. Should mechanical land preparation be subject to the same conditions that earthworks are subject to (eg, sediment discharge concentrations and erosion susceptibility)?

43. Should there be a limit on the type of mechanical land preparation that can occur as a permitted activity, or should more conditions be imposed on some methods? For example, should roller crushing have to meet more conditions?

4.5 Harvesting

Able to be more stringent where:
Geothermal and karst: Geothermal and karst protection areas are mapped or identified in a district plan. **Heritage values:** There areas of known cultural or heritage value identified through regional or district plans, iwi management plans or the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites. **Indigenous vegetation clearance:** Indigenous vegetation is cleared as a result of replanting. **Nationally significant water bodies:** Setbacks from nationally significant wetlands, rivers or lakes as required. **Nuisance issues:** There are nuisance issues including dust, noise, vibration, vehicle movements and road damage. **Significant natural areas:** Significant indigenous vegetation and significant habitats of indigenous fauna are identified in district or regional plans, including significant natural areas.
Where these circumstances or issues apply in relation to harvesting, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard.*

Permitted activity: Harvesting in rural zones (subject to conditions), including : • associated discharges of bark to land • production thinning • soil disturbance associated with harvesting (excluding earthworks – see Earthworks, section 4.7) • edge damage of adjacent indigenous vegetation • the damaging or removal of indigenous vegetation within the understory of a plantation forest, where it is necessary to harvest a plantation forest, including vegetation that: – has grown up under (or may have overtopped) production species; or – is within an area of failed planting (within the last rotation); or – is within an area of regenerating cutover.	
Conditions: District	**Conditions: Regional**
Notification Notice of commencement of harvesting activities being given to the relevant district council at least 20 working days prior to commencement of operations.	**Notification** Notice of commencement of harvesting activities being given to the relevant regional council at least 20 working days prior to commencement of operations. A harvest plan, appropriate to the assessment of the operational risks to the environment, being prepared demonstrating means of compliance with the conditions below. Details in the harvest plan to include: • an assessment and mapping of water-body values and riparian areas to identify risks associated with operations • a demonstration of how permitted activity conditions will be complied with. The harvest plan and any subsequent changes, being available to the relevant regional council at least 20 working days prior to commencement of operations or annually upon agreement with the relevant council. All harvesting being carried out in accordance with the harvest plan and any subsequent harvest plan changes.
Archaeological Harvesting shall not be carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993.	**Archaeological** Harvesting shall not be carried out in a historic heritage area unless it is carried out on an archaeological site in accordance with the Historic Places Act 1993.

If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures applying. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work being carried out in accordance with the authorisation.	If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures apply. • All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work being carried out in accordance with the authorisation.
	Fuel No machinery refuelling or storing of fuel occurring in locations where fuel might enter water bodies.
	Methods Stem butts being lifted clear of the ground during extraction, wherever practicable. The best practicable option being used when harvesting to minimise excessive soil erosion and/or sediment discharge to water bodies.
	Stabilisation to avoid adverse effects of sediment in water bodies or accelerated erosion Stabilisation, revegetation or replanting of exposed soil caused by harvesting being undertaken as soon as practicable in the spring or autumn immediately following the completion of soil disturbance, to achieve 80% ground cover within 18 months of the operation being completed**.**
	Riparian disturbance ***Harvest planning*** The harvesting plan process including prior assessment of water bodies and their riparian areas to identify risks associated with operations, including the disturbance of indigenous vegetation. Water bodies and protected riparian areas being identified and mapped, and details of their management included in the harvest plan. ***Operational*** Where safe and practical, trees being felled and extracted away from the water body or riparian zone. If unavoidable, trees being felled directly across the water body for full-length extraction before de-limbing or heading. Where extraction across perennial water bodies and riparian vegetation is the best practicable option, methods such as hauling through corridors, butt extraction and maximum suspension of loads being used to minimise disturbance to the water body and riparian vegetation. Harvesting machinery not being operated within 5 m of perennial water bodies, with the exception of water-body crossing points. When harvesting within or across a riparian zone, all disturbed vegetation, soil or debris being deposited or placed in a position where it will not enter any watercourse to the extent that it causes diversion, damming or erosion of any river or stream, or degradation of any aquatic or riparian habitat, or damage to downstream infrastructure.

	Slash and debris management ***Harvest planning*** As part of the harvest planning process the party managing the activity having a documented system for assessing and managing the effects and potential risks of slash, appropriate to the scale and level of risk of their activities. ***Operational planning*** Slash management requirements relating to water bodies and slash storage at processing sites being identified and clearly documented before the operation starts. ***Avoiding slash reaching water bodies*** Harvesting being planned and carried out so as to prevent, as far as practicable, the amount of slash that is deposited into perennial water bodies, lakes or wetlands when harvesting adjacent to perennial water bodies. ***Removing slash*** Whenever safe and practicable to do so, potentially unstable slash being removed from perennially flowing water bodies where flood flows have the potential to mobilise and cause: • the blocking or damming of stream flow • the diversion of flow into stream banks likely to cause erosion • damage to downstream infrastructure • significant adverse effects on aquatic habitat. *Advice notes:* i. This rule is intended to apply to flood flows up to a 10-year return period storm. ii. For compliance auditing purposes, the regional council taking into account the documented risk assessment process implemented by the party undertaking the operation in accordance with harvesting operation planning. ***Slash traps*** Where slash cannot safely or practicably be removed from water bodies, and there is an assessed risk of slash mobilising and causing the above effects, alternative measures being implemented to retain slash on site as far as practicable. Constructed slash (debris) traps located across a water body being: • designed and constructed to a standard appropriate to their intended use • located so as to avoid flooding of adjacent land, and in a position that allows access for maintenance • regularly monitored for the build-up of debris and within 5 working days following any rainfall event in the upstream catchment that is likely to mobilise debris • maintained free of accumulated debris – following storm events, accumulated debris being removed as soon as is practicable but no later than 20 working days of such accumulation occurring. ***Land stability*** Slash accumulations at processing sites being placed onto stable ground and managed to avoid accumulation to levels that could cause erosion or instability of land.

Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, and audit reports being available to the relevant local authority upon request.	**Auditing** Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, with audit reports being available to the relevant local authority upon request.
Default: Controlled activity (if one or more of the above conditions is breached but requirements for the archaeological condition are met)	
Conditions: District	**Conditions: Regional**
	Matters over which control is reserved are: • methods and timing of harvesting and associated soil disturbance • ecological and aquatic effects (including effects on water quality and riparian vegetation) • measures to be taken to prevent sediment run-off and erosion • methods to avoid and contain slash.
	Controlled activity **Soil disturbance in red areas** Soil disturbance associated with harvesting in a rural zone on terrain classed as having a severe, very severe or extreme level of erosion susceptibility.
	Matters over which discretion applies are: • the location and duration of works • ecological and aquatic effects • method of stabilisation of earthworks • methods of sediment retention and run-off stormwater control • effects on riparian vegetation.
Default: Non-complying: Harvesting in a rural zone when archaeological conditions are not met.	

4.5.1 Explanation

The harvesting phase can potentially cause a range of adverse environmental effects, many of which are manifested off-site in streams and estuaries (Landcare Research, nd). For the purposes of this proposal, harvesting is the act of felling trees and the associated soil disturbance, but does not include earthworks, such as earthworks to establish access roads or landings.

4.5.2 Ability to be more stringent

In some cases the proposal provides the opportunity for councils to be more stringent based on specific circumstances in their district or region.

Geothermal and karst protection areas

See explanation in Afforestation, section 4.2.

Heritage values

See explanation in Afforestation, section 4.2.

Indigenous vegetation clearance

See explanation in Afforestation, section 4.2.

Nationally significant water bodies

See explanation in Afforestation, section 4.2.

Nuisance issues

See explanation in Afforestation, section 4.2.

Significant natural areas

See explanation in Afforestation, section 4.2.

4.5.3 Conditions for harvesting being a permitted activity

Notification

It is important that harvesting not occur as a permitted activity without the relevant district or regional council being aware that a harvesting operation is imminent. Therefore, it is intended that notice be given to the local authority 20 working days prior to commencement. This gives councils an opportunity to monitor the activity properly.

A harvest plan is also required which demonstrates compliance, or the means of compliance, with conditions for the permitted activity up-front. This must be submitted to a relevant regional council 20 days prior to harvesting. Given that most of the potential impacts of harvesting relate to erosion and sediment effects, this harvest requirement is only applied at a regional council level.

Archaeological matters

See explanation in Afforestation, section 4.2.

Fuel

This condition is included because fuel contaminants are at risk of entering water bodies where heavy machinery is being used.

Methods

Stem butts being dragged across earth have the potential to cause soil disturbance, which can in turn generate instability and erosion problems. The intention of this condition is to allow some flexibility where circumstances, such as topography or the location of landings, preclude lifting stem butts clear of the ground.

There are steps that can be taken during harvesting to minimise sediment and erosion effects. These include minimising soil disturbance (eg, when selecting landing area sites).

Stabilisation and containment

When vegetation cover is removed, the ongoing and long-term effects will depend on the replacement cover and how quickly the exposed ground is stabilised. Stabilisation of soil exposed during harvesting aims to avoid erosion or sedimentation effects that could potentially occur during and after harvesting and in between rotations. It is standard practice for large-scale forestry companies to replant within a 12–18 month period. This condition has some in-built flexibility for the stabilisation technique used.

Riparian disturbance

Riparian zones are particularly sensitive to harvesting activities. A section to specifically address riparian zones has been included in the above harvesting provisions.

Slash and debris management

The proposed slash and debris management section aims to set up a graduated approach to slash management. The first step is to plan for slash and develop a system for managing it at a 'harvest plan' level. The second step is for this to feed into the operational planning phase of the harvest process. This should ensure that on-the-ground crews are aware of slash management requirements.

The next step – one of the most pivotal in effective slash management – is to prevent the slash from reaching water bodies. There is an assumption that even with an effective slash control system in place, some slash will reach water bodies. The next steps establish requirements for removing slash, or retaining slash *in situ*, in such cases.

The final step is to ensure that stability of land is not affected by slash accumulations, also known as "birds' nests".

Auditing

The proposed auditing requirement imposed on the applicant for the forestry activity is essentially a feedback loop made available to local authorities to confirm, on completion of the activity, that the harvesting operations were in line with permitted conditions. This encourages best practice.

4.5.4 Controlled activity

Harvesting within a red area requires resource consent as a controlled activity (see Appendix 5 for a description of the red area and how these areas would be established). The limits of that control are intentionally wide to reflect the broad range of potential impacts from harvesting.

4.5.5 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

4.5.6 Discussion

Rights to harvest

Harvesting is obviously a pivotal stage in the forestry cycle. Some argue that harvesting of existing forests should be a permitted activity in all cases, even where the forestry is located on land susceptible to erosion. This argument asserts a 'right to harvest' where forestry operations are already established.

However, the RMA requires the effects of harvesting to be considered and managed in light of its sustainable management purpose. Under the RMA, controls can be introduced to manage those effects. The proposed controls for harvesting aim to avoid adverse environmental effects that may arise where disincentives to harvest mean some forests, or parts of forests, are left *in situ*.

Notwithstanding this, there are some areas that may still need to be included in the 'ability to be more stringent' section.

Question on right to harvest:

44. Do you think councils should be given the opportunity to be more stringent in relation to matters such as natural landscapes, visual effects, or setbacks from water bodies? Should this apply to harvesting of existing forests too?

Questions on harvesting in general:

45. Do you think the 'controlled' activity default for harvesting is appropriate?

46. Do you have any comments on the proposed terms and conditions?

47. There are no setbacks included for harvesting because there is an assumption that suitable setbacks are established at the afforestation/replanting stage. Do you think this is appropriate?

48. Do you think the harvesting notification period for councils is long enough?

49. Do you think the auditing requirement is necessary if a harvesting plan is prepared?

50. Do councils have the capacity to deal with harvesting plans? Should these plans have to be approved by councils?

51. Are there any other methods of harvesting that should be controlled via conditions or a consent requirement?

52. Can you think of any circumstances where the stabilisation requirement is not necessary? Is an 18 month timeframe appropriate? Should stabilisation occur during the harvesting operation rather than within 18 months after completion?

53. **Do you think the proposed riparian management section is effective? Should logs be able to be dragged across water bodies in some instances?**

54. **Are the proposed controls for soil disturbance adequate?**

55. **Do you think the slash management section should include the use of slash traps where slash cannot be removed safely? Should the conditions assume that slash should not enter water bodies?**

56. **Should the conditions include maximum slash dimensions?**

57. **Do you think provisions relating to the ultimate disposal or land filling of slash on-site should be included?**

58. **Do you think the 'permitted' activity status for slash is appropriate?**

4.6 Pruning and thinning to waste

Able to be more stringent where:
No ability to be more stringent.

Permitted activity: Pruning and thinning to waste operations (subject to conditions)	
Conditions: District	**Conditions: Regional**
No conditions	**Slash** No debris from thinning and pruning being deposited where it may enter a perennial water body.
	Fuel No machinery refuelling or storing of fuel in locations where fuel might enter water bodies.

4.6.1 Explanation

Although pruning and thinning to waste is one of the more neutral parts of the forestry cycle, some minor conditions have been included in this section.

4.6.2 Conditions for thinning and pruning being a permitted activity

Slash

Slash may not be a major issue in relation to thinning and pruning, but it is important that no debris be placed where it may readily enter a water body.

Fuel

This condition is included because fuel contaminants are at risk of entering water bodies where machinery is being used for thinning and pruning.

Question on pruning and thinning to waste:

59. Are there any other issues that need to be covered here?

4.7 Earthworks

Able to be more stringent where:
Geothermal and karst: Geothermal and karst protection areas are mapped or identified in a district plan. **Hazards:** Coastal and natural hazard areas are mapped in regional plans. **Heritage values:** There are areas of known cultural or heritage value identified through regional or district plans, iwi management plans or the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites. **Indigenous vegetation clearance:** Indigenous vegetation is cleared as a result of replanting. **Infrastructure:** Network utility infrastructure is identified by district councils that warrants setbacks for safety or function reasons. **Nationally significant water bodies:** Setbacks from nationally significant wetlands, rivers or lakes are required. **Nuisance issues:** There are nuisance issues, including dust, noise, vibration, vehicle movements and road damage. **Significant natural areas:** Significant indigenous vegetation and significant habitats of indigenous fauna are identified in district or regional plans, including significant natural areas.
Where these circumstances or issues apply in relation to earthworks, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard.*

Permitted activity: Earthworks associated with forestry activities in a green area (subject to conditions): earthworks in a rural zone on terrain classed as having negligible or low susceptibility of erosion; and: **The maintenance and upgrade of existing earthworks associated with forestry activities in a green, orange or red area in a rural zone** (subject to conditions).	
Conditions: District	**Conditions: Regional**
Notification The party undertaking the earthworks advising the district council at least 20 working days prior to works commencing on site.	**Notification** The party undertaking the earthworks advising the regional council at least 20 working days prior to works commencing on site. An earthworks plan demonstrating compliance with terms and conditions (or demonstrating an adequate methodology for compliance) being provided to the appropriate local authority at least 20 working days prior to commencement of works. (With the earthworks plan being able to be provided annually upon agreement with the relevant local authority.) Detail in the earthworks plan to include: • a monitoring log of sediment discharge concentrations in Class A water, completed under the supervision of an approved contractor. All earthworks being carried out in accordance with the earthworks plan and any subsequent changes to the earthworks plan.
Archaeological Earthworks not being carried out in a historic heritage area unless they are carried out on an archaeological site in accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures applying.	**Archaeological** Earthworks not being carried out in a historic heritage area unless they are carried out on an archaeological site accordance with the Historic Places Act 1993. If any archaeological site, as defined by the Historic Places Act 1993, is exposed or identified before or during plantation forestry activities, the following procedures applying.

