Ministry for Primary Industries
Manatū Ahu Matua

Plantation forestry economic analysis: A further revised assessment of proposed National Environmental Standards

MPI Technical Paper No: 2015/14

Prepared for MPI by NZIER and HG

ISBN No: 978-0-908334-48-3 (online)
ISSN No: 2253-3923 (online)

June 2015

New Zealand Government

Growing and Protecting New Zealand

Disclaimer

While every effort has been made to ensure the information is accurate, the Ministry for Primary Industries does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information. Any view or opinion expressed does not necessarily represent the view of the Ministry for Primary Industries.

Requests for further copies should be directed to:

Publications Logistics Officer
Ministry for Primary Industries
PO Box 2526
WELLINGTON 6140

Email: brand@mpi.govt.nz
Telephone: 0800 00 83 33

This publication is also available on the Ministry for Primary Industries website at http://www.mpi.govt.nz/news-resources/publications.aspx

HARRISON GRIERSON

NZIER
NEW ZEALAND INSTITUTE OF ECONOMIC RESEARCH

Plantation forestry economic analysis

A further revised assessment of proposed National Environmental Standards

NZIER HG report to the Ministry for Primary Industries

December 2014

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice to clients in the public and private sectors, throughout New Zealand and Australia, and further afield.

NZIER is also known for its long-established Quarterly Survey of Business Opinion and Quarterly Predictions.

Our aim is to be the premier centre of applied economic research in New Zealand. We pride ourselves on our reputation for independence and delivering quality analysis in the right form, and at the right time, for our clients. We ensure quality through teamwork on individual projects, critical review at internal seminars, and by peer review at various stages through a project by a senior staff member otherwise not involved in the project.

Each year NZIER devotes resources to undertake and make freely available economic research and thinking aimed at promoting a better understanding of New Zealand's important economic challenges.

NZIER was established in 1958.

Authorship

This paper was prepared at NZIER by Chris Nixon and Richard Peterson from Harrison Grierson

It was quality approved by Peter Clough

The assistance of Sarah Spring is gratefully acknowledged.

L13 Grant Thornton House, 215 Lambton Quay | PO Box 3479, Wellington 6140
Tel +64 4 472 1880 | econ@nzier.org.nz

Key points

Introduction

This report revises the costs and benefits of a proposed National Environmental Standard (NES) for plantation forestry in the light of new information, further work by the Ministry for Primary Industries, and in response to feedback from the forestry working group established by the Ministry for Primary Industries. It follows the structure of the two initial studies done by NZIER and Harrison Grierson in August 2011 and January 2012.

The re-examination of the NES has arisen because the forestry stakeholders are subject to resource management plan rules that can differ widely between local authorities. A forestry company working in different areas of New Zealand can be subject to different rules in different regions/districts. This inconsistency creates the possibility of increased costs and uncertainty for forestry companies as they attempt to comply with a variable set of rules. The NES will be most beneficial for those companies with multiple holdings in different regions.

Background

The forestry sector and some local authorities have expressed concern that the regulatory framework for plantation forestry creates a barrier to forestry development. These concerns were taken up in 2009 when a scoping project was undertaken to assess the need for a NES for plantation forestry.

Since that time, two CBAs have already been completed examining the costs and benefits of a NES for plantation forestry as new information came to hand. Both CBAs returned a negative benefit cost ratio relative to the status quo. Since these CBAs were completed, a number of changes have occurred to specific costs and benefits which could potentially have a major influence on the CBA results. These include:

- changes to the CBA:
  - the removal of quantified environmental benefits associated with sediment loss (mainly at the time of harvesting). Not enough information or research was available to demonstrate the benefit impact of moving from a five to ten metre setback. These benefits were also compromised by councils and forestry companies already being dedicated to developing best practice maintenance and harvesting regimes
  - the removal of costs associated with ETS liabilities. Regulations have changed exempting this cost for forestry companies
  - the revised analysis of estimated setbacks providing more accurate setback data. The revisions exclude Crown Marginal Strips which already have a twenty metre setback
- firming up of information that determines yellow, orange and red consenting zones (all of which have potentially different consenting requirements/costs)

- the process of developing the NES has created its own dynamic. Some councils are including NES provisions in plan changes. This has implications for the status quo
- the development of the National Policy Statement for Freshwater Management (NPS FM) and its relationship with the NES.

These factors mean that it is a viable proposition to refresh the NES CBA so that we can further understand the likely impact given revisions and removal of specific costs and benefits.

Proposal

The issue addressed by the NES proposal is the inconsistency in regional and district plan rules. Evidence has been identified that this inconsistency results in:

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

Variable environmental practices are of marginal significance, due in large part to the existing good practices of the larger corporates in the forestry sector, and an expectation of improved professionalism across the board, related to the significant focus on health and safety practices.

Investment uncertainty was considered as part of the problem definition; however, the analysis of the status quo did not identify evidence that this is a problem.

Costs and benefits

The proposals are expected to result in a range of costs (mainly to forestry companies and councils) and benefits (mainly a reduction in plan costs, improved environmental outcomes and certainty), compared to a continuation of the status quo. Benefits arise from:

- more consistency around regulation that will reduce regional and district plan advocacy costs for forestry owners and managers (large and small), councils and NGOs
- incremental benefits from a general raising of practice within some parts of the industry.

Costs may be imposed on:

- councils, due to reduced autonomy in customising controls to local conditions, increased consenting and monitoring costs, and increased costs in adjusting plans to accommodate the NES
- forestry owners, due to increases in consenting costs, opportunity cost of setback provisions and increased monitoring and compliance costs
- NGOs, through involvement in an increased number of resource consent applications
- government, due to costs of supporting the introduction of the NES.

Key findings

The following points represent the key findings from this report:

- not all benefits and costs can be quantified, and therefore the result described below need to be considered in the context of the written description of the benefits and costs. The main problem is that quantifying the marginal change between the "with" NES and "without" NES scenarios is difficult with little available data to assist in developing marginal estimates. This is further complicated by councils and forestry companies striving to achieve best practice in different terrains
- benefits marginally outweigh costs in the central scenario. The new information provided and the adjustments made to the calculations have turned the outcome from (strongly) negative (in the past CBAs) to positive
- plan advocacy savings marginally outweigh compliance costs as consents in the status quo (without the NES) rise over the thirty year planning horizon to meet expected consents under the NES
- there will be a 'certainty' benefit both with regard to regulation and environmental practice. This is difficult to quantify, but has been estimated by reference to the effort various parties have put into the NES over the past four years. Note that efforts to reduce uncertainty can continue over time. In this respect the continuing efforts by government, councils, NGOs, and forestry managers to further understand the costs and benefits of an NES since 2009 confirms this
- the increased consistency can be expected to reduce the cost of each consent (particularly for larger forestry companies). As consents become more standardised the time spent on the consent process reduces
- setback and consent costs and plan advocacy savings drive the main costs and benefits
- the template plans and the National Policy Statement of Freshwater Management (NPS FM)will have an impact on plan consistency and environmental outcomes in the status quo. While the impact of the NPS FM on the proposed NES is uncertain, it will reduce the advocacy benefits of the proposed NES.

Further, we expect that over the thirty year timeframe of the CBA, the margin between the status quo and the proposed NES will narrow. However, the ad hoc approach in the status quo lacks consistency in terms of timing and stringency and increases uncertainty as each regional, district and unitary authority make their own decisions. This is a clear benefit for the proposed NES.

Results

The quantified results of the analysis suggest there are marginal net benefits associated with the proposed national standard. The following table presents the results for the NES. The benefit cost ratio and present value net benefit are positive for the proposed standard at discount rates of 6%, 8%, and 10%.

Table 1 Central scenario results

Discount rate	6%	8%	10%
PV costs	13,099,000	11,138,000	9,525,000
PV benefit	14,924,000	12,259,000	10,299,000
Net benefit	1,825,000	1,121,000	774,000
Benefit cost ratio	1.14	1.10	1.08
Numbers rounded			

Source: HG and NZIER

Caveats

Most of the assumptions are derived from interviews with the forestry industry, councils and government departments. Councils and foresters are characterised by major differences in topography and operating rules which makes the development of national cost and benefit averages difficult.

In some cases, there is not enough information to understand what the magnitude of costs and benefits, particularly on environmental issues.

This brings considerable uncertainty about the baseline, likely impacts, and assumptions. A key difficulty is establishing the 'baseline', or what would have happened in absence of the NES. Councils would continue to undertake their own initiatives, so we cannot attribute all costs and all benefits we estimate would come from changing the status quo, to the NES. Furthermore, because of the complexity and site specific nature of forestry, it is impossible to be entirely accurate on cost and benefit data.

The figures in this report should be regarded as giving an order of magnitude of the net costs and benefits rather than being definitive. Should new information e.g. greater certainty about the number of consents required by forest owners, become available, further analysis could be undertaken.

Contents

Figures

Tables

1. Introduction

1.1. The proposed NES

The proposed National Environmental Standard for Plantation Forestry (hereafter the NES) would introduce nationally consistent regulations for a range of forestry related activities, covering afforestation, replanting, mechanical land preparation, harvesting, pruning and thinning, earthworks, quarrying, and river crossings. [1]

The status of these activities is influenced by the erosion susceptibility zone within which the activity would fall. The zones are green, yellow, orange and red reflecting the risk of the area. At the time of writing the extent and location of each zone is based on maps found at http://www.mfe.govt.nz/laws/standards/forestry/ index.html. It is noted that these are continuing to be reviewed and that this review may impact on the costs and benefits of the NES. [2] The base activity status for activities in the green and yellow zones (lower erosion risk) is permitted, subject to conditions. The conditions vary from activity to activity. [3] Failure to comply with these conditions results in a resource consent application being required, with controlled or restricted discretionary being the most common status of these 'default' applications.

The base activity status for activities within the orange zone is also generally permitted. The exception to this is in relation to earthworks and mechanical land preparation on slopes greater than 25 degrees. In these cases, a restricted discretionary resource consent would be required. [4]

The base activity status within the red zone varies as follows: [5]

- permitted for replanting, mechanical land preparation on greater than 25 degrees, pruning and thinning and quarrying on land not at risk of earthflow or slump risk
- controlled for harvesting (excluding class 8e land)
- restricted discretionary for afforestation, harvesting on 8e land, mechanical land preparation on land greater than 25 degrees and earthworks.

The activity status of river crossings, i.e. fords, culverts and bridges, relates to the environmental risk associated with the location and design of the crossing. A low risk crossing, which is determined by compliance with specified conditions, would be permitted, medium risk controlled and high risk restricted discretionary.

A key change in the 2014 version of the draft NES is that harvesting in the orange zone previously required controlled activity consent, where as in the 2014 version this activity is permitted.

---

1 The NES is summarised in Table 24 of this report.

2 See Appendix A for sensitivity analysis of the core result based on revised ESC provided by the Ministry for Primary Industries (MPI) following the completion of the stakeholder interviews.

3 For summary of the subject of the different conditions, see Table 25 of this report.

4 In comparison, at time of earlier analysis the draft NES required controlled activity consents for earthworks and harvesting in the orange zone.

5 In comparison, at time of earlier analysis the draft NES permitted afforestation but required controlled activity consent for replanting in the Red Zone.

It is understood that the exact extent of the various erosion susceptibility zones is being finalised, and the stakeholder interviews and following analysis are based on current versions of these zones.

The NES would not cover all activities associated with forestry and in particular matters such as agrichemical use, burning (air discharges) and signage. These are outside the scope of the draft NES. In addition the draft NES allows councils to develop more stringent district or regional plan provisions for various matters including outstanding natural features and landscapes, significant natural areas, nationally outstanding freshwater bodies and regionally significant freshwater bodies.

1.2. Background and scope of analysis

This report provides a further revised evaluation of the costs and benefits of the proposed National Environmental Standard for Plantation Forestry (hereafter the NES). It follows the structure of the two previous reports (NZIER HG August 2011 and NZIER HG January 2012).

The Ministry for Primary Industries has commissioned this revised analysis in light of changes that have occurred in the period since the earlier reports were completed. These changes include:

- changes in the operating environment (e.g. changes to the Climate Change Response Act, which have reduced or removed the ETS liabilities associated with increased setbacks)
- further refinement of data relating to stream setbacks, which was a key contributor to the earlier findings (see below for more detail on these changes)
- changes within the status quo due to regional and district plan amendments and also the introduction of the National Policy Statement for Freshwater Management (see section 2.1.2 for explanation)
- the removal of quantified environmental benefits associated with sediment loss. In further discussions with councils and forestry managers adjustments were made to reflect our lack of knowledge of the quantifiable environmental benefits associated with moving from a five metre to a ten metre setback [6]
- changes to the proposed solution since the earlier CBAs were carried out, specifically changes to the status quo (permitted, controlled discretionary etc.) of specific forestry activities and changes to the erosion susceptibility calculator (see section 1.1 above).

With specific reference to bullet two above, the key change in the revised GIS analysis was excluding areas already subject to Crown Marginal Strips. Crown Marginal Strips are already subject to twenty metre setbacks. The revised GIS analysis also used more recent and more spatially accurate data for Exotic Forests. Version 3 of the New Zealand Land Cover Database (LCDB) was used in instead of the Ministry for Environment's Land Use Mapping (LUM) version 3.

[6] This is also complicated by councils and major forestry companies developing best practice maintenance and harvesting regimes.

The revised analysis has also been commissioned to assess the legitimacy of concerns regarding the earlier analysis. In particular, concerns have been raised regarding:

- the calculation of environmental benefits arising from increased setback provisions
- projections of the status quo, which did not correspond with forestry sector experience of increasing regulatory costs over time.

The following analysis is intended to increase the clarity around whether adopting the proposed standard would result in benefits for New Zealand greater than the costs incurred by adopting them. It is however only a partial cost benefit analysis. In particular it does not attempt to quantify relevant environmental costs and benefits. While the significance of these costs and benefits are described in a qualitative manner, it has not been possible to place a monetary value on them. This is because of the difficulty in determining the value of changing from a five metre to a ten metre setback and the impact of other NES rules (interviews with forestry companies, councils and environmental groups. It is understood that MPI is also to engage consultants with expertise in the environment issues associated with forestry to assist with its broader policy analysis process.

The analysis has been requested by MPI as part of the evaluation of the effectiveness and efficiency of the NES and to inform the policy process. This report is intended to be informative for such a process but it does not constitute a full section 32 analysis. [7]

1.3. The issue to be addressed

A NES is being considered in response to concerns that the forestry sector is less efficient than it could otherwise be because it is currently subject to resource management plan development, consenting and compliance processes administered by all district, city and regional councils and unitary authorities. This situation creates variation in resource management practice across the different authorities and potentially uneven environmental outcomes.

The process for considering the viability of an NES began in 2010. The Ministry for the Environment commissioned two reports which sought to evaluate the state of regional and district plan rules relating to plantation forestry. [8] These reports reviewed the plan provisions of all regional and unitary authorities and of 23 district or city councils. The district or city councils were selected on the basis of the amount of plantation forestry in the area i.e. those with the largest areas mixed in with others that had limited forestry areas so rules could be compared.

In relation to regional councils and unitary authorities, the review found that there is a very wide variety of regulatory controls relating to plantation forestry. These range from councils with no specific plantation forestry rules to those with very specific provisions, including specific rules for planting and harvesting and special provision for

[7] Section 32 of the RMA requires that, before a regulation is made an evaluation must be carried out by the Minister for the Environment which examines: a) The extent to which each objective is the most appropriate way to achieve the purpose of the RMA; and b) Whether, having regard to their efficiency and effectiveness, the policies, rules or other methods are the most appropriate for achieving the objectives. An evaluation must take into account: a) The benefits and costs of policies, rules or other methods; and b) The risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules or other methods.

[8] "*Review of 12 regional council and 4 unitary authority RMA plan provisions relating to plantation forestry*", Brown & Pemberton, 2010; and *"Review of 23 district council RMA plan provisions relating to plantation forestry",* Brown & Pemberton, 2010.

accredited operators. Variation was found to exist across the full range of forestry-related activities reviewed, e.g. earthworks, harvesting, afforestation and mechanical land preparation. This was confirmed by subsequent interviews with stakeholders.

In relation to district and city council provisions, the review found that in 'rural' zones in nearly all instances the land use activity of forestry is provided for as a permitted activity. One exception to this was identified where harvesting activities in erosion prone areas may require resource consent under a mixture of activity statuses, i.e. controlled, restricted discretion or discretionary. However, while the review indicated a high degree of consistency in relation to activity status, it identified a high degree of variation in relation to the conditions applied to permitted activities. The review found that conditions relating to factors such as earthwork volumes, areas or depth, or setbacks varied quite considerably from council to council. For example, it was found that in relation to riparian buffers applied to earthworks and vegetation clearance, these varied from 10 to 100 metres and 5 to 20 metres, respectively. [9]

Plantation forestry, like all human activity, can have adverse environmental effects. Maintaining the current and consistent environmental outcomes has been a key consideration in the development of the specific controls of the proposed NES.

Two partial cost benefit analyses (CBAs) were conducted in 2011 and 2012 by NZIER and HG. Both have suggested that given the information available the quantifiable costs outweighed the benefits of the NES.

This partial CBA considers new information (see section 1.2) and conducts a new round of interviews with affected stakeholders. It also was preceded by extensive consultation between the industry and MPI, via an industry working group. Our understanding of the problem identified by the working group, to be addressed in the proposed NES and tested in this CBA, can be summarised as follows:

[9] Page 17 of *"Review of 23 district council RMA plan provisions relating to plantation forestry",* Brown & Pemberton, 2010

Table 2 Draft problem definition

Issues	Implications	Causes
Inefficiency – the cost to NZ (not just Forestry Companies) to produce wood is greater than is necessary	Higher plan, administrative and compliance costs for various parties, including costs associated with ongoing council/industry/stakeholder engagement Uncertainty	Re-litigation of issue in planning documents Requirement to interpret variable planning rules and standards
Investment uncertainty	Operational costs for forestry companies (on-ground costs) Investment being deferred	Inconsistent treatment between Districts/Regions
Variable forestry practice	Uncertain environmental outcomes	Varying regulations in some Districts / Regions

Source: HG and NZIER

1.4. Approach to the analysis

The approach is focused on the development of the steps required in a CBA. We have chosen the CBA approach because it is a well-established method of transparently identifying and illustrating the costs and benefits that count, and to show how various factors (particularly environmental issues) can impact on the analysis.

The steps of the CBA approach are illustrated in the following table.

Table 3 NZIER's 10-step cost benefit analysis process

Step	Process
1	Define the problem / opportunity
2	Select options and specify the baseline (i.e. the 'without') scenario
3	Decide whose benefits and costs count (standing). In this case through interviews with selected stakeholders
4	Classify the kinds of benefits and costs and select the measurement indicators
5	Quantify the consequences (via the measurement indicators) over the life of the options
6	Value (attach dollar values to) the benefits and costs
7	Discount future benefits and costs to obtain present values
8	Calculate decision criteria
9	Analyse uncertainty and risk and understand the sensitivity of the results to assumptions
10	Make a recommendation and document the assessment.

Source: NZIER

Below we set out how NZIER and HG intend to construct the CBA in line with the steps described above.

1.4.1. Defining the status quo

Step 1 a draft problem definition to be tested in the CBA is set out in section 1.3.

Step 2 examines in detail the status quo provided by the legislation, regulations and district and regional planning provisions relating to plantation forestry, and also by the characteristics of the industry that are affected by it.

This must include examining the likely future developments in the forestry industry that may be impacted by the NES. While this can be speculative, we will focus on examining recent trends, attitudes to forestry investment, and discussing with industry personnel expectations for future developments. The aim is to identify how forestry trends are likely to change over the next 30 years, to establish a realistic base case.

Information sources for this element included interviews with stakeholders (see section 1.4.2 for a summary of the parties consulted) and any literature that has a bearing on resource management issues.

Based on the analysis of the status quo we set out the problem definition (section 2.3) as we understand it and provide a summary of how this compares to the draft problem definition.

1.4.2. Identifying and valuing benefits and costs

Step 3 involves understanding and identifying the costs and benefits that count in the CBA and to further inform definition of the status quo. To help to identify costs and benefits interviews have been conducted with a range of stakeholders. This information has been cross checked with information previously provided by participants and by testing views expressed by stakeholders with other stakeholders. In the revised analysis, we have built on the information already obtained with the focus being on:

- the forestry industry including forestry owners, managers, consultants and industry organisations. These included representatives of larger and smaller forestry interests, and included those with interests in a range of locations within New Zealand
- further information from central government agencies and departments, specifically the Ministry for the Environment, the Department of Conservation and the Ministry for Primary Industries
- local authorities, including district and city territorial authorities, unitary authorities and regional councils
- environmental non-government organisations specifically Fish and Game New Zealand and the Royal Forest and Bird Protection Society of New Zealand
- further examining the environmental outcomes associated with the NES. This involved a further review of the literature and discussions on the National Policy Statement for Freshwater Management (with officials) and

review of working group criticism of the previous cost benefit analysis (NZIER HG 2012).

As with previous analyses, the interviews were carried out in structured format. A set of interview questions or topics were developed to help enable the identification and quantification of costs and benefits of "with" and "without" the NES. These were then discussed with MPI who provided further comments. The interviews were undertaken as an inquiry process, and were followed up with subsequent communications as necessary to ensure the information and assumptions which inform the cost benefit analysis (CBA) were as robust as possible. This feedback is integrated into the discussions in sections 2, 3 and 4 of this report.

We have also provided MPI with a summary of individual discussions.

1.4.3. Evaluation and appraisal

Step 4, 5, and 6 of the cost benefit analysis focuses on the impacts of the proposed NES:

- classifying the costs and benefits
- quantifying the consequences if possible to demonstrate what the value of resources are (or saved) by adopting the NES
- attaching dollar figures if possible from adopting the NES

Costs are usually more readily quantified than benefits. The economic value for which needs to be inferred, explicitly or implicitly at a national level. For instance, an avoided cost is one measure of benefit, but there is also value in entirely new developments which the public is willing to pay for in one way or another.