• All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work shall be carried out in accordance with the authorisation.	• All site works in the immediate vicinity of the discovery ceasing immediately. • The area being secured to prevent further disturbance until relevant NZ Historic Places Trust authorisation has been obtained. • Work being carried out in accordance with the authorisation.
	Fuel No machinery refuelling or storing of fuel in locations where fuel might enter water bodies.
	Design matters Maximum culvert spacing not exceeding values given for various road gradients and soil types in Figure 113 of the NZ Forest Roading Manual (LIRO, 1999), with road water table culverts having a minimum of 325 mm internal diameter. Tracks being aligned and managed such that run-off is diverted to minimise the concentration of channelled flows. Landing fill areas being benched and compacted to prevent slumping. Temporary tracks and other earthworks not required for future operations being deactivated to control run-off, and stabilisation of the track being undertaken. Land disturbance not obstructing or diverting ephemeral stream channels where blocking, flooding or erosion results.
	Setbacks from perennial water bodies for new earthwork construction A minimum setback of the following being applied, except during water-body crossing and debris trap construction and maintenance: • 5 m minimum from perennial rivers and streams with a channel width less than 3 m • 5 m minimum from the 'landward extent of wetland vegetation' for wetlands • 10 m minimum from perennial rivers and streams with a channel width greater than 3 m • 10 m from lakes larger than 0.25 hectares • 20 m minimum from regionally significant wetlands, lakes or rivers • 30 m minimum from the Coastal Marine Area. The above setbacks applying to temporary tracks also, except where topographical constraints leave no alternative.
	Fill material Fill material containing only soil, spoil, rock, stone, aggregate, gravel, sand, silt or clay and in any case no more than 5% (by volume) of vegetation and wood, except when wood is used as corduroy.
	Stabilisation and containment All exposed areas of soil resulting from the activity being either: (a) contained within the site or (b) stabilised against erosion by vegetative cover or other methods as soon as practicable following completion of the activity, and no later than 12 months from the date of construction, as required to avoid the adverse effects of erosion or sediment on water bodies.

	Stabilisation including, but not being limited to, one or more of the following: • vegetative cover • mulch cover (eg, hay, straw) • slash cover • engineering techniques such as rock armouring. *Note:* Stabilisation requirements do not apply to firebreaks. No spoil being directly deposited into a permanently flowing water body, lake or the sea, or deposited in a position where it can readily enter or be carried into these. Spoil and fill not being placed over indigenous vegetation, outside of a production area, or placed in a position where it can produce sediment in a water body. Fill, batters and side castings being stabilised, as required, to minimise erosion and sedimentation, by measures such as seeding, compacting, drainage or revegetation.
	Sediment and stormwater control measures Stormwater and sediment control measures being installed and maintained to avoid sediment discharge to water bodies and prevent erosion, scour and sedimentation off-site.
	Sediment discharge concentrations Sediment from land, after reasonable mixing, not reducing the annual medium visual clarity of receiving waters, measured against a reference, before harvest or an appropriate reference catchment by more than: • 20% for Class A waters (where visual clarity is an important characteristic of the water body) • 40% for all other waters or during single events (including flood events), by more than 100 grams per cubic metre, unless the background level (ie, upstream of the activity or in a suitable reference stream) is close to or above 100 grams per cubic metre, in which case the increase in suspended solids after reasonable mixing shall not be greater than 40% above the background level. No production of any conspicuous oil or grease films, scum or foams, floatable or suspended materials at or beyond a 20 m radius from the discharge point occurring. The concentration of contaminants not exceeding: • 20 mg/m^3 of total petroleum hydrocarbons beyond a 200 m radius of the discharge.
Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, and audit reports shall be made available to the relevant local authority upon request.	**Auditing** Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, and audit reports shall be made available to the relevant local authority upon request.
Default: Controlled activity (if one or more of the above conditions is breached but requirements for the archaeological condition are met)	
Conditions: District	**Conditions: Regional**
	Controlled activity: **Earthworks associated with plantation forestry in an orange area** Earthworks in a rural zone on terrain classed as having moderate susceptibility to erosion.

	Matters over which control is reserved: • location and duration of works • area and volume of earthworks • dimensions of cut and fill • ecological and aquatic effects • method of stabilisation of earthworks • methods of sediment retention and run-off stormwater control • effects on riparian vegetation • measures to rehabilitate land.
	Restricted discretionary activity: **Earthworks associated with plantation forestry in a red area** Earthworks in a rural zone on terrain classed as having severe, very severe or extreme susceptibility to erosion.
Conditions: District	**Conditions: Regional**
	Matters over which discretion applies: • location and duration of works • area and volume of earthworks • dimensions of cut and fill • ecological and aquatic effects • composition of fill material • method of stabilisation of earthworks • methods of sediment retention and run-off stormwater control • effects on riparian vegetation • measures to rehabilitate land.
Default: Non-complying: Earthworks in a rural zone when archaeological conditions are not met.	

4.7.1 Explanation

Within the proposed NES, the earthworks section comprises all earthworks associated with establishing forestry, apart from land preparation and soil disturbance associated with harvesting, which are regulated under different sections.

Some of the most significant potential effects arising from forestry operations are associated with the construction of roads or infrastructure (such as landings) for harvesting operations. These effects are usually related to erosion or the products of erosion (ie, sediment).

Erosion has the potential to reduce on-site productivity and cause loss or damage to the forest infrastructure. Sediment has two main impacts: it can increase the turbidity of river water (decrease clarity), and it can also clog riverbeds and downstream receiving environments such as estuaries and lakes. Both of these impacts affect the biological community and health of an ecosystem (Landcare Research, nd).

The proposed approach separates out earthworks based on their position in relation to erosion-susceptible land. Earthworks are permitted within green areas but require consent from regional councils in orange or red areas. These areas would be determined as described in Appendix 5.

The maintenance and upgrade of existing earthworks is a permitted activity subject to permitted activity conditions. It is intended that such earthworks involve only works such as re-shaping of road surfaces (see glossary).

4.7.2 Ability to be more stringent

In some cases the proposal provides the opportunity for councils to be more stringent, based on specific circumstances in their district or region.

Geothermal and karst protection areas

See explanation in Afforestation, section 4.2.

Hazard areas

Earthworks can create or worsen hazard potential (ie, flooding and land instability), and careful management is required. For example, filling parts of a known overland flow path is likely to impede run-off and worsen flooding upstream, potentially enlarging the area affected by inundation. Instances of land instability may be created where excavations undercut a hillside, or where excavations result in un-retained or bare hillsides (Quality Planning, 2007).

Heritage values

See explanation in Afforestation, section 4.2.

Indigenous vegetation clearance

See explanation in Afforestation, section 4.2.

Infrastructure

See explantation in Afforestation, section 4.2.

Nationally significant water bodies

See explanation in Afforestation, section 4.2.

Nuisance issues

See explanation in Afforestation, section 4.2.

Significant natural areas

See explanation in Afforestation, section 4.2.

4.7.3 Terms and conditions for earthworks being a permitted activity (in a green area)

Notification

It is intended that notice be given to the local authority 20 working days prior to the commencement of earthworks. An earthworks plan is also required which demonstrates compliance, or the means of compliance, with conditions for the permitted activity up-front, with this being submitted to a relevant regional council 20 days prior to earthworks activities. Minor earthworks would be able to be dealt with in an annual earthworks plan if the relevant authority agrees.

Archaeological matters

Earthworks activities have the potential to alter, disturb, modify or destroy heritage or archaeological sites. See explanation in Afforestation, section 4.2.

Fuel

This condition is included because fuel contaminants are at risk of entering water bodies where heavy machinery is being used.

Design matters

A number of design matters are proposed which aim to reflect best-practice methods for earthworks in relation to forestry.

Setbacks

Setbacks from water bodies for earthworks

Setback distances from water bodies aim to establish appropriate distances to avoid increased sediment loads. These distances are the same as setbacks for afforestation and replanting.

Other setbacks

There are no setbacks proposed at a district plan level. Nuisance effects associated with earthworks, such as dust and noise effects, are outside the scope of the NES and could still be considered by district councils at a local level.

Fill material

The fill material conditions aim to avoid contaminated fill being transported around sites.

Stabilisation and containment

The stabilisation and containment conditions aim to contain sediment and run-off from exposed areas within the site where earthworks are taking place. Alternatively, stabilising exposed areas is proposed, with flexibility as to the stabilisation techniques used.

Sediment and stormwater control measures

Requirements for sediment and stormwater control measures align with the containment approach above.

Sediment discharge concentrations

The concentrations proposed are based on the Resource Management Water Quality Guidelines No. 2 (Ministry for the Environment, 1994). The approach recognises that sediment levels fluctuate during the forestry cycle, and therefore to get a true measure the levels should be an annual median, measured against a reference point. The condition also considers storm events.

The onus of monitoring for this condition has been split between the applicant (for Class A waters) and councils (for all other waters).

Auditing

It is proposed that an auditing condition be included. This condition puts the onus on plantation forest applicants to confirm that, upon completion of the works, permitted activity conditions have been adhered to. It is also proposed that this be made available to the relevant local authority upon request. This is a best-practice condition that should fit in with good forestry practice.

4.7.4 Controlled and restricted discretionary activities

Earthworks located in an orange area require consent as a controlled activity. In a red area earthworks require consent as a restricted discretionary activity (see Appendix 5 for a description of orange and red areas and how areas would be established). Details of what councils could consider in the consenting processes are also outlined in Appendix 5.

4.7.5 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

4.7.6 Discussion

Timing of earthworks

The time of year, seasonal weather conditions and duration of earthworks influence the magnitude of the effects generated. These environmental characteristics vary greatly around the country. For example, erosion rates and related potential sediment run-off loads will be greater during months of higher rainfall (Quality Planning, 2007). It is proposed that these issues be considered when the categorisation of erosion terrain is undertaken, as per Appendix 5.

Effects on significant natural land forms/landscapes

Earthworks can involve the permanent removal of soil from one area and relocation to another. Consequently, earthworks have the potential – depending on their scale – to change the underlying land form of an area. Some land forms are valued for their natural character

or landscape qualities, and earthworks can potentially compromise these values (Quality Planning, 2007).

Earthworks that result in the modification of land form patterns can have an adverse effect on the visual coherence of an area through the degradation or, in some cases, removal, of a natural land form. For example, cutting a track across a hill slope can create a highly visible 'scar' (Quality Planning, 2007).

Question on natural land forms:

60. Do you think the earthworks section should allow councils to be more stringent in relation to earthworks in outstanding landscapes?

Questions on earthworks in general:

61. Do you see merit in the categorising of terrain susceptible to erosion at a national level, as outlined in Appendix 5? Do you see any problems with this proposal?

62. How would these rules affect the permitted baseline?

63. Should councils have to approve earthworks plans?

64. Are there any gaps? Should there be more terms and conditions?

65. Do you think there should be a condition with maximum volume and area limits for permitted activities in green areas, above which a consent is required? Why?

66. Should the maintenance and upgrade of existing earthworks (eg, roads that are constructed for a harvest period reactivated at the time of subsequent rotations) still be subject to conditions set out for new earthworks?

67. Do you think the sediment discharge controls are appropriate? Are references to Class A waters appropriate?

68. Do you agree with monitoring Class A waters as part of an earthworks plan?

69. Can you think of any other design matters that should be included?

70. Do you think the stabilisation and containment techniques are robust enough?

4.8 Quarrying

Able to be more stringent where:
Erosion susceptibility: Quarrying activity occurs within a red area.
Geothermal and karst: Geothermal and karst protection areas are mapped or identified in a district plan.
Hazards: Coastal and natural hazard areas are mapped in regional plans.
Heritage values: There are areas of known cultural or heritage value identified through regional or district plans, iwi management plans or the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites.
Indigenous vegetation clearance: There is indigenous vegetation clearance as a result of quarrying activities.
Infrastructure: Network utility infrastructure is identified by district councils that warrants setbacks for safety or function reasons.
Nationally significant water bodies: Setbacks from nationally significant wetlands, rivers or lakes are required.
Nuisance issues: There are nuisance issues, including dust, noise, vibration, vehicle movements and road damage.
Significant natural areas: Significant indigenous vegetation and significant habitats of indigenous fauna are identified in district or regional plans, including significant natural areas.
Where these circumstances or issues apply in relation to quarrying, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard.*

Permitted activity: Quarrying associated with forestry activities in a rural zone where quarrying material is not being sold or transported off-site (subject to conditions)	
Conditions: District	**Conditions: Regional**
General conditions Quarrying activities being subject to applicable district conditions in the permitted activity part of the Earthworks section.	**General conditions** Quarrying activities being subject to applicable regional conditions in the permitted activity part of the Earthworks section.
Notification The party undertaking the earthworks advising the district council at least 20 working days prior to works commencing on-site.	
Volume A maximum volume of 2000 m^3 of material being quarried per year per activity site, provided that this restriction shall not apply if the quarry is not within visible line of sight from an existing dwelling, an adjoining property or a formed public road.	
Setbacks • 20 m from water bodies. • 500 m from an existing dwelling.	
Fill or spoil Fill or spoil not being deposited within 20 m of water bodies or adjoining properties.	
Restoration Within 2 months of the quarry being deactivated, the land shall be restored to a stable land form and maintained until self-sustaining (including spoil, tailings and dump areas).	

Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES, and audit reports shall be made available to the relevant district authority upon request.	
Default: Restricted discretionary (if fail to meet conditions, including earthworks permitted activity conditions)	
Conditions: District	**Conditions: Regional**
Matters over which discretion applies: • location and duration of works • area and volume of earthworks • dimensions of cut and fill • effects on riparian vegetation • measures to rehabilitate land.	**Matters over which discretion applies:** • location and duration of works • area and volume of earthworks • dimensions of cut and fill • ecological and aquatic effects • method of stabilisation of earthworks • method of sediment retention and run-off stormwater control • effects on riparian vegetation • measures to rehabilitate land.
Non-complying: Quarrying in a rural zone when archaeological conditions are not met.	

4.8.1 Explanation

Many large plantation forests have dedicated quarries that might be used over several rotations. The intent of the proposed provisions is to limit quarrying to land-based quarrying only (ie, it does not include gravel extraction from rivers). There is also a proviso that the quarrying material shall not be sold or transported off-site.

4.8.2 Ability to be more stringent

In some cases the proposal provides the opportunity for councils to be more stringent, based on specific circumstances in their district or region, including the following.

Erosion susceptibility

Quarrying in terrain with high erosion susceptibility warrants councils being able to set more stringent limits, due to potential impacts in terms of stability, erosion and run-off effects.

Geothermal and karst protection areas

See explanation in Afforestation, section 4.2.

Hazard areas

See explanation in Earthworks, section 4.7.

Heritage values

See explanation in Afforestation, section 4.2.

Indigenous vegetation clearance

See explanation in Afforestation, section 4.2.

Infrastructure

See explanation in Earthworks, section 4.7.

Nationally significant water bodies

See explanation in Afforestation, section 4.2.

Nuisance issues

See explanation in Afforestation, section 4.2.

Significant natural areas

See explanation in Afforestation, section 4.2.

4.8.3 Terms and conditions for quarrying being a permitted activity

General conditions

Because quarrying is largely an earthworks-based activity, it is intended that the activity be subject to permitted activity conditions set out for earthworks. See the explanation of these conditions in Earthworks, section 4.7.

Notification

It is proposed that notice be given to the local authority 20 working days prior to commencement of quarrying activities. This gives councils an opportunity to monitor the activity properly.

Volume

A maximum level of material being quarried per calendar year acknowledges that, above that, adverse effects such as sedimentation are likely to be more significant as the volume of earthworks increases.

Setbacks

Setbacks from water bodies for earthworks

The setbacks established in the Earthworks section apply. See explanation in Earthworks, section 4.7.

Other setbacks

A 500 m setback from dwellings is established to avoid visual effects on residential areas. Nuisance effects associated with earthworks, such as dust, vibration and noise effects, are still to be considered by district councils at a local level.

Fill or spoil

This is a provision to avoid stockpiling of fill or spoil close to sensitive water bodies and adjoining properties.

Restoration

It is proposed that a restoration condition be included to ensure that deactivated sites are left in a stable form.

Auditing

See explanation in Harvesting, section 4.5.

4.8.4 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

Questions on quarrying:

71. **Do you think councils should be able to be more stringent in orange areas as well as in red areas?**

72. **Do you agree that if quarries are located outside the 500 m setback there should no longer be a maximum volume limit?**

73. **Would areas and volume controls for material extraction be appropriate at a regional level?**

74. **How would these rules affect the permitted baseline?**

4.9 River crossings

Able to be more stringent where:
Geothermal and karst: Geothermal and karst protection areas are mapped or identified in a district plan. **Hazards:** Coastal and natural hazard areas are mapped in regional plans. **Heritage values:** There are areas of known cultural or heritage value identified through regional or district plans, iwi management plans or the Historic Places Act, including wāhi tapu, sites of significance to Māori and archaeological sites. **Indigenous vegetation clearance:** There is indigenous vegetation clearance required as a result of river-crossing activities. **Infrastructure:** Network utility infrastructure is identified by district councils that warrants setbacks for safety or function reasons. **Nuisance issues:** There are nuisance issues, including dust, noise, vibration, vehicle movements and road damage. **Significant natural areas:** Significant indigenous vegetation and significant habitats of indigenous fauna are identified in district or regional plans, including significant natural areas.
Where these circumstances or issues apply in relation to river crossings, local authorities would be able to either: • *impose more stringent rules in plans, or more stringent conditions on resource consents; or* • *(in relation to permitted activities) specify conditions in their plans that relate to effects not dealt with in the proposed standard*.