Costs and benefits are assessed across the entire affected community, and it is the overall gain or loss across the entire community that determines whether the standards are worthwhile, not its impact on particular parties. However, we have broken down the costs and benefits for each to illustrate how they impact on stakeholders and activities.

This partial cost benefit analysis is based on the understanding of economic value. More particularly, the analysis considers costs and benefits in relation to:

- administrative and compliance costs and benefits
- forestry related costs and benefits, and
- environmental costs and benefits (unquantified, as explained in section 1.2 above) .

The key issue is to identify the marginal change between the "with" and "without" NES scenarios.

1.4.4. The elements of the decision making criteria

Steps 7 to 10 examine the chosen decision making criteria, risks to the central result and other factors that need to be considered by decision makers.

The ratio of benefits to costs is a measure of the efficiency of resource use from a proposed change (to the NES). This is the chosen measure. Again, it is noted that in

this case the ratio is based on a partial quantification of the costs and benefits. The environmental costs and benefits have not been able to be quantified. MPI has commissioned separate work on these elements.

An important part of the CBA is show the sensitivity of the central scenario to changes in assumptions for example the introduction of template plans, value of setbacks in steep hill country, the consents costs, and the value of certainty benefits.

While the CBA is informative of the distribution of costs and benefits across different parties in the community it does not give any guidance on equity or fairness, which is a socio-political value judgement.

2. Current situation

2.1. Current state of the forestry sector

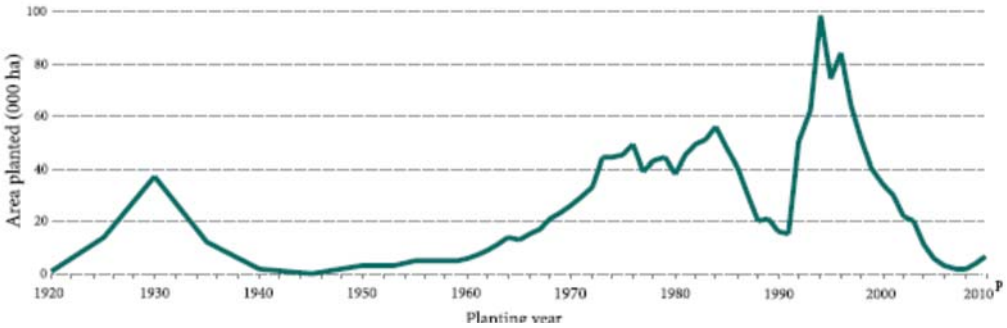
The following provides a brief summary of information taken from the "*National Exotic Forest Description"* prepared by the Ministry for Primary Industries in 2013. The key facts p2 are:

- New Zealand's net stocked planted production forests covered an estimated 1.73 million hectares as at 1 April 2013
- the total planted forest standing volume is estimated to be 512 million cubic metres with an average forest stand age (area weighted) of 16.8 years
- as at 1 April 2013, New Zealand's net stocked forest area has increased by 7,700 hectares from 1 April 2012
- harvested areas awaiting either replanting or a land use decision decreased by 5,500 hectares in the year to 1 April 2013
- of the total forest area, the Central North Island wood supply region makes up 32 percent of the entire planted forest estate, comprising more planted forest than the entire South Island
- the second and third largest areas of planted forest are in the Otago/Southland and Northland wood supply regions.

Figure 1 shows new planting in New Zealand has declined from a peak in the mid-1990s to 11,500 hectares in 2012. New plantings in 2013 are provisionally estimated at 4,500 hectares.

There is a large range in the size of plantation forests in New Zealand; however, the vast majority (approximately 75%) of the land area covered in plantation forests is contained in forests greater than 500 hectares. The reverse is the case in relation to the numbers of owners with approximately 90% of owners owning forests of less than 500 hectares in area.

Figure 1 New forest plantings 1920-2013



Source: National Exotic Forest Description, 2013

2.1.1. The Resource Management Act

The Resource Management Act 1991 (RMA) is the principal statute for managing environmental effects of activities in New Zealand. Its underlying economic direction is permissive subject to the constraints of sustainable management. The RMA does not direct or require development to happen, its role is to manage the effects of people's activities.

The costs and benefits associated with the current RMA processes in relation to plantation forestry are described in the following sections and incorporated into the cost benefit analysis detailed in sections 3 and 4.

2.1.2. National policy statements

National policy statements (NPS) are developed by central government to state objectives and policies for matters of national significance.

NPS for Freshwater Management

The NPS for Freshwater Management came into effect in 2011 and was subject to substantial revision in 2014. Of relevance to the draft NES, it directs regional councils to:

- safeguard freshwater's life supporting capacity, ecosystem processes, and indigenous species including their associated ecosystems
- manage freshwater bodies so people's health is safeguarded when wading or boating (a minimum requirement)
- maintain or improve the overall quality of freshwater within a region
- protect the significant values of wetlands and outstanding freshwater bodies.

The NPS also direct how these objectives should be achieved. It does so by requiring that Regional Councils:

- establish freshwater objectives using a specified process (i.e. the national objectives framework) and to meet community and tāngata whenua values which include the compulsory values of ecosystem health and human health for recreation

- use a specified set of water quality measures (attributes) to set the freshwater objectives (an objective can only be set below national bottom lines in specified circumstances)
- set limits which allow freshwater objectives to be met (e.g. a total catchment contaminant-load or a total rate of water take)
- put in place measures to better account for water takes and sources of contaminants, and measure achievement towards meeting objectives
- take a more integrated approach to managing freshwater and coastal water

Regional Councils are required to have fully implemented the NPS by 2025.

It is noted, that the government has signalled[10] that further amendments can be expected to the NPS to introduce additional national objectives framework attributes. Of particular relevance to forestry, is the indication that sediment related attributes are being considered.

The NPS is driving a significant round of changes to regional plans across the country. The timeline included in Figure 2 was provided by the Ministry for the Environment and shows how each of the country's regional councils propose to implement the NPS. It is noted that this timeline is based on the council work programmes as they existed prior to the 2014 amendments to the NPS.

The ongoing changes signalled in this timeline will, under the status quo, very likely have an influence on the regulation of forestry through regional plans. This will require significant input from the forestry industry and interested NGOs alike. Notably while each council is required to take action to implement the NPS, how this is done is open to their discretion and will likely mean there is variation from region to region, and quite possibly from catchment to catchment.

Other NPSs & the NZCPS

Other NPSs and the New Zealand Coastal Policy Statement (NZCPS) will also set direction that may influence the status quo for forestry management.

The NZCPS was reviewed in 2010, and provides national objectives and policies for all activities occurring within the coastal environment. What constitutes the coastal environment varies from place to place, but it is common place to consider that its landward extent is the dominant ridge behind the coast.[11] The NZCPS contains 7 objectives and 29 policies which seek to safeguard, preserve, protect, take account of, maintain and enhance various values associated with the coast. The NZCPS also seeks to enable people and communities to undertake activities.

It can be expected, that the NZCPS, will drive changes to regional and district plans and policy statements which will influence the regulation of forestry. It is noted in particular that the NZCPS sets strong policy direction (i.e. to avoid adverse effects) in areas of 'outstanding natural character' (Policy 13) and 'outstanding natural features and outstanding natural landscapes' (Policy 15).

[10] Ministry for the Environment. 2013. Proposed amendments to the National Policy Statement for Freshwater Management 2011: A discussion document. Wellington: Ministry for the Environment.

[11] Northland Regional Planning Authority v Whangarei County (1977) A4828 (TCPAB)

During stakeholder interviews the prospect of a NPS on Biodiversity was raised. A draft NPS on Indigenous Biodiversity was released for consultation in January 2011. It is understood that no progress has been made on this document since submissions closed. At time of writing, it was not understood to be a priority for the current government. Therefore, little consideration has been given to the draft NPS as part of the status quo.

2.1.3. Regional and district plans

District (including city) and regional councils are responsible for developing objectives, policies and rules for managing the effects of activities under the RMA. Within their planning documents, [12] each local authority has its own set of objectives, policies and rules. District plans tend to be predominately zone or area based, i.e. they manage the effects of activities depending on the location of the activity within the district. First generation Regional plans tended to be natural resource based, e.g. a plan for the management of freshwater. However, this trend is changing, with second generation plans being increasingly region wide. The NPSFM is resulting in catchment specific sections to regional plans.

It is difficult to determine the cost that has been incurred in the development of plan provisions associated with plantation forestry because:

- the focus placed on plantation forestry varies from council to council.
- councils have not tended to account for the costs specifically attributable to plantation forestry separately from total plan development costs.

Notwithstanding these limitations, in those regions where the council has proposed specific provisions the plan costs associated with plantation forestry have been quite significant, estimated at $200,000 to $500,000 per plan in some instances.

The regional councils canvassed for this analysis varied with regard to whether they are likely to introduce significant forestry related plan and policy changes. Some Councils have established sets of provisions, which they consider are operating well (e.g. Bay of Plenty and Gisborne) or which are new and are still bedding in (e.g. Manawatu-Wanganui). These councils indicated that they are unlikely to introduce significant plan reviews or changes.

Other councils (e.g. Marlborough & Tasman) indicated that they are likely to review their forestry related provisions as part of their second generation plan exercise. These councils indicated a desire to explore more enabling provisions, i.e. greater use of permitted activity status, but that this would be coupled with increased management plan and reporting requirements. These councils also indicated that they were considering the provisions of the draft NES as part of this exercise and would likely be integrating some of these in their proposed provisions.

The district councils canvassed both in the previous analyses and the current one presented a more mixed view, indicating some may potentially introduce more

[12] Regional Policy Statements, Regional Plans and District Plans.

significant plan changes in the future particularly to address landscape and visual concerns. [13]

We have used thirty years as the timeframe for the CBA, because this is the approximate time it takes for a pine plantation forest to be harvested. It is noted, that given this timeframe, predicting the extent of plan changes that may occur in a region or district over that period with any certainty is extremely difficult.

The forestry industry, and in particular larger forestry owners and managers, has sought to introduce some commonality by engaging in advocacy on plan development. For instance, the industry has sought to promote consistency with/or recognition of the Environment Code of Practice for Plantation Forestry. The costs associated with such advocacy are related to both staff time and, where required, external legal advice. Plan advocacy is greatest amongst the larger forestry owners and managers.

However, smaller marketing and management companies, and local Farm Forestry Branches also engage. Stakeholder interviews indicated that the level of involvement by the smaller operators is less, and that these groups tend to 'leave it to the bigger players' when things get particularly adversarial (and costly).

Third parties, such as iwi organisations, environmental non-governmental organisations, local community groups and the Department of Conservation have also been participants in the plan development process as it relates to plantation forestry. The larger national environmental NGOs indicated that this was a small proportion of their overall plan advocacy costs, which in part reflects a level of comfort with the current environmental practice of the industry.

While plan variability is resulting in relatively small costs for these parties, a clear view was expressed, similar to that by foresters, that the variability is due to the number of councils and individuals involved in plan drafting. In the view of the stakeholders, the variability is not driven by a need to respond to different environmental contexts.

The advocacy of forestry owners and managers, who seek to achieve more consistent plan provision between councils and over time, has had uneven success. As discussed in section 1.3 above, a 2010 study commissioned by the Ministry for the Environment has shown that there is significant variation in the provisions of regional and district plans.

A degree of variation between regional and district plan provisions across the country should be expected i.e. council rules must take into account local circumstances and natural variation in biophysical conditions. Good examples of this include:

- Bay of Plenty, would have provisions specifically developed for this activity, rather than relying on activity generic provisions. This is because in these districts or regions the management of plantation forestry would be a much more significant resource management issue than in other parts of the country
- it is appropriate that provisions vary across the country to deal with local biophysical conditions. An example of this is Overlay 3A in the Gisborne Combined Regional Land and District Plan, which requires the

[13] It is noted that some landscape matters sit outside of the scope of the proposed NES and therefore Councils will continue to be able to address forestry impacts on landscape values if they identify this to be a relevant resource management issue. This fact is reflected in the evaluation of the plan benefits of the NES.

establishment and maintenance of effective tree cover, including plantation forestry, in the most erosion prone land of the district

- the Waikato Regional Council has developed provisions for forestry in the Coromandel, which are intended to specifically reflect the sensitivity of the receiving coastal marine area.

However, it is the degree of variation that concerns forest owners and managers. Further, this variation, in many instances, does not come with any tangible environmental benefit. As noted, feedback from stakeholders suggest that the variation in plan provisions is often driven by the number of individual staff and councils involved in drafting plan provisions (interviews with councils and forestry companies).

This variation in regional and district plan provisions can be expected to generate costs due to:

- time required to understand the variability in the way the adverse effects of plantation forestry are managed (e.g. through plantation forestry specific rules or through generic rules)
- delays or operational changes to forestry activities as a result of non-standard approaches to the management of the effects of plantation forestry, either through permitted activity conditions or by way of conditions on resource consent applications
- costs to the forestry industry to make submissions on plans, and appeal plan changes, in an effort to get consistent provisions into plans
- local authorities absorb costs in responding to submissions and appeals.

Interview feedback suggests that for some investors, the variable plan provisions have some influence on where investment is made i.e. some investors indicate that they take into account plan provisions of a district or region when making a decision whether to invest in that area. However, other factors such as the location of ports, local infrastructure, soil type, climate and work force are also at issue. Furthermore, where plan provisions were identified as an issue it is unclear if this solely related to the actual provisions or the perception of the investor about the council's attitude to forestry.

2.1.4. Permitted activities and resource consents

Analysis completed for the Ministry for the Environment in 2010 indicated that the majority of forestry activities were at the time permitted by regional and unitary authorities in easier country (i.e. equivalent of the green zone in the proposed NES). Table 4 provides a breakdown of the percentage of councils that permit forestry activities in steeper areas (i.e. equivalent of the orange or red zones in the proposed NES).

Feedback received during stakeholder canvassing in 2010 and 2011 also indicated that, outside of special areas (such as erosion prone or landscape areas) reasonably significant portions of plantation forestry were managed under a permitted activity regime. The scope of the activity permitted in each district or region is in most cases restricted by conditions, e.g. conditions may include slope, maximum area or setbacks from water bodies, dwellings or boundaries. As noted in section 2.1.3 above these

conditions vary from council to council. For example, it was found that in relation to riparian buffers applied to earthworks and vegetation clearance, these varied from 10 to 100 metres and 5 to 20 metres respectively. [14]

Stakeholder interviews undertaken for the current review indicates that the trend for forestry activities to be managed under permitted activity regimes is continuing, and in some instances increasing, e.g. the introduction of the permitted activity regime in Manawatu-Wanganui.

Table 4 Permitted activities and resource consents

Activity	Percent of council that have an orange/red zones equivalent where permitted	Percent of council that have an orange/red zones equivalent where consent required
Mechanical land preparation	64	36
Harvesting	45	55
Earthworks and quarrying	64	36

Source: Ministry for the Environment

In many parts of the country compliance monitoring against these conditions is reactive, i.e. in response to an identified breach or a complaint. However, this approach to compliance is not universal, particularly in regions with more significant areas of plantation forestry activity. In these areas more proactive approaches exist involving regular liaison between forestry operators and council staff, with correspondingly higher time inputs from these parties.

While it is common for forestry activities to operate within a permitted activity regime, resource consents are required. The reasons for these consent requirements vary depending on location, but include non-compliance with permitted activity conditions and location specific rules.

Feedback from foresters (both large and small) indicates that over the life of the RMA the consent requirements that they face have increased. This has resulted from changes to the plan provisions and from changes in how these provisions are interpreted. Foresters also considered that the requirement for consents will continue to grow under the status quo. Feedback from councils on this point varied. Some councils do not consider that their consent requirements will change, given their expectation of stable plan provisions and well-established implementation practices. Other councils noted that they do expect some increase in their consent requirements for forestry in the future.

Our analysis assumes that under the status quo there will be a slow but gradual increase in the number of resource consents for forestry activities (see

[14] Page 17 of *"Review of 23 district council RMA plan provisions relating to plantation forestry",* Brown & Pemberton, 2010

Table 106).

Costs associated with each individual resource consent application relate to the preparation of the application, council processing and annual charges and ensuring compliance with consent conditions. While exact numbers are not available on a national basis, in the vast majority of instances resource consent applications associated with forestry have been processed on a non-notified basis.

Few notified applications have been identified in stakeholder interviews in 2010, 2011 and now again in 2014. Only one significant Environment Court case has been identified. Given this it is assumed that in all but a very few examples, the application and processing costs associated with forest resource consent applications are relatively small (i.e. averaging approximately $10,900). [15]

More complete data on the number and cost of resource consents currently required was provided by the larger corporate forestry companies. Much less complete information was able to be obtained within the scope of the study for the resource consents associated with smaller forestry blocks. This is partly due to:

- the lack of capacity of smaller owners to focus on the impact of council rules and regulations under the RMA on forestry activities
- council rules tend only to impact on small players at the time of harvest. Many small foresters have little interest in council regulations or time to devote to council policies and practices since they only have to engage once in 30 years.
- the very large number of parties involved and varying practices adopted.

Given this situation, the numbers used in the cost benefit analysis for the smaller forestry blocks should be treated as indicative.

Mixed feedback has been obtained in relation to whether the resource consent process was impacting on operational costs either through delays or forced changes to practice. Some examples of delays and associated operational impacts were identified. However, it is unclear whether such costs are attributable to variable or inappropriate plan provisions or whether the interpretation and application of the provisions is more of the issue. Feedback from stakeholders across all sectors suggests that the experience and knowledge of the individuals involved in consent processing has a significant influence on consent costs, e.g. due to unnecessary further information requests and consent conditions.

2.1.5. Changes to the RMA

In February 2013, the government released a discussion document on proposed changes to the RMA. [16] Amongst these were proposals to reduce the complexity and cost of district and regional plans, and in particular the proposal to require single resource management plans using a national template that would include standard terms and definitions.

It is understood that the intention is that all councils would have a single plan in place within five years (per district or a broader area if agreed by the councils in that area).

[15] Estimated from forestry industry interviews.

[16] Ministry for the Environment. 2013. Improving our resource management system. A discussion document. Wellington: Ministry for the Environment.

Regional and district plans would be consolidated into a new single plan template, which would have to be consistent with a new national planning template. This national template would include standardised terms and definitions, and could also include content for specific standardised zones, and rules for particular activities.

The changes identified in the 2013 discussion document did not proceed. At time of writing the incoming government has not confirmed its RMA amendment priorities and programme. However, it has clearly signalled that there will be significant changes to the Act.

If the concept of single plans based on a national template were to be pursued as part of these changes, then it might be expected that over time there would be a reduction in the variation across current council regulations.

2.2. Non-RMA influences on industry practice

There are a range of international, national and company best practice initiatives, which operate outside of the RMA, and which influence practice within the forestry industry.

At the international level, the Forestry Stewardship Council (FSC) has established a certification process that is intended to link good production practices with consumption/purchasing decisions. The FSC principles and criteria describe how forests can be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations.

Nationally, the forestry industry and various environmental NGOs established the New Zealand Forestry Accord in 1991. The Accord has several objectives, being to:

- define those areas where it is inappropriate to establish plantation forestry
- recognise the important heritage values of New Zealand's remaining natural indigenous forests and the need for their protection and conservation
- acknowledge that the existing area of natural indigenous forest in New Zealand should be maintained and enhanced
- recognise that commercial plantation forests of either introduced or indigenous 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 that this unique accord can provide for the international community.

In 2007, the forestry industry established the New Zealand Environmental Code of Practice for Plantation Forestry. The Code states that its aim is to be:

"*a key reference tool for a wide range of parties involved in managing forests by providing information on environmental values, how such values should be assimilated into operational planning, other references and resources as well as the BEPs*".

In this regard, the Code sets a range of goals in relation to what the industry considers environmentally sound management. These relate to:

- commercial values and sustainability

- ecological values and scientific values
- forest protection
- historic and cultural heritage values
- neighbour and other off-site impacts
- recreational values
- scenic and landscape values
- soil and water values
- understanding the environmental benefits of plantation forestry.

Based on the recommendations in the Code, forest operators develop their own Best Environmental Practices.

Interview feedback indicates that under the status quo costs to the forestry industry associated with the implementation of these non-RMA initiatives regularly overlap with the costs associated with the implementation of RMA controls imposed either by way of permitted activity conditions or conditions on resource consents.

Foresters commonly noted that their on-ground operations were governed by environmental management systems. While these would be influenced, and made more complex by variation amongst council rules and consent conditions, these systems were more driven the company's own objectives with regard to its environmental performance. One company described this as operating as a 'low flying angel', i.e. they operate above the minimum standard required by council regulation, but not so much that it makes their operations inefficient.

Interview feedback also noted that in some parts of the country third parties, such as the larger environmental NGOs can be involved in the non-RMA management of plantation forestry activities through liaison with forestry managers about operational practice.

2.2.1. Adverse effects and benefits of plantation forestry

As Maclaren (1996) p13 points out the costs and benefits of plantation forestry depend on what the counterfactual (i.e. what would otherwise occur) is in each instance. In most instances, the counterfactual is pasture land. According to Maclaren, the impact of forests is positive for:

- water quality: levels of nutrients are usually much higher in waters draining from pastoral land than from catchments with indigenous or exotic forestry
- soil erosion: is far less on forestry land than pastoral land. Trees dry out the soil and bind it with their roots, reducing erosion
- biodiversity: the forestation process will improve indigenous biodiversity
- tree plantations provide more shade and hence cooler water temperatures (relative to pastoral land) that allow invertebrates and native fish to flourish relative to pasture land
- recreational activities such as fishing are also improved by forestry. Conditions are more conducive to fish breeding (shade and temperature) therefore the rivers are much more attractive to those who fish.

Of course plantation forestry is not seen as beneficial by all. The monocultural stands of radiata pine are perhaps a poor substitute for indigenous forests and do not meet the expectations of all New Zealanders as a way of improving environmental or cultural outcomes. Furthermore, in some catchments, such as Canterbury, forestry is somewhat discouraged because it absorbs water. This is water that could be used for competing uses such as agriculture.

Harvesting is seen as being critical to the environmental performance of forestry. It is at that stage that the protection and habitat values provided by the forestry canopy is removed, and erosion and sedimentation risks can be significant.