Permitted activity: **Construction, upgrading and replacing of stream and river crossings** associated with forestry activities in general rural zone (subject to conditions) **Maintenance of stream and river crossings and debris traps** (this activity is not subject to any terms and conditions)	
Conditions: District	**Conditions: Regional**
General conditions Stream and river-crossing activities being subject to applicable district conditions in the permitted activity part of the Earthworks section.	**General conditions** Stream and river-crossing activities being subject to applicable regional conditions in the permitted activity part of the Earthworks section, with the exception of sediment discharge controls for the duration of the works.
	Notification A plan demonstrating compliance with terms and conditions (or demonstrating an adequate methodology for compliance), including calculations demonstrating how average recurrence interval requirements will be met for perennial water bodies. The above plan being provided to the appropriate local authority prior to commencement of works. (With the plan being able to be provided annually upon agreement with the relevant local authority).
	Catchment The catchment of perennial rivers being less than 100 ha in size except for sand country and highly porous pumice lands.
	Fuel No machinery refuelling or storing of fuel in locations where fuel may enter water bodies.

	Erosion/flooding The activity not exacerbating riverbank or riverbed erosion, or flooding effects upstream or downstream. The structure not causing more than a temporary impediment during the construction phase to the passage of flood debris.
	Water course and levels The activity not causing any change in the seasonal or annual range in water level of any indigenous wetland. Crossings not resulting in flooding of any adjoining property in a 1-in-50-year average recurrence interval flood (2% annual exceedance probability). Structures not permanently altering the course of a river or stream.
	Public access Public access not being prevented to or along a water body to the standard that existed prior to construction of the river crossing.
	Construction methods The structure being constructed to retain integrity during flood flows. The entry and exit points of the structure being constructed and maintained to prevent surface erosion, river bank erosion, and outflanking by water-course diversion. All structures being constructed from durable materials. The mixing and pouring of construction materials (such as concrete) or the refuelling or maintenance of equipment not occurring in the wetted cross-section bed of the water body. No explosives being used in the bed of a river or lake or wetland when undertaking the activity.
	Maintenance A regular maintenance programme being implemented for all roads and drainage structures, particularly following significant rainfall events and prior to and following changes in traffic flow.
	Contaminants Oil, hydraulic fluids, petrol, diesel, other fuels, lubricants, paint, solvents or cement not being released into water as a result of the construction activity.
	Fish passage The provision of fish passage, both up and down streams or rivers, being maintained in perennial water bodies to pre-crossing levels. Provision being made for the temporary diversion of a permanent river or stream around the extent of the works while the activity is taking place. Culverts being installed at the natural invert level for both inlets and outlets.

	Culverts The maximum length of a culvert being 20 m. Culvert diameter size being a minimum of 375 mm. Fill over culvert crossings being fully contained and protected from collapse or erosion by armouring or construction using ground-durable material. Cut-offs and culverts being designed, installed and maintained to minimise sediment delivery to streams and wetlands and to prevent scour, rilling, gullying or slope failure. Culverts being constructed so that alignment and gradient are the same as those of the subject water body. All permanent culverts being designed to accommodate a 1-in-50-year flood (2% annual exceedance probability) without "heading up".
	Fords The ford not resulting in a vertical drop or discontinuity in flow under any flow conditions. No spoil being deposited onto the water-course bed during construction of the approaches. The ford not increasing flooding or risk of flooding. The ford being able to pass a 1-in-50-year flood event (2% annual exceedance probability). The river being diverted and work area dewatered before bed material is excavated and wet concrete poured. Fords being on natural gravel or rock surfaces or on a constructed platform resistant to erosion and scour. Ford approaches and downstream channel areas being protected against scour at high flows. The ford not causing the raising of the level of the bed.
	Bridges The bridge being a single-span bridge. Any bridge being designed so that a 50-year average recurrence interval flood can be accommodated, with the soffit (underside of bridge beams) for permanent bridges being at least 1.0 m above the 1-in-50 average recurrence interval flood. Any bridge being designed so as not to decrease the natural active (bankfull) flow channel width by more than 10%. The upstream and downstream approaches being fully contained and protected from collapse or erosion by armouring or constructions using ground-durable materials. The maximum length of a bridge being 30 m.
Auditing Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES with audit reports being available to the relevant district authority upon request.	**Auditing** Auditing of forestry operations being undertaken by the applicant on completion of works to confirm compliance with the terms and conditions of the NES with audit reports being available to the relevant district authority upon request.

Default: Restricted discretionary (if one or more of the above conditions is breached but requirements for the archaeological condition are met)	
Conditions: District	**Conditions: Regional**
	Matters over which discretion applies: • ecological and aquatic effects • water volume and diversion effects • water quality • fish passage • public access and navigation • design matters and construction methods • timing of installation and removals • location of works.
Default: Non-complying: Water bodies in a rural zone when archaeological conditions are not met.	

4.9.1 Explanation

River crossings are an essential part of most plantation forests. Because rivers (including streams) are particularly sensitive receiving environments, it is intended that the provisions cover all permanent and temporary structures. The conditions for permitted activities set out a general requirement and then have specific conditions for culverts, fords and bridges, all of which are commonly used in plantation forests.

4.9.2 Ability to be more stringent

In some cases the proposal provides the opportunity for councils to be more stringent, based on specific circumstances in their district or region.

Geothermal and karst protection areas

See explanation in Afforestation, section 4.2.

Hazard areas

See explanation in Earthworks, section 4.7.

Heritage values

See explanation in Afforestation, section 4.2.

Indigenous vegetation clearance

See explanation in Afforestation, section 4.2.

Infrastructure

See explanation in Earthworks, section 4.7.

Nuisance issues

See explanation in Afforestation, section 4.2.

Significant natural areas

See explanation in Afforestation, section 4.2.

4.9.3 Terms and conditions for river crossings being a permitted activity

General conditions

As river crossings have an earthworks component, it is intended that the activity be subject to permitted activity conditions as set out for Earthworks. See the explanation of these conditions in Earthworks, section 4.7.

Notification

It is intended that notice be given to the local authority prior to commencement, with a plan prepared demonstrating compliance, or the means of compliance, with conditions for the permitted activity up-front. Where there are a number of river crossings, it is intended that the plan could be provided on an annual basis.

Catchment

Catchment size can have implications in terms of flooding potential and sediment yield. For this reason, a maximum catchment has been applied, beyond which a resource consent would be required and the structure considered on a case-by-case basis.

Fuel

This condition is included because fuel contaminants are at risk of entering rivers where heavy machinery is being used.

Erosion and flooding

Structures in rivers can cause an obstruction that can exacerbate erosion and flooding effects. For permanent structures, in particular, it is vital that the natural dynamic of the river is not disturbed.

Watercourse and levels

Water levels in rivers can be adversely affected by construction within water bodies. It is intended that such changes not occur as a result of structures.

Public access

The condition reflects section 6(d) of the RMA, under which maintenance and enhancement of public access is a matter of national importance.

Construction methods

The proposed construction methods outlined aim to reflect best-practice methods for construction near water bodies.

Maintenance

A regular maintenance programme for roads and drainage structures is important, especially in terms of debris clearance.

Contaminants

Working in close proximity to sensitive rivers means that it is important to have tight control over contaminants.

Fish passage

Maintenance of fish passage is an essential component of habitat protection and is a reflection of requirements set out in sections 6(a) and (c) of the RMA.

Culverts, fords and bridges

There are specific conditions applied to culverts, fords and bridges, which are the main type of river crossings used in plantation forests.

Auditing

It is proposed that an auditing condition be included. This condition puts the onus on plantation forest applicants to confirm that, upon completion of the works, permitted activity conditions have been adhered to. It is also proposed that this be made available to the relevant local authority upon request. This is a best-practice condition that should fit in with good forestry practice.

4.9.4 Non-complying activity

See explanation in 'Archaeological matters' in section 4.2.3.

4.9.4 Discussion

Receiving environments

The main objective outlined in this document is to have an appropriate framework for controlling plantation forestry activities. This is recognised as accommodating different receiving environments. Water bodies are particularly sensitive and unique receiving environments.

Question on receiving environments:

75. **Do you think the rules governing these are best dealt with at a regional council level?**

Questions on river crossings generally:

76. **Are there any gaps?**

77. **Should constructions near/across water bodies of regional significance have a stricter activity status?**

78. **Can you think of any other construction methods that should be included?**

79. **Do you think the conditions for culverts, bridges and fords are sufficient? Do there need to be specific controls for any other types of river crossings?**

80. **How would these rules affect the permitted baseline?**

81. **Do you think the proposed conditions are enforceable?**

5 Implementing the Proposed NES

5.1 Who would be responsible for implementing and monitoring the NES?

Territorial and regional authorities would be responsible for giving effect to, and enforcing the requirements of, the NES. The proposed NES has been developed to give effect to the functions of territorial and regional authorities under sections 30 and 31 of the RMA.

5.2 How would the NES affect existing plans?

In general, an NES overrides a rule in a plan. A rule in a plan:

- cannot be more lenient than an NES
- can specify that an activity (that is permitted by the standard) is permitted, subject to terms and conditions to regulate effects not covered by the standard
- can be more stringent if the NES specifically allows a rule in a plan to be more stringent.

It is not intended that the NES will require councils to immediately change their plans to reflect the NES. The NES is intended to override any rules in plans that relate to the effects of forestry within the scope of the NES.

It is anticipated that any inconsistency between plans and the NES can be removed during the course of plan reviews that would occur in the normal course of events.

There may be continuing overlap where the NES permits activities but has reserved the ability for a council to have more stringent rules when certain effects occur or circumstances exist.

There may also be cases where councils apply more stringent conditions for activities. The result of this situation may be that activities that are subject to more stringent tests and certain activities may default to requiring a resource consent. Some existing plans will have existing activity controls that could take effect immediately and operate together with the NES. Other local authorities may wish to amend their plans in order to achieve this.

5.3 How would the proposed NES affect existing and new resource consents?

The proposed NES will not directly affect existing resource consents unless a consent authority chooses to apply section 128 of the RMA to review consent conditions. If that is the case, depending on the context it may be relevant to consider the NES.

The intention is that the NES will apply to any new designation or application for resource consent that is lodged after the NES comes into effect. Where an application for resource consent has been made before the NES comes into effect, the intention is that the application does not have to comply with the requirements of the NES if the decision on whether to notify it has been made before the date on which the standard is notified in the gazette.

Where the decision on notification or non-notification pre-dates the gazettal of the NES, the consent will prevail over the NES unless the NES expressly provides otherwise. However, the intention is that the application does not have to comply with the requirements of the NES in this situation.

The NES will apply to any new designation or application for resource consent that is lodged, or in respect of which a notification decision is made, after the NES comes into effect.

Questions:

82. Do you see any problems complying with the proposed NES or with enforcing it?

83. Are the thresholds for determining whether resource consent is required clear and appropriate?

84. Do you have any comment on how this proposal would work in with your regional or district plan?

6 Costs and Benefits of the Proposed NES

A preliminary assessment of the costs and benefits of the proposed NES has been prepared by independent consultants. The preliminary cost–benefit analysis shows that the nationwide impacts are expected to be positive, whereas site-specific impacts are unable to be quantified at this preliminary stage.

The complete analysis will be reported in two parts:

1. a preliminary cost-benefit analysis – an initial scoping assessment, presented in summary here (the full preliminary cost–benefit analysis report, including information sources, is available on the Ministry's website at www.mfe.govt.nz/laws/standards/forestry)
2. the full cost-benefit analysis – a fuller quantification will be completed after analysis of the consultation responses and formulation of a final policy position, if the option of an NES is pursued.

A summary of the potential costs and benefits of the proposed NES is shown in table 4, and a description of these impacts is given below.

To ensure future impacts are compared appropriately against current impacts, future impacts quantified in monetary terms have been discounted. The rate used for discounting future impacts in this analysis is 8 per cent. The time period used for the analysis is 20 years.

Table 4: Potential costs and benefits of the proposed standard

Impacts	Costs	Benefits
Potential nationwide impacts (Note: Time period used is 20 years. The value of impacts accruing in future years has been discounted at 8 per cent.)	• One-off implementation costs for central government: **$120,000** • One-off implementation costs for local authorities: **$1 million** • One-off implementation costs for forestry sector: **< $100,000**	• Avoided plan changes for councils: **$1 million** • Avoided plan-change submission costs for sector and other stakeholders: **$0.5 million** • Avoided research, interpretation and briefing costs to the forestry sector: **$2.5 million** • Reduced lobbying by the forestry sector: **$10,000** • Avoided enforcement and remediation costs from increased compliance: **total unknown ($5,000–$250,000 per breach)** • Increased certainty for the sector: **total unknown (reduced regulatory risk may increase forestry investment)** • Improved environmental outcomes: **total unknown (carbon capture benefits $290,000 per 100 ha, Kyoto Protocol target met).**
Potential nationwide total	**$1.22 million**	**$ 4 million +**

Potential site-specific impacts	*In locations with more lenient rules imposed by the NES:* • a reduction in good environmental outcomes: **un-quantified**	*In locations with more stringent rules imposed by the NES:* • improved environmental outcomes: **un-quantified**
	In locations with more stringent rules imposed by the NES: • increased consent application costs for sector: cost of application (eg, $5,000 to $20,000) x expected number of additional consents • increased consent-processing costs for councils: cost of processing (eg, $2,000) x expected number of additional consents • increased monitoring costs for councils or sector: cost of monitoring (eg, $500 to $5,000) x expected number of additional monitored activities • increased dispute costs: dispute costs (eg, $20,000 to $100,000) x expected number of additional disputes • increased delays for sector: unquantifiable, but potentially $250,000 per 100 ha affected • increased costs for some forestry activities (eg, culvert or setback requirements): reduced cost per activity x expected number of activities affected.	*In locations with more lenient rules imposed by the NES:* • reduced consent application costs for sector: cost of application (eg, $5,000 to $20,000) x expected number of avoided consents • reduced consent-processing costs for councils: cost of processing (eg, $2,000) x expected number of avoided consents • reduced monitoring costs for councils or sector: cost of monitoring (eg, $500 to $5,000) x expected reduction in number of monitored activities • reduced dispute costs: dispute costs (eg, $20,000 to $100,000) x expected number of avoided disputes • reduced delays for sector: unquantifiable, but potentially $250,000 per 100 ha affected • reduced costs for some forestry activities (eg, culverts or setback requirements): reduced cost per activity x expected number of activities affected.

6.1 Benefits on a nationwide basis

The introduction of the proposed NES would generate a number of benefits to society, including:

- avoided plan changes for councils
- avoided plan-change submission costs for the forestry sector
- avoided research and interpretation costs
- avoided enforcement and remediation costs from increased compliance
- increased certainty for the forestry sector, leading to increased investment
- improved environmental outcomes.

A summary of these benefits is provided below.

6.1.1 Avoided plan changes for councils

In the absence of an NES, many councils are likely to carry out periodic plan reviews and individual plan changes that would, from time to time, affect the rules governing plantation forestry activities in a particular area. These reviews and proposed amendments typically

involve councils committing time and resources to investigating potential amendments, operating public consultation processes and determining what changes are to be made.

The magnitude of the council resources used for these reviews varies from council to council, depending on the nature of the plan being reviewed. Discussion with selected councils revealed that relatively simple plan changes can cost around $20,000, but that the costs of carrying out plan changes that require extensive public consultation can range from around $100,000 to $200,000. Assuming a typical plan change cost of $20,000, avoiding five plan changes a year over a 20-year period would generate a benefit in the order of $1 million in total (applying an 8 per cent discount rate to impacts in future years).

6.1.2 Avoided plan-change submission costs for the forestry sector

In response to these reviews and proposed plan changes and amendments, forestry sector participants may make submissions during the various consultation processes. The cost of preparing these submissions, including staff time, would be avoided by the introduction of an NES. In some cases these costs may be minor, say $2,000, but more typically the costs may range up to $7,000 to $10,000. In some cases the costs may be considerably higher. For example, submission costs incurred by forest owners in Canterbury who submitted on Environment Canterbury's Natural Resources Regional Plan were around $100,000.