When considering the potential adverse effects of forestry and how these might change under the status quo, there are three key factors of relevance. First as already mentioned foresters in many instances have well established environmental management systems. With reference to these existing systems, the environmental NGOs interviewed for the latest CBA noted that the forestry industry was relatively well performing.

The second factor is that other matters have an indirect influence on the environmental performance of forestry. An example of this is how factors such as tree growth and the difficulty/cost of harvesting has meant that on steeper land the setbacks established from streams are often larger than those required under the industry Code of Practice or by council rules. Another example is the expectation by several of the industry stakeholders interviewed that the current emphasis on health and safety will have indirect environmental performance benefits i.e. those that have good health and safety records are more likely to have good environmental records (interviews with forestry companies and councils).

The third factor influencing environmental performance under the status quo, specifically freshwater outcomes, is the NPS for Freshwater Management. As already noted this is driving planning processes at the regional level, which are focussed on freshwater objectives and which can be expected to result in an improvement in the environmental outcomes associated with forestry activities, as with many other activities.

2.3. Summary of problem identified in the analysis of the status quo

This section summarises our analysis of the problem definition associated with the regulation of plantation forestry under the RMA. It draws directly on the analysis of the status quo in the previous sections.

2.3.1. Plan variation

The analysis of the status quo identified that significant cost is being incurred by industry, councils and stakeholders due to re-litigation of the same resource management issues across the country and overtime (i.e. as plans are reviewed). Related to this is the uncertainty that forest owners face with regard to the future changes to plans which may occur following decisions to invest in or plant forests.

It is considered that while some of this cost is the result of provisions being set to reflect local context and biophysical conditions, the number of councils and individuals

involved in the drafting of plans is also a source of the variation and a cause of the costs identified.

National level policy direction, particularly the NPS FM will drive significant new advocacy requirements.

2.3.2. Resource consent requirements overtime

While views on this matter are mixed and in particular differ between foresters and some councils (but not all) we have concluded that under the status quo there will be a slow but gradual increase in the number of resource consents for forestry activities. Whether status quo consents exceed NES consent numbers is unknown however for the purposes of this analysis we have gradually increased consent numbers so that they equal NES consents by the end of the thirty year period. This will in part occur by national policy direction, but also by incremental increases the stringency of plan provisions.

2.3.3. Operational costs

There is some limited evidence that the variable regulation is adding cost to environmental management and compliance systems associated with forestry and that some added operational costs (e.g. increased harvesting costs or tracking costs) may be incurred as a result. For example, in one interview the cost of regulatory rules for forestry roads was said to be 30% higher in Auckland relative to Southland, and due to council regulation, without any discernible environmental benefit.

Notwithstanding such examples, at least a portion of these costs appear to be the result of the implementation of the plan provisions and RMA processes (e.g. through conditions placed on resource consents) rather than as a result of variable plan provisions per se. In this regard, the cost impact of inexperienced staff and staff turnover within some councils has been commonly identified in stakeholder interviews (see section 2.4.1 below).

There is little evidence that the current resource management regime is impacting on forestry investment at a national level. This is notwithstanding the likely local impacts where regulation is the most stringent. Therefore, while it appears[17] likely that variation in plan provisions does have some (possibly small) influence on where new forestry investment in occurs in New Zealand, when it comes to investing in New Zealand relative to some other country, New Zealand is still an attractive forestry investment option. It is equally certain that other factors have a strong influence on decisions about where forestry investment occurs in New Zealand. For these reasons, we have not identified 'reduced investment in forestry' as a problem arising from the resource management regime under the status quo.

2.3.4. Environmental outcomes

Stakeholder feedback from all sectors including environmental NGOs indicates that the environmental performance of larger, corporate forestry operations is high relative to other rural industries. This is reflected in the relative small component of NGO plan

[17] Based on interviews with forestry owners.

advocacy specifically directed at forestry related RMA provisions. This position seems to the result of well-established environmental management systems in this sector of the industry.

In comparison, given that currently there is less prevalence of standardised environmental management systems within the small forestry part of the sector, it is likely that there is more variable environmental practice. This is in part due to the direct price of harvest being more significant than on-going reputation/brand. More variable forestry practices within the smaller forest segment of the sector, is creating some uncertainty about environmental outcomes and may be resulting in reduced environmental outcomes than would occur in a more standardised context. We note that 'problem' is current, but is expected to improve under the status quo as the professionalism of all parts of the forestry sector improve as an indirect result of the significant focus being placed on health and safety concerns.

Based on this, we consider that the problems associated with variable environmental practices is of marginal significance.

2.3.5. Assessment of the draft Problem Definition

The following table summarises the problem as we understand it relative to the headings in the draft problem definition.

Table 5 Problem definition

Issues	Evidence from the analysis of the status quo
Inefficiency – the cost to NZ (not just Forestry Companies) to produce wood is greater than is necessary	The same issues are being re-litigated across New Zealand. This is reflected in the plan advocacy costs of forestry operators and third parties, as well as in council costs. National level policy will drive significant new advocacy requirements. There is evidence that variable council regulation is adding cost to environmental management systems and compliance. All parties identified uncertainty about future regulation. Experience of council staff and staff turn-over also identified as a significant cause of inefficiencies.
Investment uncertainty	Operational inefficiencies have been identified due to variable provisions. Again at least a portion of these costs appears to be the result of inexperienced staff and staff turnover within some councils. Variation in plan provisions is likely to have some (possibly small) influence on where new forestry investment in New Zealand. However, when it comes to investing in New Zealand relative to some other country, New Zealand is still an attractive forestry investment. It is equally certain that other factors have a strong influence on such decisions.
Variable forestry practice	Practical considerations such as rate of tree growth and costs of harvesting discourage foresters from planting trees on difficult terrain include steep stream gullies. These practical factors are likely to have indirect benefits in terms of environmental outcomes by limiting forestry activities in riparian margins likely to be more erosion prone. Also well-established environmental management systems within the corporate segment of the forestry sector in particular. Given less prevalence of standardised environmental management systems, it is likely that there is more variable environmental practice in the smaller part of the sector, where direct price of harvest is perhaps more significant than on-going reputation/brand Non-RMA factors may drive improvement under the status quo, particularly changes to health and safety requirements may raise environmental performance indirectly, via a general raising of professional standards in the industry.

Source: NZIER

2.4. Stakeholder feedback

Stakeholders were a key element of the information gathered to inform all three analyses. The following provides a summary of the feedback obtained from the stakeholder groups.

2.4.1. The forestry industry

Interviews were held with, and/or data received from, several industry representatives as part of the initial and revised analysis. [18] Those interviewed operated from a range of locations and also are involved with the management of varying sized forestry blocks. The aim was to understand how the scale of the forestry operation related to resource management costs.

The large forestry operators involved in the analysis either by way of interview or through the provision of information represents approximately 75% of this part of the forestry sector by area. Given the disparate nature of the parties involved in smaller scale forestry in New Zealand, those involved in the analysis represent only a small fraction of this part of the sector.

Overall the intent of these interviews was to improve our understanding of how the current RMA plan provisions influence the costs of these parties both in terms of their administrative costs and operational costs and therefore assist in testing the problem specification. In addition, the parties followed up or preceded the interviews with the provision of written material and figures relating to plan and consent costs.

The feedback can generally be summarised as follows:

- for larger owners and companies specific, a quite significant effort is applied to the monitoring of plan processes and subsequent submissions, hearings and at times Environment Court appeals
- plan provisions are expected to keep on evolving overtime, requiring on going involvement in plan processes
- for smaller growers and those consultancies involved in the management of smaller blocks, plan advocacy occurs but is more limited and is often undertaken by Farm Forestry Branch members on an unpaid basis (which is an unquantified cost)
- many plantation forestry activities operate under permitted activity regimes, however, resource consents are still regularly required for a range of forestry activities, particularly harvesting, earthworks and stream crossings
- the majority of consents are processed on a non-notified basis, with a few being notified and very rare exceptions proceeding to the Environment Court
- resource consent costs do not appear to have a strong correlation to the scale of the forestry block, i.e. smaller forestry blocks can face costs which, proportional to their area, are greater than those encountered for larger forestry blocks

[18] The Ministry took responsibility for industry contact during the current analysis, particularly with the major forestry companies.

- through a combination of RMA controls, non-RMA best practice and forestry practicalities stream setbacks on much of the steep land (above 15 degrees) is equal to or greater than 10 metres under the status quo. However on the flatter land and in some smaller forests that setbacks may be at 5 metres
- the NES is expected to reduce plan advocacy costs, but increase resource consent requirements.
- views on the extent of the resource consent increase varied depending particularly on locality but also due to the approach to consent bundling, the influence of the erosion susceptibility provisions and on the respondents' views on how the NES will be interpreted and implemented
- notwithstanding the above, the number of resource consents that are expected to be required under the 2014 NES is lower from industry expectations on earlier drafts of the NES
- the industry expect some efficiency gains / costs savings for each individual resource consent application under the NES, and overtime, given the single set of provisions
- concerns were expressed about inexperienced staff, who relied on a literal interpretation of rules, rather than being able to call on practical experience to guide the requirements that imposed on activities on the ground
- moving from a varied and complex set of provisions which change overtime, to largely a single set of provisions which remain stable overtime provides certainty benefits
- foresters do examine the rules of the district/region they are contemplating investing in e.g. forestry roads are 30% more expensive in Auckland than they are in Southland. However whether RMA rules stops foresters investing in New Zealand is highly debatable. The costs and uncertainties associated forestry investments in California or Russia are an order of magnitude higher than the costs and uncertainties in the New Zealand forestry sector
- few examples of un-harvestable forests were identified and where plantation forests have been determined to be un-harvestable factors other than resource management regulation are generally considered to be the most significant cause, e.g. roading and access costs in particular. In a very small number of instances resource management issues were considered to have contributed to deferred or cancelled harvest.

2.4.2. Local authorities

Local authorities were interviewed to consider similar matters as those discussed with industry. Feedback was received broadly in relation to three areas: plan development, resource consents and compliance monitoring.

Feedback on plan costs was mixed, partly due to the difficulty the authorities have in determining the portion of their plan costs that are attributable to forestry interests. Some councils anticipate that with the NES they will experience some decrease in plan costs going forward, as to a large extent they will not need to address the rules associated with plantation forestry. Others, particularly some regional councils, note

that because their regional plan rules are not activity based, i.e. forestry specific, plan savings will be minimal. A third group of councils suggested their costs may in fact increase overall. This view is based on the belief that they will not receive savings for the reasons given by the previous group and that they will face additional costs (ranging from $5,000 to $30,000) associated with changes to their plan which clarify how it relates to the NES. Even though NES provisions do not have to be specifically reflected within plans, some councils may choose to do this for clarity reasons. In addition some plans may need to be reshaped to cater for new NES provisions.

Councils were mixed as to whether they would likely take up the ability to be more stringent as provided for in the NES, other than where they already have rules which fall into this category. The most commonly identified exceptions to this were the opportunity for district councils to be more stringent in Outstanding Natural Features and Landscapes and also sensitive natural areas. The district councils spoken to identified this as an area where they were already more stringent than the NES or may choose to be in the future.

Regional Councils were mixed about whether they would utilise the opportunity to be more stringent for nationally outstanding freshwater bodies and regionally significant freshwater bodies. This mixed view appears in part to relate to the uncertainty about the definition of these features and the methodology that will need to be employed to identify them. One council noted that ensuring that the terms used in the NES are consistent with terms in the NPSFM and elsewhere is important to avoid undue costs and confusion.

With regard to implementation of the NPSFM, regional councils were uncertain about how this would interact with the NES. Some recognise that through the NPS, they could choose to implement provisions that would control forestry, in addition to the rules in the NES. Other councils did not consider that this was likely, but acknowledged that determining how the NES practice based approach fitted with the resource use limit or outcome based approach of the NPS would take some work.

In relation to resource consents the feedback from local government was reasonably consistent with the feedback provided from industry. Again it was considered, particularly by the regional councils, that consent requirements would likely increase under the NES. A key reason for these views was that some of the councils spoken to do not currently have erosion susceptibility based provisions. For this reason in particular, views on the extent of the increase varied depending on current provisions and local context. The approach of councils to compliance monitoring varies in relation to the significance of plantation forestry in the area. Those councils with more significant plantation forestry noted that they devote more resources to the issue and approach compliance in a more pro-active fashion. For those councils where forestry is less significant, less resources are applied and the approach appears to be more reactive (as you would expect).

Councils were also asked about whether they consider that the NES would create issues in relation to the permitted baseline in their district or region. In the 2010/2011 analyses, a number of councils consider that it will do so by giving forestry a favoured status by virtue of having its own NES and creating a direct comparison with similar activities undertaken for the purposes of farming. It is apparent that some councils considered the NES might indirectly lead to pressure for plan changes introducing similar provisions for other activities. This view was less prevalent in the stakeholder interviews held in 2014, which perhaps reflects an acceptance that the standards

included in the draft NES are in many cases more stringent than existing forestry rules, and most likely more stringent than current rules applying to other rural land uses.

2.4.3. Non-government organisations

Environmental NGOs were interviewed for the initial analysis and for the 2014 re-analysis. The focus of the interviews was to understand their views in relation to the environmental outcomes that might be expected from the NES and to also identify the costs they incur as a result of their involvement in the decisions made under the RMA relating to plantation forestry.

In relation to the environmental outcomes of the NES, during the initial analysis the views of the groups were mixed. One considered that the NES does not go far enough in advancing environment outcomes relative to the status quo and that there are large environmental risks associated with how different local authorities will implement the NES.

A second considered that there is an implied environmental benefit from the NES as it will generally result in a tightening of rules relating to forestry. However, it is considered that these benefits are at risk due to the heavy reliance that will be placed on the compliance activities of local authorities (i.e. monitoring). In this organisation's view, current practice in this regard is generally poor. The third group noted that there would be environmental winners and losers as a result of the NES, but that real gains would be made in relation to erosion control and riparian setbacks.

It is noted that while two groups considered that environmental benefits would result, evidence of the 'quantity' of such benefits was not able to be provided. During interviews for the 2014 analysis, it was clear that the view that there would be environmental improvement was based on a general raising of the bar. In other words while it was accepted that a large proportion of the industry already operate using best practice measures, this is not universal and for a small group the NES would drive better practice. In this regard, one of the NGOs noted that for them the NES would provide certainty that best practice would be applied more consistently across the country.

In relation to their involvement in RMA forestry related processes, one of the groups is not directly involved and therefore does not incur costs currently, nor is it likely to in the future.

The other two are directly involved in plan processes and to a lesser extent resource consents. These groups are also active in best practice initiatives outside of the RMA. They note that relative to other issues that they engage in under the RMA forestry is not as significant. Notwithstanding this, these organisations anticipate that their costs will reduce as a result of the NES.

These views have not changed under the revised analysis.

2.4.4. Central government

Information was obtained from and discussion held with staff from the Ministry of Primary Industries (MPI) (originally the Ministry of Agriculture and Forestry), the Ministry for the Environment (MFE) and the Department of Conservation (DOC) as part of the analysis.

Two key areas were canvassed in discussions with the MPI. These were in relation to the Emission Trading Scheme (ETS) and lost production implications of the stream setbacks proposed in the NES.

Information provided by MPI indicates that much less land would be taken out of production due to stream setbacks than was estimated in the 2010 and 2011 analyses. This is the result of more accurate GIS information. Coupled with the advice of the forestry sector stakeholders on how practicalities impact on stream setbacks, it is evident the opportunity costs of the stream setbacks in the draft NES are less than estimated in the 2010 and 2011 analyses.

MPI has also advised that changes to the Emission Trading Scheme mean that areas removed from production in response to NES setback requirements will no longer generate liabilities under the Climate Change Response Act.

Both MPI and MFE were interviewed about the interaction of the NES with the implementation of the NPSFM. Both ministries accepted that there is some uncertainty about how the two documents would work together. MFE noted that the NPSFM works across industry sectors and is based on setting resource use limits and avoiding over allocations (including the allocation of the assimilative capacity of water bodies). In contrast, the good practice approach of the NES is not based on a known contribution of contaminants to water bodies. Therefore, under the NES there is a potential to over or under shoot the level of control needed to achieve catchment based limits. It was acknowledged that these factors would need to be worked around by both central and local government, and that the forestry sector would need to be involved in this effort.

A discussion was also held with MFE regarding the potential for template plans to be introduced under future RMA amendments. It is clear from this discussion that there remain significant uncertainty about the content and timing of template plans, even if they are included in 2014/2015 amendments to the Act. MFE advised that if template plans were advanced by the government, the initial emphasis may be on the structure of plans and on definitions. Specific plan content is likely to be a later priority and whether specific standardised activity related rules are advanced will depend on the commitment of future governments.

It would therefore not seem appropriate to include the concept of template plans in the central result for this analysis. However, sensitivity analysis around this issue is relevant.

Interviews with the Department of Conservation (DoC) focussed on their involvement in the RMA processes associated with forestry, the benefits of the proposed stream setbacks, and the overall benefits of the NES.

DoC noted that it is involved in a large number consent applications annually, but that only a small proportion of these related to plantation forestry. Of those that do relate to plantation forestry the majority are non-notified applications. DoC is also involved in plan processes associated with forestry, however again this is relatively less significant than its involvement in relation to other issues.

DOC considers that the NES would provide environmental benefits associated with a standard set of 'good environmental' rules across all regions in New Zealand, i.e. like the environmental NGOs, DOC perceives a general raising of the bar as a result of the NES. No specific evidence of the size of the benefit was given by DoC. DOC

acknowledged that it was a strange that there was no ability for Councils to be more stringent in areas of 'outstanding natural character', which are given a high level of protection in Policy 13 of the NZ Coastal Policy Statement.

3. Costs and benefits of adopting the NES

We have used a cost benefit framework to examine the value of the NES.

CBA is a long-established technique intended to identify the economic efficiency of a proposed project or policy change. Efficiency is broadly about maximising outputs obtained from available inputs, but there are different variants used in economics:

- **technical efficiency** (scale) refers to the most cost-effective way of providing a given service, for instance, reducing or eliminating regulatory costs that do not improve desired outcomes improves technical efficiency of regulated activities
- **allocative efficiency** (matching) refers to the ease with which resources can move across the economy to their most productive uses. For instance, rules that impede desirable investment or allow investment where it should not occur is not allocatively efficient
- **dynamic efficiency** (innovation) refers to altering processes or changes to new activities over time.

If the introduction of the NES can reduce the community-wide costs of regulation, it will improve technical efficiency. To the extent that it shifts resources from one less productive activity to a more productive activity, it also improves the allocative efficiency of resource use by focussing forestry companies on other profitable activities that might otherwise not occur. If it also allows new, more efficient ways to implement regulations, it also improves dynamic efficiency over time e.g. better sequencing of harvest activities to further minimise environmental harm.

A cost benefit analysis proceeds by comparing effects and outcomes associated with the introduction of new technology against what would have occurred under a counterfactual, without the proposed change. This counterfactual can be described as a projection of the status quo into the future as supply and demand conditions change.

3.1. The counterfactual

Setting up the counterfactual is difficult because there is:

- limited baseline data from which to measure any change over 30 years
- uncertainty about what forestry companies, councils and NGOs are likely to do in absence of the introduction of a NES
- uncertainty about the impact of initiatives that would emerge without a NES.

Therefore, there are potentially a number of credible counterfactuals. The one we assume here is open to question, and should be treated as "work in progress". We treat the counterfactual here as a tentative "peg in the ground".

We assume that, if no NES was in place that unevenly and over time Councils would gradually introduce elements of the draft NES as part of their plans. This would be a disjointed process with no consistency between councils. Further we expect that:

- some councils will continue with evolving their current systems
- if parts of the draft NES were implemented they are likely to be:
  - more expensive to implement
  - stand-alone rules and configured differently
- riskier (i.e. some councils could impose conditions that unnecessarily restricted forestry activity), and could cost more (i.e. imposed unduly high costs on industry)

Specifically, under the status quo, costs of variable consenting provisions and the need for plan advocacy for forestry operation activities and protection across local authority districts comprise:

- costs to NGOs in monitoring council plans
- costs for local councils in planning processes, and
- various costs for forestry companies in complying with localised requirements, and surveillance of different regions' or districts' plan requirements.

These categories refer to costs where they originally fall, not on where they are finally borne. For instance, extra costs for forestry companies will either be passed onto consumers in log prices or absorbed, which in turn could impact on forestry company profitability. Ultimately, the costs are likely to fall on:

- forestry owners and managers for plan advocacy
- local ratepayers, who pay the costs incurred by councils in developing plans
- the economy as a whole will lose some dynamic efficiency, as the drag on forestry efficiency increases.

The benefits of variability of provisions across local authorities are less tangible, and relate to the value to the community of self-determination and control over the pattern of development, as well as the ability to respond to localised environmental conditions. The economic value of such self-determination can be inferred through:

- the increase in consenting costs associated with the NES provisions
- increase in other costs (for minor plan adjustments, training, monitoring) for forestry owners and managers, and councils
- the community's willingness to pay for restrictions and processes that result in opportunity costs incurred within the community due to additional resources used and benefits forgone:
  - such willingness to pay can be estimated through market research type surveys, but these require more time and resources than is provided for in this project
  - community value is usually determined through the political process that approves the rules applied in each locality, and the economic value implied by these decisions can often vary widely between apparently similar outcomes.

Any reduction in the above costs or gains in the above benefits that are likely to arise from adopting the new standards are relevant to economic cost benefit analysis. In practice, the benefits are often less completely valued than the costs, but by getting some measure on the more tangible effects on costs, such analysis can provide insight on how big the benefit of local control would need to be to justify retaining it.

3.2. Situation under the status quo

The current arrangements governing environmental effects of "plantation forestry activities" fall unevenly on different parties in the community. The principal resource use effects (detailed in Table 6) are costs and benefits to councils (districts, unitary, and regional), the environment, general public, NGOs, government and small and large forestry owners.

The benefits revolve around localised control while the costs of a less efficient forestry sector fall on the forestry owners and managers.