Assuming a typical submission cost of around $10,000, avoiding submissions on five plan changes a year over a 20-year period would generate a benefit in the order of $500,000 in total (applying an 8 per cent discount rate).

Offsetting these benefits to some extent is the fact that an NES itself may be prone to amendment over time, and there are some areas outside the NES's scope, or that are able to be more stringent, that will still require submissions. This could occur if new scientific research provides an improved understanding of the environmental impact of forestry activities, or if new types of forestry (eg, energy forestry) become more prevalent. Because of these possibilities, not all submission costs may be avoided by an NES.

6.1.3 Avoided research and interpretation costs for the forestry sector

Given the variability of rules between locations, as well as the inherent complexity of the current rules in many areas, an NES is likely to lead to greater consistency and certainty for the forestry sector. This would in turn reduce the costs of forestry operations, as operators would no longer need to research, interpret and apply different rules for forestry operations in different districts and regions.

This process can be costly, as employees must be fully briefed and trained regarding the rules applicable for each operation. In some cases it may even be necessary for employees to be briefed about different sets of rules that apply to the same forest if a single forest spans two districts or regions. Based on estimates provided by forestry sector participants, an NES may lead to an annual reduction in costs equivalent to around two or three FTEs, plus some overheads, across the sector. These savings could be worth approximately $250,000 per year. Over a 20-year period this benefit would be in the order of $2.5 million in avoided costs in total (applying an 8 per cent discount rate).

6.1.4 Avoided enforcement and remediation costs

The rules governing forestry activities are occasionally breached by forestry operators. If an NES were to lead to greater consistency and simplicity, more individuals throughout the sector would have a better understanding of the rules that apply in any given location. This may result in fewer breaches overall.

These breaches can result in negative environmental impacts. As well as these impacts, any resulting enforcement action can generate costs, such as legal expenses and internal staff time for both councils and forestry operators.

Consequently, an NES would be simpler and less costly to interpret and comply with than current rules in many areas, meaning there may be fewer breaches of forestry activity rules. This could avoid some of the negative environmental and external impacts, remediation costs, enforcement costs and legal expenses that would otherwise arise under the status quo.

6.1.5 Increased certainty for the forestry sector regarding future rules

An NES could also increase certainty regarding forestry rules over time, which would reduce some of the 'regulatory' risks faced by forestry investments. Currently there is scope for councils to alter rules governing forestry activities in a manner that may negatively affect forest owners' ability to obtain returns from their investments. This may occur if limitations are placed on harvesting activity, for instance. One impact of such regulatory risk is if a lender (eg, a bank) considers there is a risk that plan changes could hinder the ability for a forest to be harvested. This risk, whether real or perceived, can affect interest rates charged for loans. This in turn can negatively affect the financial viability of forestry investments.

Increased certainty in activity rules and reduced risk to forestry activities could lead to greater profitability, which would constitute a benefit of an NES. Increased returns could in turn lead to a higher level of investment in forestry than would otherwise occur, particularly in areas where uncertainty is currently high. Benefits from increased forestry investment could also include improved environmental outcomes, as described in section 6.1.6 below.

6.1.6 Improved environmental outcomes

Several of the beneficial impacts outlined above would have the effect of reducing both the regulatory risks and the costs of regulatory compliance faced by the forestry sector. This could effectively increase the returns to forestry investments, although this increase is likely to be relatively small, particularly in relation to land costs. However, if the increased certainty and reduced regulatory risk were enough to generate investment in what otherwise would be a marginal forestry investment, this could lead to a small increase in forestry compared to the status quo. Increased forestry activity could potentially generate positive environmental impacts if this avoids land being used for other types of land uses.

To the extent that an NES leads to increased compliance with forestry activity rules, if these rules are easier to interpret there may also be fewer breaches of the rules (see section 6.1.4 above). Improved environmental outcomes may also arise in areas where an NES leads to more stringent rules, although these impacts would not occur in all areas.

The environmental benefits that could arise from increased forestry and greater compliance may include:

- improved water quality
- increased carbon capture
- biodiversity enhancement (see section 1.7.9).

Although it is difficult to quantify the benefits of improved water quality and biodiversity, the benefit of a given increase in carbon capture can be estimated. A decrease in New Zealand's net greenhouse gas emissions would reduce New Zealand's liability under the Kyoto Protocol. This analysis also assumes that when the Kyoto Protocol expires in 2012, a similar international agreement will be in place.

New plantation forests absorb approximately 800 tonnes of carbon dioxide equivalent per hectare over a rotation, but the carbon dioxide absorbed is assumed to be emitted on harvest (MAF, 2010a). Over multiple rotations, on average approximately half this amount (ie, 400 tonnes of carbon dioxide equivalent per hectare) can be assumed to be removed from the atmosphere. Based on a carbon price of $25 per tonne of carbon dioxide, every additional hectare of forestry would generate a one-off benefit of just over $4,000. Consequently, if one additional forest of around 100 hectares is created (less than 0.01% of the current total plantation forest), the one-off benefit generated would be around $400,000.

6.2 Benefits on a geographic basis

The introduction of the proposed NES would generate local benefits, but these would vary depending on location. They would include:

- reduced resource consent costs for the forestry sector
- reduced consent-processing costs for councils
- reduced monitoring and data costs
- reduced dispute costs
- reduced delays for the forestry sector in obtaining consent
- reduced costs for some forestry activities.

6.2.1 Reduced resource consent costs for the forestry sector

If an NES were to reduce the number of activities requiring consent, the costs imposed on the forestry sector in the course of applying for resource consents would also be reduced. The magnitude of the costs that could be avoided varies. The typical cost of internal staff time and other expenses incurred in the preparation of resource consent applications may be around $5,000, but it may range up to around $20,000. Also, typical application charges levied by councils may be in the vicinity of $1,500, although charges are often larger for more complex applications (eg, $10,000).

6.2.2 Reduced consent-processing costs for councils

If an NES were to reduce the number of activities requiring consent, the (unrecovered) administrative costs imposed on councils from processing consent applications would also be reduced. The average unrecovered administrative cost incurred by councils in relation to resource consents obtained by Telecom during its nationwide roll-out of roadside cabinets and cell sites was estimated at around $2,600 per consent. The equivalent cost for forestry activity consents could be of a similar magnitude.

6.2.3 Reduced monitoring and data costs

To the extent that certain forestry activities in some areas would no longer require resource consent, this would reduce the ability of councils to request data and other information concerning forestry operations. Any reduction in such requests may lead to a reduction in monitoring and reporting costs faced by the forestry sector. An NES also has the potential to lead to a reduction in compliance monitoring carried out by councils. These costs typically range from around $500 to $5,000.

6.2.4 Reduced dispute costs

To the extent that an NES would lead to some activities becoming permitted activities rather than requiring consent, this could reduce dispute costs associated with the resource consent process. For instance, it is likely that there would be fewer occasions when applicants would need to undertake costly appeals to obtain consents.

Also, third parties who might otherwise challenge the granting of consents would be excluded from doing so if activities were instead permitted. This would increase the certainty for the forestry sector of being able to carry out certain activities that would be permitted as opposed to requiring consent. Furthermore, in contrast to individual plan rules, an NES cannot be challenged except by a judicial review regarding the process carried out in its creation. The costs of a typical dispute may be around $10,000 to $20,000, although the cost of some disputes can be substantially higher.

6.2.5 Reduced delays for the forestry sector in obtaining consent

In the process of obtaining resource consents, forestry sector participants can occasionally be subject to delays if councils do not adhere to the appropriate deadlines. In some cases these delays can have a substantial impact on the timing of activities such as harvesting. This can occur if such delays mean that consents are not granted until non-harvesting periods have begun (eg, winter). This means that harvesting activity can be delayed until the appropriate harvesting period in the following year.

To the extent that an NES would reduce delays because fewer activities would be subject to a consent application process, this would benefit the forestry sector by increasing the flexibility regarding the timing of harvesting activity. Fewer delays and increased flexibility can provide more scope for forestry owners to take advantage of favourable log prices.

Given the volatility of these prices, the timing of harvesting can have significant impacts on the returns to forest owners. For instance, a change in prices by $5 per tonne can alter the return on a 100-hectare forest block (which could generate around 50,000 tonnes) by around $250,000.

6.2.6 Reduced costs for some forestry activities

In areas where an NES would lead to more lenient rules for certain activities, the costs of carrying out these activities may be reduced. Changes to rules, such as setback requirements, can allow more trees to be grown on a given forest block, increasing the value of forest investments.

6.3 Costs on a nationwide basis

The proposed NES would impose some costs, or negative effects, on various members of the wider society. These costs include:

- implementation costs for central and local government
- implementation costs for the forestry sector.

6.3.1 Implementation costs for central and local government

The introduction of an NES would require changes and impose costs on both councils and central government organisations (administrative costs). These costs would be one-off costs incurred in the transition from the status quo to an NES and are likely to apply across the country.

The implementation of an NES is likely to generate two main administrative costs:

- costs to central government of implementation
- costs to councils of amending plans and notifying changes.

After the current consultation process is completed, any decision to introduce an NES would generate implementation costs for central government. These would include the costs of educating stakeholders (incurred by the Ministry for the Environment); for example, from providing workshops, guidance material and erosion mapping information. The total administrative cost of workshops would be in the vicinity of $20,000, with the cost of generating guidance material estimated at around $50,000, and technical advice around $10,000. The costs of providing councils with erosion mapping information would be an estimated $40,000.

Even though not required by legislation, the introduction of an NES could also lead many councils to change their existing plans to incorporate the new rules, including changing policies and objectives where a conflict with the NES rules occurs. Work would be carried out by council practitioners interpreting the NES, determining what impact it would have on existing rules and plans, and educating staff about the new rules. External costs of this adjustment process may include obtaining legal interpretations of the NES and the costs of notifying these changes to interested parties (eg, via advertising). Based on discussions with selected councils, the total cost of this process for an individual district or regional council could range from $2,500 to around $20,000.

However, these costs could be considerably larger if councils were required to identify certain features, such as wāhi tapu, archaeological sites, wetlands or hazard areas. This could require engaging specialist expertise and carrying out a public consultation process. In this case, the costs incurred by councils could range from around $100,000 to $200,000 per council. Assuming that the majority of councils (eg, 80) incur minor implementation costs, say $5,000, and a small minority (eg, five) incur large implementation costs, say $100,000, the total cost to councils could be in the order of $1 million.

6.3.2 Implementation costs for the forestry sector

The implementation of an NES is likely to generate one-off adjustment costs for the forestry sector as it adjusts to new standardised rules. This is because any change in rules brought about by an NES would need to be interpreted and understood by both the forestry sector and by RMA practitioners. These parties would incur costs (eg, time) in interpreting and reviewing the changes brought about by an NES. However, the magnitude of these adjustment costs is likely to be relatively minor, as the majority of consent applications would be carried out by five or six large firms.

6.4 Costs on a geographical basis

The introduction of the proposed NES would generate a number of local costs, but these would vary depending on the location. They would include:

- increased resource consent costs for the forestry sector
- increased resource consent-processing costs for councils
- increased monitoring costs
- increased dispute costs
- increased costs for the forestry sector due to delays
- increased costs for some forestry activities.

6.4.1 Increased consent costs for the forestry sector

In areas where an NES would lead to more stringent rules (eg, if activities that were previously permitted instead required consent), ongoing costs could be generated for resource consents required for certain specified forestry activities. Any increased use of the resource consent process in these areas would generate additional costs for councils and, to a larger extent, applicants.

The resource consent application costs incurred by the forestry sector can be grouped into two types:

- (external) council charges
- (internal) costs of preparing consent applications.

As well as council charges for processing applications, forestry sector operators incur costs in the preparation of consent applications. These costs can include the time and expense incurred in deciphering and interpreting the relevant plans, developing applications, and planning activities that adhere to the rules within these plans. These rules – along with the structure,

approach and layout of plans – often differ across districts and regions. Even within a particular area, rules that govern certain forestry activities may be contained in several different plan documents and may not be cross-referenced.

Also, plan rules are subject to change at the discretion of individual councils and can vary over time. These factors can impose substantial interpretation and planning costs on the forestry sector. These costs can arise not only in relation to carrying out the same activity across different areas, but also in carrying out the same activity within a certain area over time. By standardising these rules to a much greater degree, an NES could lead to a substantial reduction in these interpretation, preparation and planning costs.

The resource consent costs faced by the forestry sector could vary considerably depending on a number of variables, including the nature of the activity in question and the location. According to selected forestry sector participants, the typical cost of internal staff time and other expenses incurred in the preparation of resource consent applications can be around $5,000, but may range up to around $20,000 per application. Also, typical application charges levied by councils can be in the vicinity of $1,500 for simple applications, but may be significantly larger for more complex applications (eg, $10,000).

6.4.2 Increased consent costs for councils

Any increase in resource consent requirements would increase the administrative burden on affected councils. However, many of these costs are passed on to applicants in the form of consent application charges levied by councils. Consequently, it is only that portion of expenses not recovered by applicants that would constitute (net) costs to councils. The degree of cost recovery varies across councils, with some councils attempting to carry out full cost recovery whereas others do not seek to recover any application processing costs. The status of the consent also influences whether councils can directly recover costs.

Because in most cases councils attempt to recover the majority of the costs they incur in processing consent applications, the remaining, unrecovered, administrative costs are a relatively small proportion of the total consent application costs, at least in relation to charges passed on to applicants. Although figures are not available for forestry consents, the average unrecovered administrative cost incurred by councils for resource consents obtained by Telecom during its nationwide roll-out of roadside cabinets and cell sites was estimated at around $2,600 per consent application.

6.4.3 Increased monitoring costs

In addition to the costs of consent application processes, forestry operators may also face additional monitoring and information reporting costs. Activities such as water quality monitoring may be requirements of any consent provided by councils. These monitoring costs typically vary from around $500 to $5,000 per consent. Information reporting requirements can also add to administrative costs for forestry operators.

6.4.4 Increased dispute costs

Disputes regarding the consenting of forestry activities typically arise because either:

- applicants challenge councils' decisions if consent is not given or certain conditions on activities are imposed; or

- third parties challenge councils' decisions on providing consent, or certain conditions are not imposed.

The specific costs that can arise include the time spent and expenses incurred in resolving disputes (eg, preparing submissions, attending hearings, hiring legal representation, court time). These costs would be minor if a dispute were resolved quickly and informally, but may be substantial if a case is heard in the Environment Court. Councils tend to budget around $50,000 per appeal.

Given that there will be one or more other parties involved in a dispute, this suggests that the total costs imposed on all parties could exceed $100,000. In one recent case, the total dispute costs were in excess of $1 million. However, a more typical magnitude for the costs generated by a dispute may be around $10,000 to $20,000.

In areas where an NES resulted in rules that were more stringent (eg, more activities required consent), there could be greater scope for more disputes. Also, an NES that imposes rules on some forestry activities could give rise to inconsistency if different rules were to apply to the same activities when carried out for other, non-forestry, purposes. For example, earthworks carried out in the course of forestry activities could be permitted, whereas earthworks carried out for subdivision development could require consent. This inconsistency could give rise to disputes and challenges.

6.4.5 Increased delays for the forestry sector

The introduction of an NES could lead to an increase in the delays experienced by the forestry sector, particularly in areas where there are currently no rules concerning forestry activities. New regulatory requirements introduce the potential for delays to the extent that councils must first provide permission, or obtain information they consider suitable, before forestry operators are entitled to carry out certain forestry activities such as harvesting.

The reduction in flexibility for forestry operators as to when they are able to carry out harvesting activities can have negative consequences if it prevents forest owners from taking advantage of favourable market conditions (eg, high log prices or low shipping costs). Because of the volatility of these prices, delays can have adverse impacts on forest owners. Consequently, any such adverse impact of a delay that arises because of new regulatory requirements would constitute a cost.

Given the volatility of these prices, the timing of harvesting can have significant impacts on the returns to forest owners. For instance, it is not uncommon for prices of logs to change by $5 per tonne over the course of a year (ie, a 5 per cent or 10 per cent fluctuation). For example, this can alter the return on a 100-hectare forest block, which could generate around 50,000 tonnes, by around $250,000.

6.4.6 Increased costs for certain forestry activities

In areas where an NES would lead to more stringent rules (eg, where there are currently no rules), an NES could increase the costs of carrying out certain activities. For example, if an NES were to require that culvert pipes used in a certain area be larger than those currently allowed, this may increase the costs faced by the forestry sector, although this impact would be relatively minor.

Also, rules governing setbacks could have a negative impact on some forest owners if these rules were to become more stringent. If setback requirements were increased because of an NES, this could reduce the amount of forest that could be grown and harvested in a given forest block. A resulting reduction in returns to affected forestry owners, which could be manifested as a reduction in land value, would constitute a cost of an NES.