Table 6 Costs and benefits "without" the plantation forestry NES

Status quo		
	Costs	Benefits
Environment		
Sediment, stream habitat, soil erosion, flood effects and overall environmental management	Uncertainty in environmental outcomes due to local variation	Benefit from setbacks that are driven by forestry practicalities, industry best practice and to some extent by the 'average' 5 metre setback required in council plans Localised rules
Councils		
	On-going costs of dealing with forestry companies particularly in areas where forestry is a major land use (plan, consenting, monitoring costs)	Conditions can be set taking into account local physical characteristics They also can react to local concerns and priorities
Forestry companies		
	Variable consenting procedures, and changing overtime	Consent costs kept to a minimum in some more lenient regions or districts, at present.
	Variable plan provisions (plan advocacy) with consequent costs for internal procedures and approaches	
	Monitoring costs	
	In house compliance	
	Costs associated with permitted activities	
	Appeals	

Status quo		
	Costs	Benefits
	Increase uncertainty from region/district to region/district	
Government		
	Less than optimal outcomes for efficiency & environmental values	
NGOs		
	Plan advocacy Uncertainty about environmental outcomes	Access localised proceedings
General public		
	Plan advocacy by local community groups	Have the benefits of local proceedings

Source: HG and NZIER

3.2.1. Changes with the NES

The impacts of the proposed NES on the different stakeholders in the community are summarised in
Table 7. The forestry industry incurs most of the cost burden through an increase in opportunity costs of setbacks, and increased consenting costs. Councils also will have some costs (loss of local control, minor plan changes and training). The benefits are mainly in relation to certainty for all sectors with a stake in the industry, for the environment and the reduction in plan costs for the forestry industry, NGOs and councils alike.

Table 7 Costs and benefits "with" the plantation forestry NES

"with" the NES			
Stakeholder/issue	Costs	Benefits	Risks
Environment			
Sediment, stream habitat, soil erosion, flood effects and overall environmental management	Loss of locally applied rules	Nationally, a small possible environmental gain. Although benefit will vary from site to site.	There is no evidence that provides clear support for the assertion that the proposed standard provisions will result in material gains for the environment.
Councils			
Regional and unitary councils	Very small increases in permitted activity costs due to increased conditions and associated reporting requirements and increased consenting costs	Reduction in plan costs	Size of the reduction depends on take up of the ability to be "more stringent" rule or use of issues outside of the scope of the NES. It also depends on how the interaction between the NES and the NPS FM works through (although the NPS FM is likely to contribute to reduced advocacy costs)
	Training on NES		
	Some minor plan changes		
District costs	Increased consenting costs	Reduction in plan costs	Same comment as regional/unitary councils
Forestry companies			
	Increased consenting costs, decreasing overtime with efficiency gains and given the anticipated gradual increase in consent numbers under the status quo	Reduction in plan advocacy costs	Depends on councils taking up the ability to be more stringent or to use issues which are outside of the scope of the NES. It also depends on how the interaction between the NES and the NPS works through (although the NPS FM is likely to contribute to reduced advocacy costs).
	Small Increase in compliance costs associated with permitted and		

"with" the NES			
Stakeholder/issue	Costs	Benefits	Risks
	consented activities, decreasing overtime with efficiency gains		
	Opportunity cost of setbacks		Uncertainty about the width of existing setbacks, & regarding the value of the land subject to additional setbacks under the NES
Government			
	Administrative costs (implementation and monitoring costs)	More, efficient forestry sector, and improved & more consistent environmental outcomes	
NGOs			
		Decrease in plan advocacy costs	
	Increase in consenting costs		
General public			
	Loss of some self determination	Decrease in plan advocacy costs	

Source: HG and NZIER

A fully quantified model (if possible) would compare the "with" and "without" standard situation over a period of years. This requires developing scenarios for "with" and "without" standard situations over a foreseeable future, and comparing the differences between them. This requires for each scenario:

- a full understanding of the environmental benefits associated with the NES including sediment, biodiversity and recreational use
- a full valuation of social and cultural issues and how they change with the NES, and
- the compliance cost of obtaining consents for activities that would be subject to the NES, arising from application preparation and processing costs and any additional costs from meeting non-standard requirements.

The model structure is based on the premise that the NES is likely to reduce the plan costs for both councils and forestry companies/owners, and increase the cost of compliance for the consents process for both forestry companies/owners and councils.

4. Analysis of the costs and benefits

We have focused on costs and benefits associated with the proposed NES. In this way, stakeholders receive a "big picture" view of the likely costs and benefits.

To assess whether the draft NES standards are likely to be worthwhile, it is necessary to assess the magnitude of the effects their introduction would have, and value these in dollar terms as far as possible.

The costs and benefits are informed by the interview results, including cross checking responses, and by the expert opinion of the authors. They infer some representative or typical values to use in the analysis. As much of the information obtained is commercially sensitive and offered in confidence by the respondents, the figures that appear here are in most cases "blended" from different respondents, and are not attributable to individual sources.

The nationally aggregate cost benefit analysis is constructed by estimating the costs and benefits associated with the projected number of consents, and plan advocacy costs over the next 30 years. The thirty year time period has been used since it is close to a full rotation of *pinus radiata* plantation forest.

A net present value is calculated from the central estimates.[19] The discount rate used is 8% real, in line with current Treasury guidelines. The discount rate is also varied to see if it makes any significant difference to the CBA. All costs and values are real resource costs, excluding all taxes, subsidies and other intra-community transfer payments. A sensitivity analysis is then developed to illustrate various options that could be considered.

4.1. Forestry costs and benefits associated with the NES

4.1.1. Environmental costs and benefits

There are a range of environmental values that could potentially be influenced by the NES. Unfortunately, the lack of data on environmental effects, the relatively small changes in environmental performance that will be introduced by the NES, and site specific nature of forestry operations means that little can be definitively said about the environmental effects of the NES.

The interviews and a further search of the literature (see Blaschke et al 2008 for a good overview) found little concrete evidence to support further quantifying environmental benefits. The literature suggests, for example, that increased setbacks will have an environmental benefit. However, as pointed out by members of the NES steering

[19] It should be realised that in a discounted analysis that the costs and benefits that count most come in the initial years of the proposed NES.

group, there is no evidence that can back up quantification of a marginal change in setback size.

Further most participants thought that a marginal increase in setback would improve environmental outcomes but in many cases, setbacks were 10 metres or more in the status quo.

The environmental benefits of the NES potentially occur within terrestrial, freshwater and coastal environments. It is recognised that the impact of the NES on these values will not be consistent across the country. In different contexts the NES may have positive outcomes, while in others, with particular characteristics, the one size fits all approach may result in negative outcomes compared with the status quo. Two points are relevant:

- the extent of negative environmental outcomes is mitigated by the inclusion of provisions allowing councils to be more stringent than the NES in relation to some sensitive environmental issues
- we have developed a national view. It should not be inferred from the analysis that more localised negative outcomes will not result from the NES, however, detailing such local variation is beyond the scope of this report.

Table 8 summarises what we know about these values. The benefits are associated with wilding pines, sediment loss (mainly at harvest time), in stream habitat and biodiversity and potentially the overall management impacts of the proposed NES.

Other potential benefits include the impact of flood effects and potentially recreation. Both are difficult to determine in terms of their benefit impact, although most stakeholders interviewed suggest some benefit, particular on mitigating flooding. The benefits associated with recreation are only speculative.

Table 8 Summary of NES Environmental impact

Components	Impact	Comment
Wilding trees	Possible benefit	Signalled by forestry companies controlling the issue. Understood that the worst issues are the result of historical practices rather than current practices. NES will not impact on bigger companies but may restrict wilding spread from future planting by small foresters.
Sediment and soil erosion	Possible benefit	Unsure how big this benefit is since we have no data that shows a marginal change. A complicating factor also is the impact of the National Policy Statement for Freshwater Management and how that deals with sediment, and how likely it is that council efforts to implement the NPS FM would achieve the same benefits under the status quo.
Stream habitat and biodiversity	Possible benefit	Similar to soil erosion. It is also of note that both significant natural areas and highly valued water bodies are features that Councils are able to be more stringent on.
Flood effects	Marginal benefit	No evidence
Overall impact to forestry companies	Benefit	Consistent rules that guide planning procedures. The focus on health and safety is also improving RMA performance, and there is clear evidence of existing environmental management systems operating based

Components	Impact	Comment
		on good practice in significant elements of the forestry sector.
Recreation	Speculative benefit	No evidence to support this

Source: HG and NZIER

Wilding trees

Wilding trees are unplanted (self-sewn) trees species that have spread, most commonly over tussock grasslands in New Zealand. The main problem has been with Pinus Contortia, with an emerging problem of Douglas Fir in the South Island. The cause of the problem is attributed to shelter belt plantings, corporate forests, and other plantings, in roughly equal proportions.[20] The potential benefit associated with the introduction of the wilding standards in the NES is limited due to the following factors:

- corporate forestry owners and operators have identified the problem and are effectively controlling for it. The best environmental practice for planting in the NZ Environmental Code of Practice for Plantation Forestry requires the use of the Wilding Risk Calculator as a compulsory rule
- possible benefit in relation to smaller plantation forestry applications less likely to be applying the Environmental Code. But in these cases the benefit is still limited by:
  - the source of much of the wilding spread is old plantings, i.e. a significant part of the wilding problem is a legacy issue[21]
  - while the wilding problem is not entirely a legacy problem, the proposed NES wilding standards would apply to afforestation only. It does not apply to replanting of existing forests, including where the replant involves a change of tree species even if the new species presents a higher wilding risk. In 2012, the total area of afforestation (covering corporate and smaller forestry operations) represented about 20% of the total planting (replanting and afforestation) undertaken that year[22]
  - the NES is limited to plantation forests and does not control spread associated with shelter belts and landscape plantings
  - some councils, e.g. Marlborough District, are proposing to introduce controls on wildings under the status quo.

Based on these factors we consider that the proposed NES – as a forward looking regulation – is unlikely to reduce the expenditures on controlling wilding trees by regional and district councils, DoC and voluntary work by Forest and Bird e.g. DoC spends an estimated $2.75 million per annum on controlling wilding trees.[23]

[20] Interview with MPI in 2011.

[21] Froude, V.A. 2011. Wilding conifers in New Zealand: beyond the status report. Report prepared for the Ministry of Agriculture and Forestry. Pacific Eco-Logic, Bay of Islands.

[22] 2013 'National Exotic Forest Description', Ministry for Primary Industries, pg. 11

[23] Interview with DoC in 2011 and confirmed in 2014.

Soil erosion and sediment

Sediment and soil erosion loss has two main impacts:

- increases the turbidity of stream water (i.e. decrease clarity)
- clogs stream beds and downstream receiving environments such as estuaries and lakes.

Both of these impacts affect the biological community and health of an ecosystem.

Good practice across a forestry operation and the inclusion of a riparian buffer are expected to reduce the amount of sediment and soil erosion input from forest harvesting and earthworks into waterways (Thompson et al., 2009). Valuing sediment and soil erosion loss is problematic, since the information we have is limited and sensitive to changes in the assumptions.