Another example of how costs may be increased for the forestry sector is if rules governing harvesting activity that seek to limit scouring are more stringent (eg, if logs must be lifted rather than dragged along the ground in certain areas). It is possible that as a result of such a requirement, more roads may need to be used on certain sites. This may not only increase costs for foresters, but may also result in a larger environmental footprint.

In areas where there are currently no rules, an NES could lead to forestry companies applying for Code of Compliance certificates for permitted activities. Such certification can be used as confirmation that all relevant terms and conditions have been adhered to. The costs of this certification are generally minor (around $200).

6.4.7 Negative environmental impacts

Negative environmental impacts from forestry activities can be 'on-site' or 'off-site' impacts. On-site impacts can include soil erosion, which can reduce the capacity of land to sustain vegetation. Off-site impacts can include:

- downstream impacts on in-stream values and ecosystems from increased sedimentation
- reduction in the flood capacity of waterways because of sedimentation
- harvest debris harming infrastructure (eg, floodgates, bridges)
- negative impacts on receiving environments, which could be close to urban areas (eg, floods and land slips).

The potential for negative environmental outcomes from an NES are perhaps most likely if an NES resulted in rules that were more lenient than existing rules in certain areas, although these impacts would not occur in all such areas. Specifically, if an activity that currently requires consent becomes permitted, there may be less scope for councils, or other affected parties, to object if there are environmental concerns. This is more likely in areas where current rules have been designed to manage specific risks that arise within a particular location or region.

Also, allowing some activities to become permitted rather than requiring consent could have an impact on the degree of compliance monitoring that occurs in relation to these activities. This stems from the fact that whereas councils tend to recover the costs of compliance monitoring of consented activities via charges, they do not typically charge for any monitoring they carry out in relation to permitted activities. These costs can include staff time and water testing.

The Local Government Act allows for councils to charge for monitoring in relation to permitted activity conditions, but in practice it appears that councils do not institute charges because of the complexity and cost of applying this legislation. Consequently, if an NES were to give more activities permitted status, the costs of monitoring may no longer be imposed on forestry operators, but instead may be passed on to councils.

If councils maintain the same level of monitoring, the outcomes from an NES in terms of monitoring would be unchanged. However, councils could potentially reduce their monitoring activity if they were to face budgetary constraints. Also, because the permitted nature of the

activities in question may mean fewer reporting requirements, councils may be less aware of the need for specific monitoring in some cases. As a result, less monitoring could occur in these areas. Although this may reduce monitoring costs, it could also increase the likelihood of negative environmental impacts.

Questions:

85. Have we accurately reflected the range of costs and benefits arising from the proposals for an NES, and who might bear the costs or receive the benefits?

86. Are there any costs and benefits we have overlooked? Do you have specific costs or benefits in your location? Do the estimates on costs and benefits seem correct?

87. Do you have any information you would like to see included in the final cost–benefit analysis that will be carried out after the submissions are received and analysed?

88. In the area/s you operate in, what would the impact of the NES be on forestry operations, including any increased/decreased need for resource consent?

89. Do current plantation forestry rules materially influence industry investment decisions and regional location decisions?

7 What Happens Next?

7.1 Making a submission

A six-week submission period is provided to allow for consultation with the public and interest groups (eg, iwi authorities). During this period the Ministry will be holding workshops around the country to make presentations and answer questions about the proposed policy in this document. These workshops will be advertised on the Ministry website, in newspapers and in relevant newsletters.

Anyone can make a submission on the subject matter of the proposed standard.

Please include the following information with your submission:

1. your name and postal address, phone number, and email address (where applicable)
2. the title of the proposed standard you are making the submission about
3. whether you support or oppose the standard
4. your submission, with reasons for your views
5. any changes you would like made to the standard
6. the decision you wish the Minister for the Environment to make.

You must forward your submission to the Ministry for the Environment, PO Box 10-362, Wellington 6143, or by email to standards@mfe.govt.nz, in time to be received no later than 5.00 pm Monday 18 October 2010.

Note: Your submission and any attached information (including your name but excluding your contact details) may be published on the MfE website and may be required to be disclosed in response to any requests under the Official Information Act 1982.

7.2 What happens to submissions?

Once submissions have been compiled, they will be considered during the development of the proposed standard, should this option be pursued. The Ministry will prepare a report with recommendations on the subject matter of the standard for the Minister for the Environment, including a section 32 (cost–benefit) analysis. The report and recommendations will be publicly notified. If the Minister's approval is given to continue developing the proposed standard, the final wording will be drafted and the proposed standard made into regulations.

7.3 Discussion questions

Your submission may address any aspect of the proposed subject matter of the standard. However, the Ministry for the Environment would also greatly appreciate any specific comment you might have on the questions posed in the document.

7.4 Pilot study: online discussion forum with data

The Department of Internal Affairs, with the support of the Ministry for the Environment, will run an engagement pilot study in parallel with the consultation on the NES. The pilot study will run as an online discussion forum, subject to the terms and conditions on the relevant web page. Data and images that are relevant to the question will be provided to supplement the discussion.

The pilot is designed to supplement opinion-making in one area only: how erosion susceptibility classification (see Appendix 5) could be used in forestry planning processes. Information derived from this study will be used in a thematic way to support the development of the NES: it will not be analysed and systematically taken into account in the development of the NES.

The pilot study will allow the Ministry for the Environment and the Department of Internal Affairs to evaluate the effectiveness of engaging with stakeholders in an online discussion forum. We are particularly interested in the following aspects:

- Did you use the online discussion forum to inform your opinion on erosion mapping?
- If yes, did you assess the supporting data sets within the online forum?
- Did you contribute to the online discussion, either with comments yourself or by rating someone else's comments?

More information on how to get involved in this process will be provided at upcoming public consultation workshops and online at: www.mfe.govt.nz/laws/standards/forestry.

Appendix 1: Legislative Framework

The following national legislation influences plantation forestry.

Biosecurity Act 1993

The Biosecurity Act deals with the exclusion, eradication and effective management of pests and unwanted organisms. The Ministry of Agriculture and Forestry (MAF), the Ministry of Fisheries, the Ministry of Health and the Department of Conservation all have responsibilities under the Act. Regional and territorial authorities also have a range of functions, powers and duties relating to the monitoring, surveillance and management of pests, pest agents and unwanted organisms, including the management of wilding trees (information based on Harris, 2004).

Conservation Act 1987

The Conservation Act established the Department of Conservation, the New Zealand Conservation Authority and Conservation Boards. The Act sets out broad principles for the management of conservation areas, indigenous freshwater fisheries, and natural and historical resources. The Department of Conservation also administers land under the National Parks Act 1980 and Reserves Act 1977, which are listed in the first schedule of the Conservation Act.

Crown Forests Assets Act 1989

In response to Māori concerns about the Government transferring Crown land to state-owned enterprises, the Crown Forests Assets Act 1989 allows the Crown to sell its forest assets but not the land. The Act provides for the management of the Crown's forest assets and the transfer of those assets (including transfer to Māori ownership and associated compensation).

Environment Act 1986

The Environment Act 1986 established the Ministry for the Environment and the Office of the Parliamentary Commissioner for the Environment.

Forestry Encouragement Act 1962

An Act to authorise the making of loans, out of money appropriate by Parliament for the purpose of establishing and managing farm woodlots and forest plantations.

Forestry Rights Registration Act 1983

This Act was passed to facilitate the use of joint ventures for the development of plantation forestry. It provides for a forestry right to be granted by the owner or lessee of land to another person to establish, maintain and harvest, or just to maintain and harvest, a crop of trees on that land.

Forests Act 1949 (Part 111A)

The Forests Act regulates the sustainable harvesting of indigenous forest on private land and is administered by the Sustainable Programmes Directorate of MAF. Part IIIA of the Act promotes sustainable management of indigenous forest land. This Act requires indigenous forests to be managed in accordance with approved Sustainable Forest Management (SFM) plans and permits.

Forests and Rural Fires Act 1977

This is the main legislation controlling rural fires. If a forestry organisation would like to clear vegetation by burning, it must obtain a permit from a Rural Fire Authority (set out in this Act). The Act also constrains the ability of land owners adjacent to designated forest areas to light any fire in the open.

Hazardous Substances and New Organisms Act 1996 (HSNO)

The HSNO Act has regulations relating to the storage and use of agrichemicals in forests, and to bulk fuels and oil stored in forests and quarries. For example, secondary containment systems are required for fuel tanks over certain volumes to minimise the risk of spills to the land or water, etc. The Department of Labour monitors and enforces regulations set out under the HSNO Act. The HSNO Act regulates the introduction of any new bio-control agent for weeds and pests, or the genetic modification of any species.

Health and Safety in Employment Act 1992 (HSE)

The HSE Act requires forest owners, principals to contracts, contractors and forest workers to take all practical steps to avoid, isolate or minimise hazards in forestry operations. In effect, worker safety has to take priority over all other activities undertaken in forests. The Department of Labour has issued an Approved Code of Practice for Safety and Health in Forest Operations, which constrains certain activities if they cannot be undertaken safely (eg, activities like removing slash from streams).

Historic Places Act 1993

The purpose of the Historic Places Act is "to promote the identification, protection, preservation, and conservation of the historical and cultural heritage of New Zealand". Under the Act, the Historic Places Trust retains regulatory responsibility for archaeological sites and listing of historic sites (Harris, 2004). Any person wanting to destroy, damage or modify an archaeological site (as defined in the Historic Places Act) must apply to the New Zealand Historic Places Trust for an authority to do so.

Local Government Act 2002

The purpose of this Act is to provide for democratic and effective local government that recognises the diversity of New Zealand communities; and, to that end, this Act—

(a) states the purpose of local government; and

(b) provides a framework and powers for local authorities to decide which activities they undertake and the manner in which they will undertake them; and

(c) promotes the accountability of local authorities to their communities; and

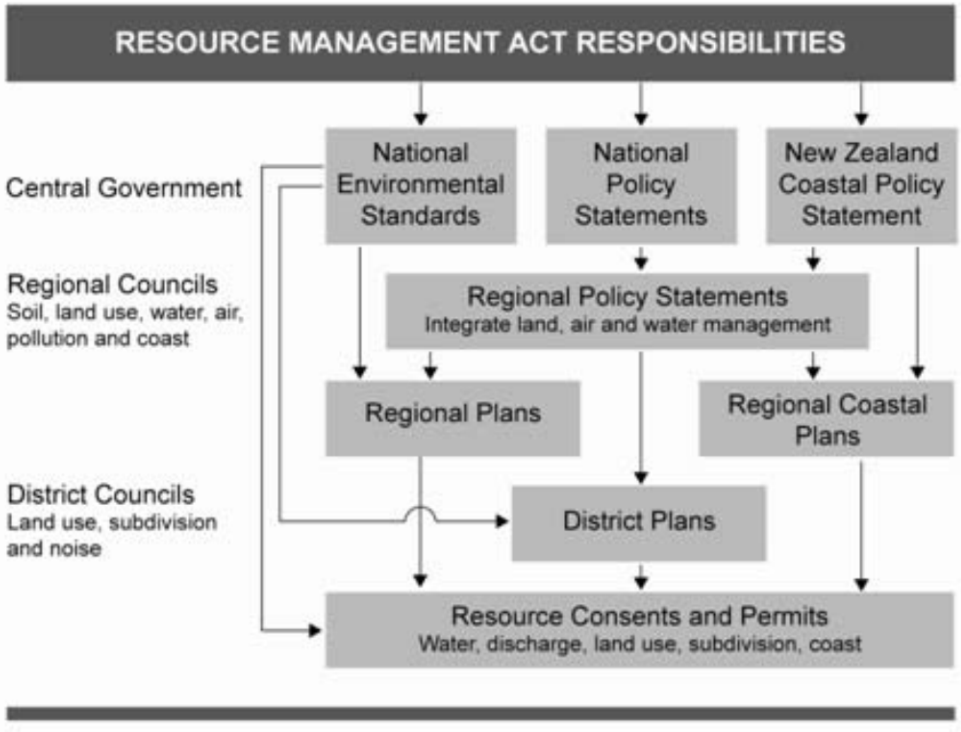
(d) provides for local authorities to play a broad role in promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach.

Resource Management Act 1991 (RMA)

The RMA sets the regulatory framework for resource management in New Zealand.

The purpose of the RMA is to "promote the sustainable management of natural and physical resources" (section 5), and the Act provides for a range of policy instruments to achieve this, as set out in figure A1.

Figure A1: Planning instruments under the RMA



National policy statements, including the New Zealand Coastal Policy Statement, set out objectives and policies for matters of national significance that are relevant to achieving the purpose of the RMA, but do not contain rules. National environmental standards (NES) are regulations that are legally enforceable. They are used to manage adverse effects on the environment. NES are discussed in more detail in section 1.4.

Regional policy statements and plans contain objectives and policies (regional plans also contain rules) that may relate to forestry activities (eg, land disturbance and activities in riparian areas). District plans may contain objectives and policies and rules to regulate aspects of plantation forestry activities.

Soil Conservation and Rivers Control Act 1941

The Act and its 1959 amendment provided for catchment boards to introduce controls on vegetation removal and/or earthworks by way of bylaws or soil conservation notices. Soil conservation notices, known as section 34 notices, could be for a specified area of land. With the introduction of the RMA, section 34 notices had a transitional timeframe of two years. However, because a consent was required under a bylaw, such consents were deemed to be discretionary consents under the RMA.

South Island Landless Natives Act (1906) (SILNA)

This Act provided for the transfer of land to approximately 4000 individuals of Māori descent. The transfer recognised long-standing calls for economic redress over land purchase agreements that left sections of the Māori population with insufficient land, or no land, with which to support themselves.

A 1999 survey of the SILNA lands found that approximately 17,300 hectares have some form of indigenous forest cover, excluding forests on Stewart Island and the Waitutu and Whakapoai blocks. These lands are located predominantly in Southland, with smaller areas located on the West Coast, Otago, Marlborough and Nelson.

From 1993 to 2004, SILNA forests held certain exemptions under the Forests Act 1949. These were partially removed in a 2004 amendment. The legislation still distinguishes between SILNA and other privately owned indigenous forest land. SILNA owners can harvest their forests without an SFM plan or permit (subject to the provisions of the Resource Management Act 1991), and sell the resulting timber on the domestic market. However, in the case of exports, SILNA forests are treated as any other privately owned indigenous forests and are subject to Part IIIA of the Forests Act 1949.

Other controls

The following also control plantation forestry in New Zealand.

New Zealand Forest Accord 1991

The New Zealand Forest Accord was signed in 1991 (and updated in 2007) by a number of non-governmental organisations and forestry groups. The objectives of the Accord were to:

- define the areas where it is inappropriate to establish plantation forestry
- recognise the value of indigenous forests and the need for their protection and conservation
- acknowledge the existing areas of natural indigenous forest that should be maintained and enhanced
- recognise that commercial plantation forests of either exotic or introduced species are an essential source of perpetually renewable fibre and energy, offering an alternative to the depletion of natural forests
- acknowledge the mutual benefits emanating from an accord between New Zealand commercial forestry enterprises and conservation groups, and the example this unique accord can provide to the international community (Harris, 2004).

Bylaws

Bylaws are rules or regulations that are usually made by a local authority under an Act, such as the Local Government Act 2002. They exist alongside rules in RMA plans and can regulate issues such as environmental nuisance, traffic, food and recreational use, at a district or regional level. The Minister of Conservation can also make bylaws under the National Parks Act 1980 and the Reserves Act 1977, and regulations under the Conservation Act 1987.

Iwi management plans

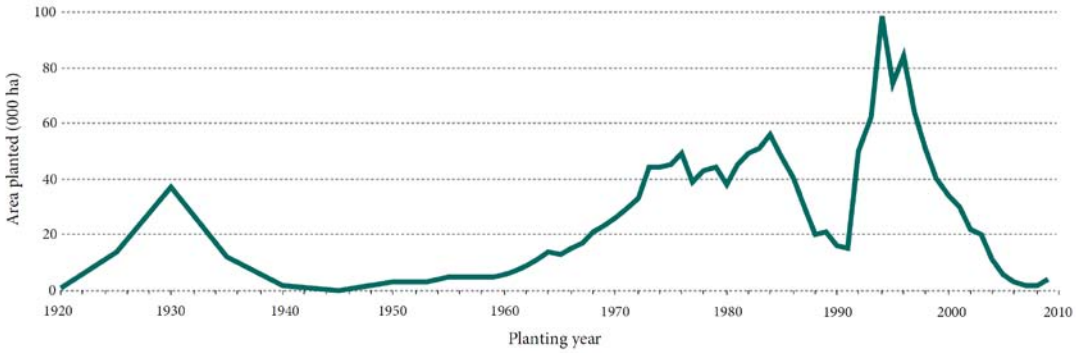
'Iwi management plan' is a term commonly applied to a resource management plan prepared by an iwi, iwi authority, rūnanga or hapū (Quality Planning, nd). The RMA states that when preparing or changing any regional plan (section 66) or territorial plan (section 74), councils shall have regard to any relevant planning document recognised by an iwi authority and lodged with that council, to the extent that its content has a bearing on resource management issues of that region or district.

Appendix 2: Planning for Plantation Forestry

Plantation forestry in New Zealand

Plantation forestry is a common feature in our rural landscapes and is an important industry for the country. Plantation forests are widespread in New Zealand due to extensive planting in the late 1920s and early 1930s, late 1960s through to the 1980s, and the mid-1990s, as illustrated in figure A2. These extensive planting periods were driven by a number of factors, including the need to meet domestic needs and to supply international markets.

Figure A2: New forest planting, 1920–2009

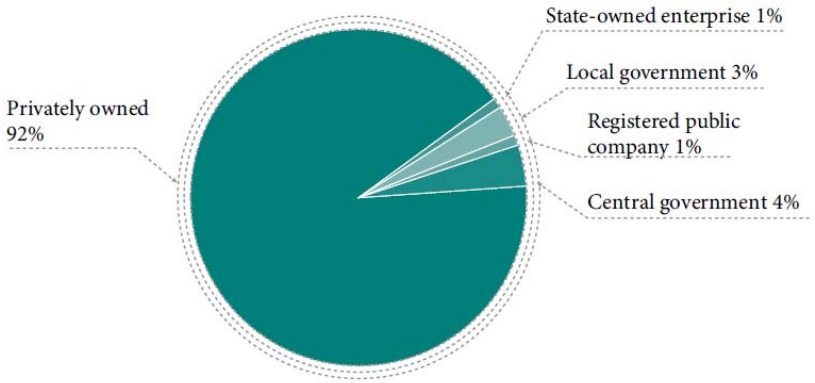


Source: MAF, 2009c

Forestry ownership and distribution

Kaingaroa Forest is the largest plantation forest in New Zealand, covering an area of around 189,000 hectares in the central North Island (Kaingaroa Timberland, nd). Around 100 forest owners have forests that are over 1000 hectares, which account for 70 per cent of total forests by area. Over 90 per cent of forests are privately owned (figure A3).

Figure A3: Forest ownership in New Zealand



Source: MAF, 2009c

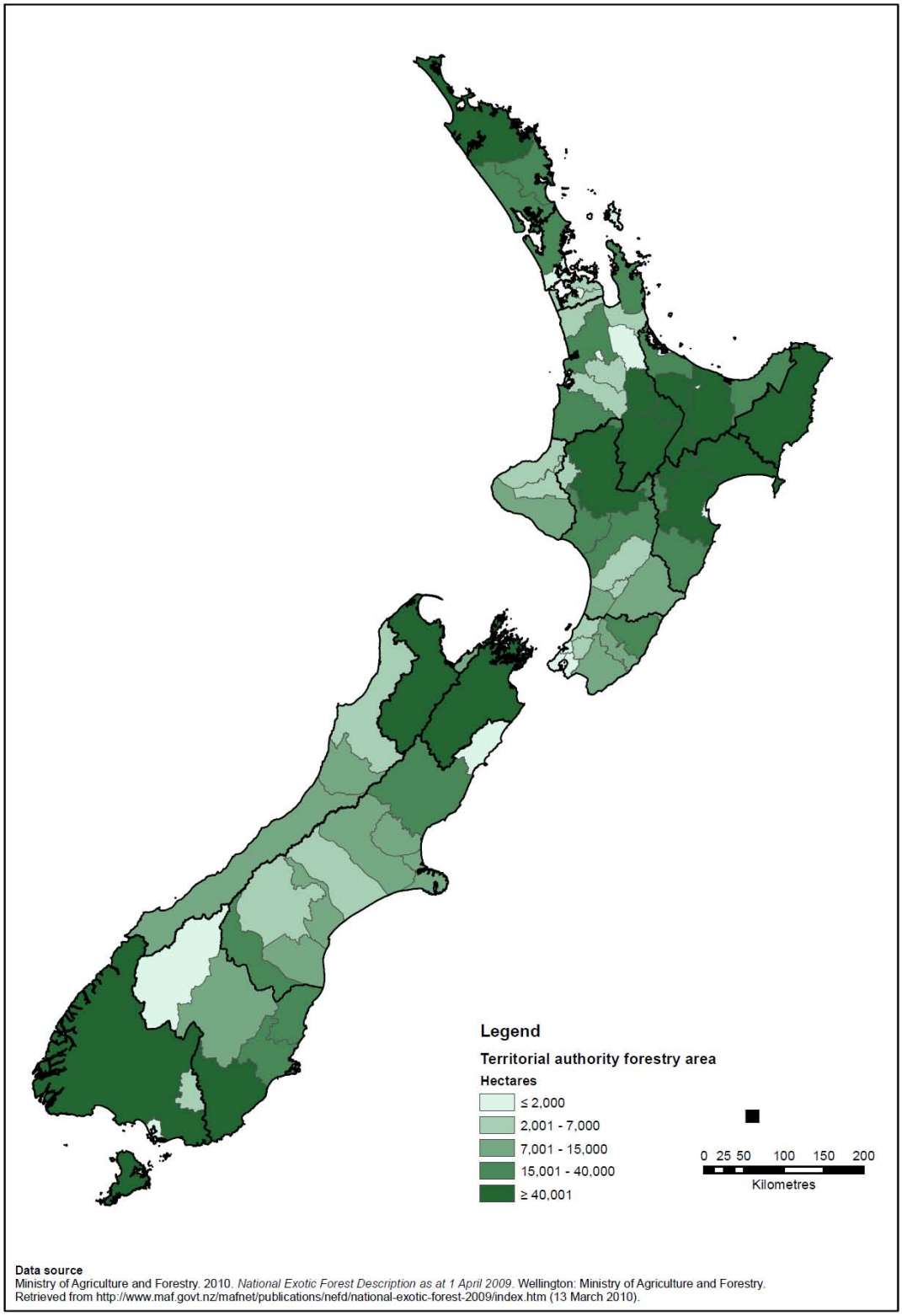
Note: Percentage does not add to 100 per cent due to rounding.

There are estimated to be 15,123 forest owners in New Zealand. About 15,000 hold less than 1000 hectares each, but in aggregate they own 30 per cent of the plantation forest estate. Some 13,000 of these owners have less than 40 hectares each (MAF, 2008).

Māori are forest and forest land owners, and the return of forest land through the Treaty of Waitangi settlement process means that Māori have significant interests in the sector (MAF, 2009a).

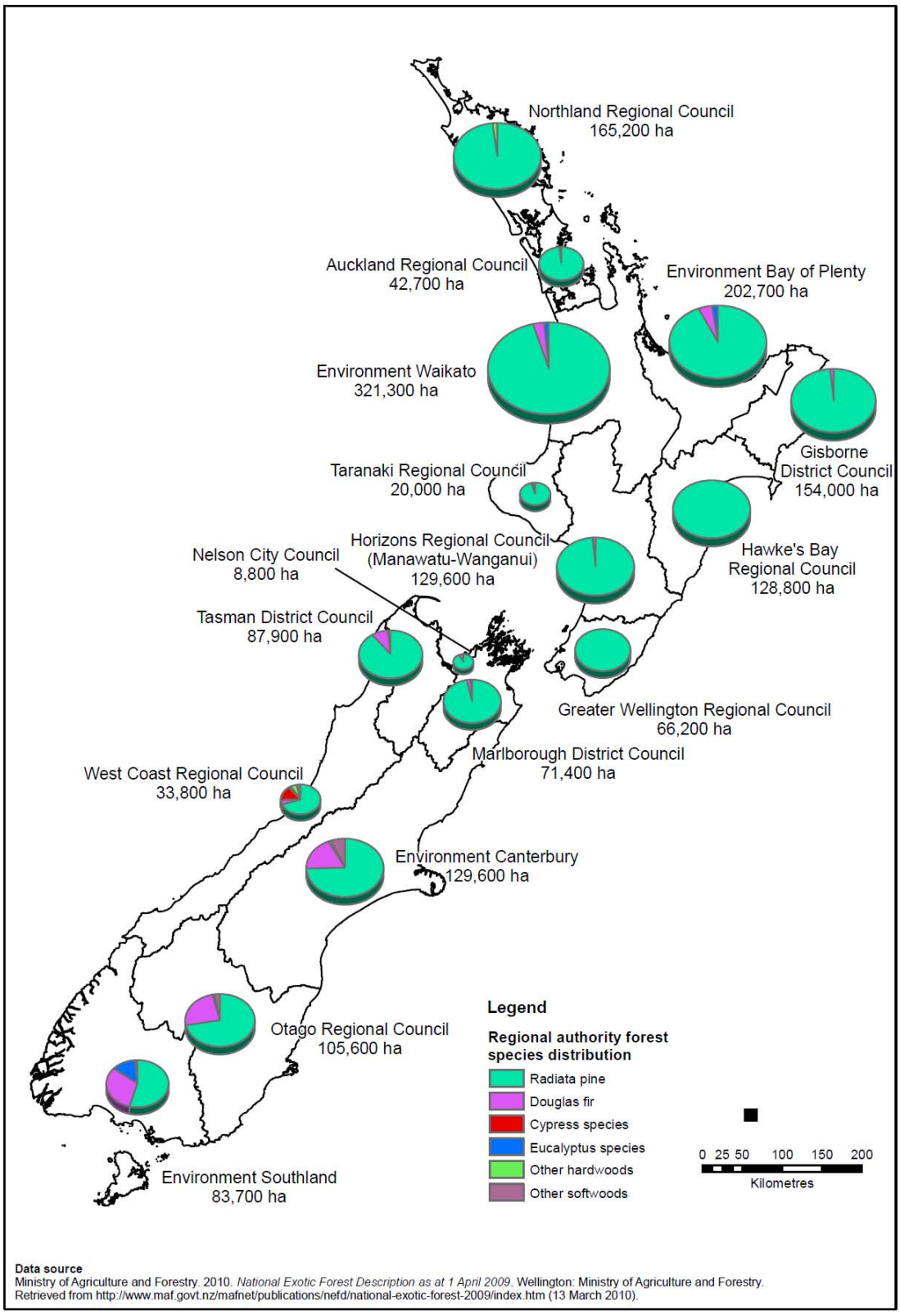
Figures A4 and A5 illustrate the distribution of plantation forests by territorial authority and regional council. The majority of forestry is in the North Island and the resource is dominated by radiata pine.

Figure A4: Plantation forestry distribution (hectares), by territorial authority, April 2009



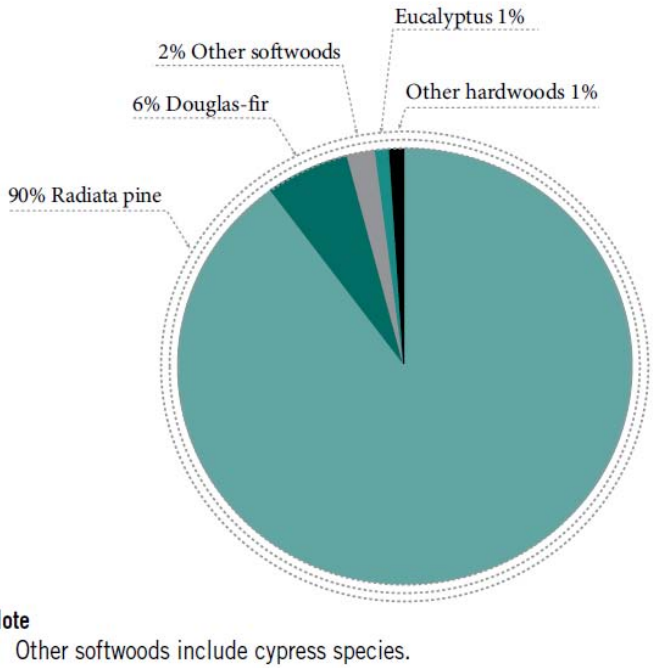
Data source
Ministry of Agriculture and Forestry. 2010. *National Exotic Forest Description as at 1 April 2009*. Wellington: Ministry of Agriculture and Forestry. Retrieved from http://www.maf.govt.nz/mafnet/publications/nefd/national-exotic-forest-2009/index.htm (13 March 2010).

Figure A5: Plantation forestry distribution (hectares and species), by regional authority, April 2009



Radiata pine makes up the majority (90 per cent) of the plantation forests in New Zealand, with Douglas fir, eucalyptus and other softwoods and hardwoods making up the remaining 10 per cent (figure A6) (MAF, 2009c).

Figure A6: Plantation forest species distribution, 2009



Source: MAF, 2009c

Plantation forests and the New Zealand Emissions Trading Scheme (NZ ETS)

The NZ ETS was enacted by the Climate Change Response Act 2002 with the aim of supporting global efforts to reduce greenhouse gas emissions and to allow New Zealand to comply with international obligations, including the Kyoto Protocol (MAF, 2010a).

Reducing greenhouse gas emissions is the main driver behind the NZ ETS. Worldwide greenhouse gas emissions are increasing from both natural and human activity, and forestry plays an important role as a 'carbon sink', whereby atmospheric carbon dioxide, one of the main greenhouse gases, is removed from the atmosphere through photosynthesis (MAF, 2009b). The amount of carbon stored in a forest varies depending on the age, the species, and the site. An average radiata pine forest absorbs approximately 800 tonnes of carbon dioxide equivalent per hectare over 30 years, equivalent to approximately 2.5 tonnes per tree (MAF, 2010b). Harvesting forests has the opposite effect, as most of the wood removed from a forest eventually breaks down and is returned to the atmosphere as carbon dioxide (MAF, 2009b).

As a way of meeting New Zealand's Kyoto Protocol emissions target, the NZ ETS introduces a price on the emission of greenhouse gases. This provides an incentive for participants to reduce emissions and enhance forest carbon sinks. New Zealand Units (NZUs) are issued by the Government for post 1989 forest carbon sinks, which may be held or traded (MAF, 2009b).

Forestry was the first sector to enter the NZ ETS (on 1 January 2008) due to its existing position as a significant store of carbon and the potential for forests to expand into farms and larger-scale planting (MAF, 2009b).

Under the NZ ETS, forests are divided into pre-1990 and post-1989 forests, which have different obligations and opportunities for forest land owners, as summarised in table A1.

Table A1: Obligations and opportunities relating to pre-and post-1990 forests

Pre-1990 forests (area that was forest land on 31 December 1989, and that on 31 December 2007 was still forest land and covered by predominantly exotic species)	**Post-1989 forests** (exotic or indigenous forest established after 31 December 1989)
Compulsory inclusion when exotic land is deforested. Exotic forest owners can: • harvest, and replant or regenerate (within certain time periods) without automatically becoming a participant under the NZ ETS • apply for an allocation of NZUs, or • apply for an exemption (MAF, 2009b). Owners of pre-1990 indigenous forests have no obligations under the NZ ETS.	Voluntary inclusion in the NZ ETS. Participants are entitled to receive NZUs for the increase in carbon stored since 1 January 2008 in their forests as they grow. Participants have legal obligations for forest registered in the NZ ETS, including to: • report at least once every 5 years on the change in carbon stocks in their registered forest area • surrender units if the carbon stocks in their registered forest area fall below a previously reported level (eg, due to harvesting or fire) • notify the Government if any part of the forest area registered is sold or transferred (MAF, 2010a).

The NZ ETS may influence the forestry sector, in that participants may shift investment to longer-lived, high-volume species such as Douglas fir, redwoods and eucalypts (MAF, 2009b). Harvesting decisions may also be influenced by carbon prices, and rotation ages may vary or trees may not be felled at all and kept as carbon forests (MAF, 2009b).

NZ ETS links with a new management framework

The NZ ETS provides incentives for creating carbon sinks (carbon forests) through afforestation, and disincentives for harvesting and not replanting. Deforestation of pre-1990 forest land incurs a liability to surrender NZUs, and owners of post-1989 forests who have chosen to be participants in the NZ ETS are liable for a decrease in the carbon stored in the forests as a result of fire or harvesting (MAF, 2009b). Recent reductions seen in land deforested may be attributable to the disincentives imposed under the ETS (MAF, 2009b).

There are potential links between the NZ ETS requirements and any new management framework for plantation forestry. Increased certainty through a new management framework may increase investor confidence and provide incentives for establishing more plantation forests, including carbon forests. On the other hand, changing a new management framework could have implications for forest land under the NZ ETS.

Note: international climate agreement rules and New Zealand NZ ETS rules are subject to change. MAF's website and Guide to Forestry in the Emissions Trading Scheme will be updated accordingly, should the rules change (MAF, 2009b).

Appendix 3: Alternative Option: Possible Approaches

Possible approach: A non-regulatory national plantation forestry guideline

A national guideline as an alternative to a national environmental standard was canvassed.

Part 1: Land-use planning

Apply a *nationally consistent approach* for identifying where plantation forestry should be located and/or continued as a land use. This would involve the identification and mapping of areas throughout the country that are suitable for afforestation and replanting using available land-use capability mapping and associated descriptive classes. The approach would indicate what the appropriate activity status under the RMA could be (permitted, controlled, restricted discretionary, etc) for planting, depending on the land capability constraints and other attributes identified. Areas excluded for planting would include previously defined significant natural areas, conservation areas, and areas that are highly susceptible to erosion or slips.

Part 2: Guidelines for plantation forestry operations

Ensuring *best management practices* in forest management and *technological flexibility* in the range of methods used in mitigating the environmental impacts of forestry, particularly those relating to land-disturbing activities and impacts on aquatic ecosystems (freshwater and coastal). This would involve the development of national guidelines based on available and new best practice for forestry operations. Existing guidelines and guidelines in development could be used as the basis for the national guideline, with best-practice guidelines for sediment and environmental management being incorporated. Regional bio-geographic variability appropriate for all forestry could also be reflected in the national guidelines.

Part 3: Industry certainty

Providing more certainty of the right to harvest forests planted for harvesting purposes. Part 3 would be developed in conjunction with Part 2. It would provide guidance on the long-term authorisation of forestry using either the designation process or 35 years or greater, based on a forest management plan and adherence to national guidelines.

Possible approach: A national accredited operator standard

A national accredited operator system could apply in conjunction with the national environmental standard or as an alternative. Like the Environment Bay of Plenty accredited operator standard, it would accredit competent forestry operators and allow the resource consent controls or the cost for obtaining approval to be minimised.

The standard could be beneficial because it would:

- improve consistency of on-the-ground practice
- encourage and recognise best practice
- reduce monitoring costs for local authorities
- reduce consents and associated costs for the forestry sector.

Appendix 4: Evaluation of Options

Assessment criteria

The following key criteria were developed to assess the effectiveness of several possible options in meeting the purpose of the RMA and the policy objective outlined in section 2.5:

- *provides national consistency* – provides a national approach that reduces the current inconsistency in how plantation forestry is managed between councils
- *promotes the sustainable management of natural and physical resources* – encourages a management regime that ensures that adverse environmental effects of plantation forestry are avoided, remedied or mitigated
- *provides long-term certainty* – provides certainty that the forestry sector can carry out forestry activities under a consistent framework
- *is able to be implemented in an appropriate timeframe* – allows for implementation of the desired outcome in the shortest timeframe
- *allows for local input for different receiving environments and local values* – allows for local input where district/regions have unique environments or values that require tailored approaches to management
- *is able to promote best practice* – reflects existing industry and council best practice
- *does not significantly tighten or loosen overall controls* – does not apply a more lenient or a more stringent approach to the status quo overall and fits with the way plans currently function.

Evaluation of alternative options

The proposed options were evaluated against the evaluation criteria above, as follows.

Status quo

- **National consistency:** there is no national consistency in how plantation forestry is managed. Rule, and term and condition thresholds vary widely between local authorities.
- **Promotes the sustainable management of natural and physical resources:** there is an opportunity for local authorities to promote sustainable management.
- **Certainty:** councils would still formulate their own rules, so inconsistency would likely remain, which would affect long-term certainty.
- **Implemented in an appropriate timeframe:** not applicable.
- **Local input for different receiving environments and local values:** the current management framework provides the opportunity for local input to decisions.
- **Promotes best practice:** the forestry sector and councils will continue to promote their own best-practice examples.
- **Does not significantly tighten or loosen overall controls:** not applicable.

Non-regulatory national guidance

- **National consistency:** guidance could be applied at a national level and could provide consistency in the management of plantation forestry. However, there is no guarantee that guidance will be picked up by local authorities, so it is unlikely to achieve consistency in the long term.
- **Promotes the sustainable management of natural and physical resources:** guidance is voluntary, so it is not a particularly effective tool overall for ensuring adverse effects are addressed.
- **Certainty:** guidance has no legal status, so there is no guarantee that councils would implement it and therefore long-term national certainty cannot be assured.
- **Implemented in an appropriate timeframe:** guidance is cost effective, fast to implement and easy to update.
- **Local input for different receiving environments and local values:** the ability for local input would remain under this option.
- **Promotes best practice:** guidance could promote examples of best practice.
- **Does not significantly tighten or loosen overall controls:** there is no legal status for guidance, so it would be hard for this option to have specific impacts on the management framework for forestry.

Other standards (apart from the NES)

- **National consistency:** standards could be applied at a national level and could provide consistency in the management of plantation forestry. Many standards are not legally enforceable, however, and would rely on local authorities incorporating or referencing them in plans. Certainty is not guaranteed, so it is unlikely standards would achieve consistency in the long term.
- **Promotes the sustainable management of natural and physical resources:** standards would be an effective tool for managing effects, but this would depend on local authorities incorporating or referencing them in plans.
- **Certainty:** a standard has no legal status, so there is no guarantee that councils would implement it and therefore national consistency cannot be assured.
- **Implemented in an appropriate timeframe:** as standards are not legally binding they can take time to implement.
- **Local input for different receiving environments and local values:** in most cases the general public would be consulted and have the opportunity to provide input (this applies to Standards New Zealand standards only).
- **Promotes best practice:** standards could promote examples of best practice.
- **Does not significantly tighten or loosen overall controls:** with Standards New Zealand standards there would be the ability to develop a standard similar to an NES. Other standards would likely only be a component of the overall framework and would not have significant control over impacts.

Memorandums of understandings (MOUs)

- **National consistency:** MOUs would not improve national consistency because plan rules would still apply, and these vary widely across the country. Consistency within regions might be improved.
- **Promotes the sustainable management of natural and physical resources:** although a general approach to forestry could be agreed, it is unlikely that MOUs would have an influence at a rules level.
- **Certainty:** there is no guarantee that parties would implement and maintain MOU's. For MOUs to be effective in the long term, they would have to be updated and monitored for effectiveness.
- **Implemented in an appropriate timeframe:** MOUs are fast to implement and are flexible, and therefore are able to evolve over time.
- **Local input for different receiving environments and local values:** the current management framework would remain, which would provide the opportunity for local input in decisions.
- **Promotes best practice:** the industry and councils could continue to promote their own best-practice examples, and these could be reflected in MOUs.
- **Does not significantly tighten or loosen overall controls:** an MOU is not likely to affect controls at a rules level.

Minister Directed Plan changes

- **National consistency:** Minister-directed plan changes would still leave councils to interpret and draft their plan rules independently and may not improve consistency.
- **Promotes the sustainable management of natural and physical resources:** plan changes are an effective tool for managing resources but this depends on the content of the plan rules, which would be determined by local authorities.
- **Certainty:** the current planning framework would remain largely unchanged because councils would still formulate their own rules, and inconsistency would likely remain, which would affect long-term certainty.
- **Implemented in an appropriate timeframe:** plan changes would be administratively inefficient because they are required to go through the lengthy Schedule 1 process.
- **Local input for different receiving environments and local values:** this option would provide the opportunity for local input into decisions via a Schedule 1 process.
- **Promotes best practice:** the forestry sector and councils could continue to promote their own best-practice examples under this option as part of the plan process.
- **Does not significantly tighten or loosen overall controls:** the outcome would be largely uncertain because councils would still determine the rules.

National policy statement

- **National consistency:** relying on an NPS would not provide national consistency. An NPS can set overall policies, but would require local authorities to change their plans to give effect to policies by introducing rules. This option would bring a high level of consistency, but there could still be considerable variability in rules.
- **Promotes the sustainable management of natural and physical resources:** an NPS would be an effective tool for managing effects at a high level through setting objectives and policies.
- **Certainty:** an NPS is unlikely to provide certainty because plans would still be subject to 10-year reviews, and local variability in rules would still apply.
- **Implemented in an appropriate timeframe:** an NPS has a complicated timeframe, including a long implementation phase (eg, councils were given four years to give effect to the NPS on Electricity Transmission).
- **Local input for different receiving environments and local values:** there may be the opportunity for local input into the process of giving effect to an NPS, through a schedule 1 process.
- **Promotes best practice:** an NPS could reflect best practice.
- **Does not significantly tighten or loosen overall controls:** an NPS is high level, aimed at objectives and policies, but could influence the management framework overall.

National Environmental Standard

- **National consistency:** an NES has the ability to provide a consistent set of rules that apply across the country.
- **Promotes the sustainable management of natural and physical resources:** an NES is an effective tool for managing resources, but it would rely on councils applying appropriate protection for resources for issues outside the scope of the NES.
- **Certainty:** national consistency would provide certainty about the status of plantation forestry activities, although some uncertainty would remain where there is an ability to be more stringent or activities are outside of the scope of the NES.
- **Implemented in an appropriate timeframe:** NES's take time to prepare but once they are gazetted, can take effect immediately.
- **Local input for different receiving environments and local values:** there would be an opportunity for local input into decision-making on consent applications for activities falling outside the scope of an NES or where councils can be more stringent.
- **Promotes best practice:** an NES could reflect best practice provided certainty and enforceability is retained.
- **Does not significantly tighten or loosen overall controls:** there would be an opportunity for an NES to determine and reflect a middle-ground approach to forestry regulation.

Appendix 5: Erosion Susceptibility Classification

When determining the appropriate status of forestry activities, and in particular earthworks, a key issue that has been identified is the susceptibility of the land to erosion. For the purposes of the NES it is proposed to classify land into three broad classes in terms of its erosion susceptibility:

- red area– high erosion susceptibility
- orange area – moderate erosion susceptibility
- green area – low erosion susceptibility.

A number of existing systems for assessing erosion susceptibility were considered as the basis for this classification process.

Option 1: New Zealand Land Resource Inventory

The New Zealand Land Resource Inventory (NZLRI) is a spatial database describing key attributes of the land resources of New Zealand: rock, soil, slope, erosion (at the time of mapping) and vegetation. It was first published as a series of map sheets (at 1:63,360 scale) based on mapping completed in the late 1970s and early 1980s (National Water and Soil Conservation Organisation, 1979). It now comprises a geospatial database, with a nominal compilation scale of 1:50,000, stored within a Geographic Information System (GIS), and incorporates second-edition remapping of some areas (Northland, northern Waikato, Gisborne – East Coast, Wellington [west of, and including, the Tararua Range] and Eastern Marlborough) carried out in the mid-1980s to early 1990s (see www.landcareresearch.co.nz/databases/nzlri.asp).

Within each map unit the five inventory factors are set out as a code. In addition to the inventory code, each map unit also contains a land-use capability (LUC) assessment, which groups areas of land with similar management and soil conservation requirements. The minimum polygon size is < 5 hectares.

The LUC assessment has three basic components: class, subclass and unit. Class is the most general, classifying land from Class I (the most versatile and productive class) to Class VIII (the class with most limitations to use). Subclass groups units with the same kind of limitation or hazard. Only the dominant limitation is recorded in the LUC unit, but other limitations may be recognised in the land-use capability extended legend. The four kinds of limitations recognised are:

- **e** – erodibility
- **c** – climate
- **w** – wetness
- **s** – soil limitation within the rooting zone.

The unit, which is represented by a number, indicates the particular LUC and denotes similar management and conservation requirements.

LUC extended legends for each of the LUC regions, published after completion of the maps, provide interpretive data relating to the key physical characteristics, present and potential use for cropping, grazing and forestry, fertiliser requirements, erosion potential, and soil conservation and water management requirements. These extended legends make the worksheets useful as a wide-ranging land management tool.

Pros

The NZLRI:

- provides national coverage
- is widely understood and used by regional councils
- provides the only national coverage of the various attributes that all other models in some form or other use
- has regional correlation of legends (but this may need to be looked at again).

Cons

The NZLRI:

- incorporates old mapping in some regions, which means the attributes "vegetation present" and "present erosion" may be out of date (all other attributes will not change with time)
- has a scale of 1:50,000, which may not be detailed enough for operational use.

Option 2: Highly Erodible Land (HEL) system

The Highly Erodible Land (HEL) system identifies land highly susceptible to mass-movement erosion using a combination of the erosion terrains derived from the NZLRI database, a 15-metre digital elevation model (DEM) to determine topography, and land cover mapping. It considers the main forms of mass-movement erosion in New Zealand (landsliding, earth flows, and massive gullying). Highly erodible land was defined as "land with the potential for severe erosion if it does not have protective woody vegetation" and was identified by:

- defining slope thresholds for each erosion terrain and assigning all land above the threshold to HEL on the basis of landslide risk (thresholds ranged from 24° on weak Tertiary-age mudstone to 45° on hard greywacke)
- assigning all pixels mapped with moderate or severe earth-flow erosion and gully erosion (from the NZLRI) to HEL
- determining whether land identified as HEL has existing woody vegetation cover (if protected it is excluded from HEL).

The HEL land was further classified in terms of whether it was or was not connected to a water course. The procedure produces five classes of HEL:

- high landslide risk – connected to stream
- high landslide risk – not connected to stream
- moderate earth-flow risk
- severe earth-flow risk
- gullying risk.

Because it uses the DEM to identify slopes, the HEL system is capable of higher spatial resolution than the NZLRI approach alone. At present the land cover map is derived from Ecosat (~2001), but this may be readily updated to 2008 using LUCAS.

HEL was first piloted in the Manawatu–Whanganui region and forms the basis of their SLUI programme (Dymond et al, 2006). It was subsequently widened to include the whole of the North Island (Dymond et al, 2008), and now North Island regional councils use it for soil conservation planning. MAF also use it to evaluate regional council requests for soil conservation funds.

Pros

The HEL system:

- focuses on erosion
- has a higher spatial resolution (ie, differentiates between high and low slopes within NZLRI polygons)
- uses more up-to-date mapping of vegetation cover and is easily updated with current maps of land cover.

Cons

The HEL system:

- only covers the North Island (South Island coverage would take ~ 1 month to complete)
- includes current woody vegetation cover and assigns nil erosion susceptibility where vegetative cover exists – this would need to be amended to derive inherent erosion susceptibility excluding vegetative cover.

Option 3: NZ Empirical Erosion Model (NZeem®)

NZeem® is an empirical model that predicts mean annual sediment yield from a given catchment, based on annual rainfall, type of terrain and percentage of woody vegetation cover:

$$\mathbf{SSY} = \boldsymbol{a}\ \mathbf{C}\ \mathbf{P}^2$$

where:

SSY = mean annual suspended sediment yield (t/km^2/yr)
a = erosion coefficient, a constant depending on erosion terrain
C = cover factor (woody vegetation = 1, non-woody = 10)
P = mean annual rainfall.

NZeem® partitions the New Zealand landscape according to the factors controlling erosion: rock type, land form (especially slope angle), rainfall and land cover. The erosion co-efficient (*a*) is a measure of inherent erosion susceptibility related to land-form characteristics (geology, slope angle, etc). The rock type and land-form data comes from the NZLRI (above).

The model is calibrated on about 200 sediment yield data sets from most regions in New Zealand. NZeem® is claimed to be applicable to all types and sizes of catchments (Dymond et al, 2010). It also builds on earlier work resulting in a database and digital map of

mean specific sediment yield (kg / km2 / yr) produced by NIWA and Landcare Research as part of a project funded by the Foundation for Research Science and Technology for studying carbon transfers associated with erosion (Hicks et al, 2003).

Pros

NZeem®:

- has national coverage
- has been validated to sediment yields
- predicts off-site effects
- uses an erosion co-efficient (*a*) that deals with 'risk/susceptibility' as an intrinsic property of the land, independent of rainfall and land cover.

Cons

NZeem®:

- may not adequately address the needs of the NES with regard to clearfell harvesting in terms of processes (it uses sediment yield data and a vegetation cover factor to 'estimate' erosion)
- uses a scale that could be an issue
- assumes that sediment yield from non-woody vegetation is 10 times that from woody vegetation throughout New Zealand, when it may be quite variable depending on inherent erosion susceptibility.

Table A2: Application scopes for HEL and NZeem®

Scope	NZeem®	HEL
Catchment sediment yield	Yes	No
Farm sediment yield	Yes	No
Prioritisation of farm plans	Yes	Yes
Design of farm plans	No	No
Prioritisation of catchment soil conservation	No	Yes
Prioritisation of regional soil conservation	Yes	Yes
Prioritisation of soil conservation for reducing sediment yield	Yes	No

Preferred option

Following discussion with a range of erosion specialists, the current preference is to proceed using option 1, the NZLRI, as the basis for erosion susceptibility classification. It is planned that a group of technical experts from Landcare Research, Scion, GNS and NIWA, and from regional and central government, will be tasked with assigning individual LUC units in each NZLRI region to each of the red, orange and green area classifications.

As a general guide it is anticipated that:

- the green area will include:
  - all Class I–V land
  - the majority of Class VI land
  - Class VII land where the limiting factor is not related to erosion susceptibility under plantation forestry conditions
- the orange area will include:
  - selected moderate erosion risk units within Class VIe and VII land
- the red area will include:
  - high erosion risk units within Class VIIe and VIII land (noting that, by definition, Class VIII land is unsuitable for productive use): it is anticipated that the red area classification will be the outermost end of the erosion susceptibility continuum.

Note: Slope thresholds may also be identified when assigning NZLRI units to risk classes, to account for localised inaccuracy due to the scale of LUC mapping.

Erosion susceptibility and receiving environments

The time of year, seasonal weather conditions and duration of earthworks influence the magnitude of the effects generated. These variables differ greatly around the country. For example, erosion rates and related potential sediment run-off loads will be greater during months of higher rainfall (Quality Planning, 2007). It is proposed that these issues be considered when the categorisation of erosion terrain is undertaken.

The environment within which forestry activities take place also influences the potential effects. For example, the effect of increased loads of sediment discharged on a river will vary depending on the capacities of that particular river to cope with elevated levels of sediment.

Freshwater Ecosystems of New Zealand (FENZ)

The Department of Conservation, in collaboration with NIWA, Landcare Research, local government and New Zealand's freshwater community, has been working on a system of mapping databases called FENZ (Freshwater Ecosystems of New Zealand).

FENZ has been designed to help build a robust, objective picture of New Zealand's fresh water to inform decisions relating to its use and conservation by providing an independent, scientifically credible platform for describing the values of New Zealand's rivers, lakes and inland wetlands. The tools will be available for use by regional councils and other stakeholders.

FENZ comprises three separate layers (rivers/streams, lakes and wetlands). The database objectively maps and quantifies various aspects of New Zealand's fresh water, providing:

- comprehensive descriptions of the physical environment and biological character
- classifications that group together rivers and streams, lakes and wetlands having similar ecological character into classes suitable for use as management units
- estimates of human impacts on biodiversity status

- rankings of biodiversity value that indicate a minimum set of sites that would provide representative protection of a full range of freshwater ecosystems, while taking account of both human impacts and connectivity.

Various parts of FENZ are already being used in the management of freshwater resources. Following are some examples.

- Data describing the distribution and condition of wetlands has been invaluable in helping Department of Conservation staff identify significant wetland values on the South Island's West Coast as part of their broader input to a new regional plan.
- Staff from the Greater Wellington Regional Council are exploring use of the river and stream classification as a framework for regional-scale management.
- Environment Waikato staff are using both the ecosystem classification and predictions of the distributions of freshwater species to guide the identification of sites requiring remedial action.

It is envisaged that FENZ will be used as part of the erosion susceptibility mapping exercise, whereby rivers, streams, lakes and wetlands with high freshwater values are used to inform green, orange and red areas.

Abbreviations

DEM	Digital elevation model
ECoP	Environmental Code of Practice
FENZ	Freshwater Ecosystems of New Zealand
GIS	Geographic Information System
GNS	Institute of Geological and Nuclear Sciences
HEL	Highly Erodible Land
LUC	Land-use capability
LUCAS	Land Use and Carbon Analysis System
MAF	Ministry of Agriculture and Forestry
MOU	Memorandum of Understanding
NES	National Environmental Standard
NIWA	National Institute of Water and Atmospheric Research
NPS	National Policy Statement
NZ ETS	New Zealand Emissions Trading Scheme
NZFOA	New Zealand Forest Owners Association
NZLRI	New Zealand Land Resource Inventory
NZUs	New Zealand Units
NZeem®	NZ Empirical Erosion Model
RMA	Resource Management Act 1991

Glossary

Afforestation: new planting on land not previously planted in plantation forest.

Aggregate: crushed rocks, gravel and sand, which is produced by quarries.

Agrichemical: any substance, whether organic or inorganic, man-made or naturally occurring, modified or in its natural state, that is used to eradicate, modify or control flora or fauna.

Annual exceedance probability (AEP): the chance of a flood of a given size (or larger) occurring in any one year, usually expressed as a percentage. Note: NIWA's flood discharge model, WRENZ (available at http://wrenz.niwa.co.nz), gives an estimate of the 1% AEP flood (in cubic metres per second) for designated rivers and streams in New Zealand.

Archaeological site: has the same meaning as in section 2 of the Historic Places Act 1993.

Armouring: the placement of riprap, composed of large pieces of quarried angular rock material of sufficient mass, or the use of other rigid methods to resist scour in flood flows and/or to contain a stream in defined channels.

Average recurrence level (ARI): the long-term average of the number of years between the occurrence of a flood as big as (or larger than) the specified event. For example, floods with a discharge as great as (or greater than) the 50-year ARI design flood will occur on average once every 50 years. ARI is another way of expressing the likelihood of the occurrence of a flood event.

Battery culverts: a stream crossing structure using multiple culvert or box pipes to handle low flows through the pipes, and designed to allow major flows and debris to overtop the entire structure (also known as a vented ford).

Best practicable option: the best method for preventing or minimising adverse effects on the environment having regard, among other things, to:

(a) the nature of the option and the sensitivity of the receiving environment to adverse effects

(b) the financial implications, and the effects on the environment, of that option when compared with other options

(c) the current state of technical knowledge and the likelihood that the option can be successfully applied.

Blading: use of bulldozer, skidder or excavator with blade to remove logging slash and organic soil layers to create a track.

Catchment:	the total area from which a single water body collects surface and subsurface run-off.
Class A waters:	has the same meaning as in section 69 and schedule 3 of the Resource Management 1991 (the RMA).
Coastal Marine Area:	has the same meaning as in section 2 of the RMA.
Consent authority:	has the same meaning as in section 2 of the RMA.
Contaminant:	has the same meaning as in section 2 of the RMA.
Controlled activity:	has the same meaning as in section 2 of the RMA.
Corduroy:	the laying of whole trees or logs close together to provide a stable base for machinery passing to or from a road subgrade. A corduroy is typically used to cross a poorly drained area (swampy ground) with low load-bearing capacity.
Culvert:	a round pipe or box structure that conveys a water flow under a road, track or other stream or river crossing.
Cultivation:	includes drainage, felling bush, clearing land for cropping, and clearing land for planting.
Cutover:	forested land that has been completely harvested.
Debris:	the accumulation of remains, including vegetation and soil, from forestry operations.
Discretionary activity:	has the same meaning as in section 2 of the RMA.
Drift decks:	a stream crossing structure composed of a series of inverted "u" shaped precast concrete elements, bearing a concrete slab that passes low flows through the structure, and designed to allow major flows and debris to overtop the entire structure**.**
Dwelling:	any permanent structure that is occupied or intended to be occupied in whole or in part as a residence, and includes (but is not limited to) travellers' accommodation.
Earthworks:	the disturbance of the land surface by machinery, including blading (including V-blading), boring, contouring, drilling, moving, removing, placing or replacing soil or earth; or by excavating; or by a cutting or filling operation. It excludes tracking and associated soil disturbance due to the movement of wheeled or tracked machines used in or around cut-over areas at time of harvest.

Ecological corridors:	a strip of vegetation which is important for connection corridors or habitats for animals and plants.
Edge damage:	the damage of indigenous vegetation bordering plantation forestry.
Erosion:	the detachment and movement of topsoil by the action of wind and flowing water.
Fill material:	earth placed (normally under a strict compaction regime) to raise the land surface.
First schedule consultations:	as set out in Schedule 1 (3) of the RMA.
Fish passage:	the natural movement of fish between the sea and any river, including upstream or downstream in that river or stream.
Flood hazard areas:	zones mapped in regional or district plans that have the potential for damage to property or persons due to flooding.
Ford:	a natural shallow area in a water body able to be crossed by light 4WD vehicle or log truck (but not a log skidder extracting logs), or an artificially built-up bed designed to facilitate the crossing of a water body.
Forestry / plantation forestry:	a forest (native or exotic) deliberately established for commercial purposes.
Geothermal area:	an area containing geysers (naturally occurring geothermal springs that occasionally or frequently erupt); springs vigorously depositing sinter; mud pools or geysers; superheated fumaroles; geothermal wetland, lake, pool or stream; or hydrothermal eruption crater.
Green area:	to be defined (see Appendix 1).
Harvesting:	the act of plantation forest species being cleared from the land.
Hazards (natural):	has the same meaning as in section 2 of the RMA.
Heading up:	additional flow though a culvert under pressure driven by a hydraulic head of water above the culvert inlet.
Historic heritage:	has the same meaning as in section 2 of the RMA.
Historic heritage area:	historic heritage area– (a) means an area that is protected by a rule because of its historic heritage; and (b) to avoid doubt, includes an area that is protected by a rule because it is a site of significance to Māori.

Indigenous vegetation:	vegetation that occurs naturally in New Zealand or that arrived in New Zealand without human assistance.
Infrastructure:	has the same meaning as in section 2 of the RMA.
Iwi:	a set of people bound together by descent from a common ancestor or ancestors.
Iwi authority:	has the same meaning as in section 2 of the RMA.
Karst protection area:	an area of limestone geology with underground streams and many cavities.
Lake:	has the same meaning as in section 2 of the RMA.
Landing:	a log production and assembly area within a forest.
Land-use capability (LUC):	described in Appendix 1.
Local authority:	has the same meaning as in section 2 of the RMA.
Log crossings:	a stream crossing structure composed of a series of logs, often bound together by wire rope that passes low flows under the structure **(**also known as a skid bridge).
Maintenance and upgrade of existing earthworks:	includes activities to upgrade existing earthworks (roadways and landings), minor reshaping of existing forest roads, clearing of water tables and installation of water controls and road metalling. Upgrade does not include road widening.
Mechanical land preparation:	root raking, discing, mounding and spot mounding, contour and downhill ripping, roller crushing and other cultivation of land and associated removal of vegetation. V-blading involving disturbance of subsoil will be considered under earthwork rules. Note: Mechanical land preparation is not included in the definition of earthworks.
Mechanical raking:	the process of making a windrow of slash. It generally involves a rake on an excavator boom, or a root rake on a bulldozer but not lowered into the subsoil.
Mounding:	a term to encompass a variety of site preparation treatments involving mechanical disturbance of soil or sub soil.
Natural character:	those qualities and values of wetlands, lakes and rivers and their margins which derive from the presence of natural features and natural processes. Although not excluding structures and human activities, areas of natural character derive their predominant influence, character or identity from the presence of natural values and processes.

New Zealand Land Resources Inventory (NZLRI):	a spatial database containing land information (described in Appendix 1).
Non-complying activity:	has the same meaning as in section 2 of the RMA.
Orange area:	to be defined (see Appendix 1).
Outstanding natural features and landscapes:	features that are considered as being of national or regional significance, including land forms, geological features, natural character and view shafts.
Perennial river or stream:	a stream that maintains water in its channel throughout the year, or maintains a series of discrete pools that provide habitats for the continuation of the aquatic ecosystem.
Permitted activity:	has the same meaning as in section 2 of the RMA.
Production thinning:	thinning tree stems for sale.
Pruning:	removal of branches from the lower section (up to 8 m) of a tree to produce high-quality clear-wood logs.
Public access:	unobstructed admission to space that is available for public use.
Quarry:	areas where hard rock or cemented gravel is extracted for processing and storage, which includes areas where associated activities, such as vehicle movement, transfer of rock for processing, stockpiling of aggregate and loading of products to transport trucks, occur.
Red area:	to be defined (see Appendix 1).
Regional council:	a regional council named in Part 1 of Schedule 2 of the Local Government Act.
Rehabilitation:	restoration to as near to pre-disturbance conditions as possible. This may entail such measures as revegetation for erosion control, enhancement planting, modification and armouring of water bodies.
Replanting:	planting of vegetation over land where forest harvesting has previously occurred.
Restoration:	the active intervention and management of degraded biotic communities, land forms and landscapes in order to restore biological character, ecological and physical processes, and their cultural and visual qualities.
Restricted discretionary activity:	has the same meaning as in section 2 of the RMA.

Riparian zone:	the margin and the bank of a water body; ie, the area where direct interaction occurs between land and water systems, which is important for the management of water quality and ecological resources.
Ripping:	disturbing the subsoil to a depth of 30 to 90 cm with a single or double tine or (winged) ripper mounted on an agricultural tractor or bulldozer in order to break up highly compacted soil or a subsurface soil pan prior to planting, to improve drainage and tree-root penetration.
River:	has the same meaning as in section 2 of the RMA.
River crossings:	temporary or permanent culverts, battery culverts (also known as vented fords or dry fords overtopped during floods) and bridges.
Road:	has the same meaning as in section 2 of the RMA.
Roading:	earthworks of 3 m or more in width carried out in order to form, construct or reconstruct a road or formed track, but excluding normal maintenance operations (grading, re-metalling, water table clean-outs).
Roller crushing:	a large roller weighing several tonnes released down a slope from a ridge or track, crushing and breaking up vegetation in its path. On flatter terrain rollers can be towed by a bulldozer or tractor.
Rural zone:	land that a relevant operative or proposed district or regional plan classifies as primarily for rural activities.
Sediment:	solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from site of origin by air, water, gravity or ice and has come to rest on the earth's surface, either above or below water.
Sediment control measures:	measures designed to capture sediment that has been eroded and entrained in overland flow before it enters the receiving environment.
Sediment discharge concentration:	the concentration of suspended sediment in a water body.
Setback:	the measured distance from a feature that creates a buffer within which activities cannot take place.
Significant natural areas:	areas with significant indigenous vegetation and significant habitats of indigenous fauna, as outlined in section 6(c) of the RMA.

Skid site:	an area of land in the forest, often specially prepared and surfaced, where logs or tree lengths extracted from the forest are accumulated, processed and loaded onto trucks for removals. Also referred to as a landing.
Slash:	branches, tops, chunks, cull logs, uprooted stumps, slovens, broken trees and other waste wood left behind after harvesting.
Slash and debris traps:	traps set in water bodies to trap **slash** and debris from forestry operations.
Soffit:	the underside of a bridge.
Soil disturbance:	the disturbance of the ground surface by harvesting activities such as dragging logs, but excluding earthworks.
Spoil:	the by-product of excavations and earthworks (soil or rock).
Stabilisation:	providing adequate measures, vegetative and/or structural, that will protect exposed soil to minimise erosion.
Stream:	see definition of river.
Suspended solids:	small solid particles that remain in suspension in water.
Territorial authority:	a city council or district council named in Part 2 of Schedule 2 of the Local Government Act.
Thinning:	selective removal of trees within a stand to achieve an optimum stocking rate for the final crop. Production thinning involves the removal of the thinned trees for sale. Thin-to-waste operations leave the felled tree *in situ*.
Tracking:	construction of temporary access structures of 1.5 m or more in width, including bladed tracks to serve as log skid roads, mobile tail-hold (backspar) trails or firebreaks, or tracks suited to light 4WD vehicles and ATVs (all-terrain vehicles). (Adapted from BC Forest Practices Code.)
Upgrade:	see maintenance and upgrade of existing earthworks.
Urban /residential zone:	land that a relevant operative or proposed district or regional plan classifies as primarily for residential activities.
Wāhi tapu:	has the same meaning as in part 2 of the Historic Places Act 1993.
Water body:	fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area.
Water yield:	the amount of water run-off coming out of a catchment over a specific period of time.

Wetland:	has the same meaning as in section 2 of the RMA.
Wilding trees:	the natural regeneration or seedling spread of exotic trees, occurring in areas not managed for forest production.
Windrowing:	slash from forest harvesting which is mechanically piled into rows.
Woodlots:	small plot of plantation forest, usually on farms.

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