In the past CBAs, we have attempted to make estimates of the environmental benefit using values generated by Krausse et al (2001) and the Landcare NZEEM model. Valid criticism of this approach by the NES forestry working group means that we have not attempted to quantify benefits associated with reduced sedimentation in this CBA. The criticisms included:

- significant on-going effort within the forestry industry on environmental management systems which means that good practice is a consistent feature in large foresters segment of the sector, and a growing feature in other segments of the sector
- the difficulty in calculating a benefit estimate for increased setbacks i.e. there is no evidence to support a benefit or cost of an incremental change from 5 to 10 metres
- the site specific nature of forestry operations. In some case a 5 metre setback might be preferable to a 10 metre setback. This is because dragging a log across a stream delivers a better environmental outcome relative to building two roads on each side of the stream
- the expected narrowing of regulation between the status quo and the proposed NES. The draft NES has been around for some time now and we have found evidence that its provisions are being considered in various plan changes.

A further unknown is the implications of the draft National Policy Statement for Freshwater Management (NPS FM). Sediment will be included, at some stage, in the NPS FM. While it is uncertain how it will co-exist with the NES, we expect the introduction of the NPS FM will reduce advocacy costs in the status quo (narrowing the difference between the status quo and the proposed NES).

Stream and terrestrial habitat impacts

With regard to stream habitat, the literature (e.g. Rowe et al 2002) points to the benefits of a 10 metre buffer. Shade, leaf litter food, insect foods, wood input, cover for fish, water quality and the development of a cool moist riparian area will be improved with the move to a 10 metre setback.

As yet, there is insufficient research that could help us further understand what the value of the stream habitat and biodiversity gains could be from the NES, particularly

the benefit that could be attributed to the marginal improvements in forestry practice that may result from the NES. However, from the interviews conducted in-stream habitat values are seen to be extremely important.

Interview respondents indicated that the NES can be expected to also generate some terrestrial biodiversity benefits, e.g. from the habitat corridor created by stream setbacks and overall improvements in operation practice. However, it was acknowledged that what these might be is unclear and will depend on site specific factors. Specifically, the magnitude of these benefits is uncertain for various reasons:

- a wider setback potentially can increase the value of the terrestrial habitat, however there is no clear evidence as to the actual value of the marginal improvement (similar issue for sediment)
- how these setbacks will be managed by foresters is uncertain. The NES does not require a particular management approach to setbacks, i.e. the NES does not require active planting or require regeneration to be unhindered within these areas
- Good practice is an increasing feature under the status quo in response to both council regulation and other non-RMA factors.

Flood effects

Flood effects are also closely associated with soil erosion. Erosion is often caused by climatic events that exceed some threshold for an erosion process.[24] While the prediction of such an event is often possible and is of a random nature, the prediction of the exact location at which a particular erosion process occurs (e.g. a landslide) is extremely difficult.

Flood effects have the potential to reduce on-site productivity and cause loss or damage to the forest infrastructure. However, whether or not flood effects can be referenced to the draft NES is very difficult to determine i.e. measuring what would have happened without the NES compared to with the NES.

Overall environmental management

The draft NES, as a package, is likely to have a small overall positive impact on environmental outcomes within plantation forestry management. However, as time goes on, this benefit is being diluted because of the improved environmental performance in the status quo. This narrowing has been driven by councils picking up provisions in the draft NES and putting them in their rule set and outside factors such as the increasing prevalence of in-house environmental management systems and the focus on health and safety management by foresters. This is driving out undesirable practices including disregard for council rules and the RMA in general.

Two marginal benefits may include:

- the NES promotes good environmental management. We expect minor improvements in the environmental outcomes may come with better forest management and the increased surety of consistent rules across New Zealand for forestry practices

[24] This of course would be a lower threshold during and after harvesting.

- the rules set down in the NES give a clear signal to overseas buyers of forestry products and domestic stakeholders that New Zealand will follow best international practice in the development of its forestry industry.

Recreational activities

While we have many studies that look at the value of streams and rivers to fishers, none of these studies look at the value of rivers and streams from a national perspective (see Sharp and Kerr, 2005 for a summary and Turner et al, 2011 for recent site specific values).

We also have the added complication of determining the difference in recreational values "with" and "without" the NES. We are unsure whether recreational activities will be affected by the increase in buffer size since we have little information to help put a national recreational value on this benefit. Therefore, we have not valued it under the NES. This benefit is also speculative since we have little knowledge (based on stakeholder interviews) about the relationship between increased buffer zones and recreational values.

4.1.2. Tāngata whenua

Māori views on the NES will vary. In previous CBAs different iwi groups expressed different views about forestry in general i.e. some wanted to reduce reliance on pinus radiata, while others owned pinus radiata plantations. MPI will carry out additional engagement in the consultation phase of process to further understand iwi views.

4.1.3. Large forestry managers/owners

Plan advocacy

Approximate plan advocacy costs have been obtained from large forestry managers/owners.

Large forestry companies expected plan advocacy costs to drop by 50% under the proposed NES. We consider that the costs savings will not begin at this level because of the potential complications with how it interacts with the NPSFM. We therefore expect that cost savings will begin at 40% and transition to 50% over a period of 5 years as 'workarounds' for the NPS/NES interaction are developed.

However, plan advocacy costs will not be eliminated because of continuing plan monitoring. Of specific interest to the companies are those issues where councils are able to be more stringent on or which are outside of scope of the NES and because of the need to maintain enabling objectives and policies in plans.

The calculated savings are set out in the following table.

Table 9 Large forest company plan advocacy benefits under the NES

Issue	Values	Comment/calculation	Source
Forestry area of major forestry companies	1,239,766 ha	Forest are over 500 hectares	MPI, National Exotic Forest Description (2013)
Plan advocacy under the status quo	$959,000	1,239,766 x 0.76 cents per hectare	Interviews with large forestry companies
Plan advocacy under the NES	$575,000	40% reduction to 46 cents per hectare. After 5 years a further drop to 38 cents per hectare	Interviews with large forestry companies
Estimated savings	$383,000 in first year.	A further improvement in year 5 to $480,000	

Source: HG and NZIER

Changes in consent costs

Forestry companies indicate that the average price per consent is approximately $10,900 (includes cost of preparation and council processing fee).

We expect that after the first year with the NES consent costs will drop by 10% per annum for the four years and thereafter by 2% per annum. This reflects the learning processes by forestry companies as the interpretation requirements drop with a single rule set.

Feedback from both foresters and councils supports the view that there will be an immediate increase in the number of resource consents required for forestry per annum. This immediate increase will in large part be due to activities in the orange and red zones of the ESC requiring consents, as currently they are permitted. In other words while much of the NES is based on a permitted activity regime, in some aspects it is more restrictive than the current regimes which are also based on permitted regimes.

As the NES is expected to remain unchanged for a significant period, the number of consents will remain constant at this increased level through the evaluation period. In contrast, we expect the number of consents will increase under the status quo. Therefore, the difference in the number of consents required under the NES compared to the status quo will decline over time. So while initially consents required under the NES will be about 1.25 times that of the status quo the difference will eventually be nil. This reflects an increased number of consents being required under the status quo i.e. over the next thirty years without the NES we expect the number of consents to grow to the point where they match the NES in year thirty.

Table 10 Large forest company consent costs under the NES

Issue	Value	Calculation/comment	Source
Status quo	$1,200,000	Average price $10,891 x 114 consents in the first year. Number of consents will grow over the forecast period to match those of the NES in year 30	Forestry company interviews
With NES	$1,758,000	Average price $10,891 x 162 consents. The price will reduce by 10% for four years and a further 2% per annum thereafter	Forestry company interviews
Costs	$517,000		
Note: Numbers rounded			

Source: HG and NZIER

In house compliance

Increased resource consents will generate increased in-house consent compliance costs. These costs are mainly to do with ensuring compliance with consent conditions.

This will not be the full cost of implementing measures required under consent conditions, since other activities not been attributed to either the RMA status quo or the 'with-NES' scenario also drive compliances costs. These include health and safety standards and each company's own internal environmental practices.

Costs between the status quo and proposed NES narrow as the difference in the number of consents are reduced. We have also reduced costs further since consent process will be standardised.

Table 11 Large forest company in-house compliance costs under the NES

Issue	Calculation	Comment	Source
Status quo	$137,000	Average no. of consents per annum (114) x in house average compliance costs ($1,200)	Forestry company interviews
With NES	$155,000	Average no. of consents per annum (162) multiplied by in house average compliance costs ($1,200) x a standardisation cost reduction of 80%	Forestry company interviews
Costs	$18,000	In first year. Reduces as consents reduce	
Note: Number rounded			

Source: HG and NZIER

Council charges

Council annual charges paid by forestry companies will increase in line with the number of consents required under the NES.

The table below sets out the increase.

Table 12 Council charges with the NES

Issue	Value	Calculation/Comment	Source
Status quo	$139,000	Average no. of consents per annum (114) x council annual charges ($1,217)	Forestry company interviews
With NES	$196,000	Average no. of consents per annum (162) x council annual charges ($1,217)	Forestry company interviews
Costs	$29,000	In first year. Reduces in line with consent reductions and familiarity with consent process (2% after year 4)	
Notes: Numbers rounded			

Source: HG and NZIER

Permitted activities

Permitted activity costs will initially increase (10% above status quo costs). The expected rise is due to the increased complexity of the permitted activity conditions and reporting requirements in the NES and the time that will be taken for the new regulations to bed in.

While these costs will vary significantly between regions, all large companies expect some increase in costs associated with permitted activities, particularly around monitoring and auditing. These are however expected to decline slightly (10% for the first 4 years and 2% thereafter and decreasing in line with consent relative to the status quo as the types of auditing and monitoring costs become more familiar.

Table 13 Permitted activity costs under the NES

Issue	Value	Calculation/Comment	Source
Status quo	$124,000	10,000 x 1,239,766 (number of hectares managed by large companies divided by 100,000 ha)	Forestry company interviews
With NES	$136,000	Estimated increase under the NES 10%	Forestry company interviews
Costs	$12,000		
Note: Numbers rounded.			

Source: HG and NZIER

Opportunity cost of setbacks

The opportunity cost of not planting setbacks has been estimated at:

- $8,500 per hectare for slopes under a 7% gradient (estimated by MPI at 730 hectares)
- $5,000 per hectare for slopes between 7% and 15% (estimated by MPI at 442 hectares).

Slopes over 15% have not been valued as it is expected that under the status quo these would have setbacks at least ten metres to reflect forestry practicalities.

The number of hectares affected by this is approximately 1,173 hectares. In calculating this area an allowance has been made for the setbacks already included in the status quo. Existing setbacks are the result of district or regional plan requirements, best practice employed by forestry companies, or a combination of the both.

The total value is approximately $8.4 million (divided by 30 years gives a per annum cost of $281,000).

Table 14 Opportunity cost of setbacks

	Value	Calculation/ comment	Source
Slope below 7%	$6,200,000	$8,500 x 730.4 hectares	MPI
Slope 7%-15%	$2,200,000	$5,000 x 442 hectares	MPI
Total	$8,400,000		
Per annum	$280,000	$8,400,000 divided by 30 years	
Note: Numbers rounded			

Source: HG and NZIER

4.1.4. Regional and unitary councils

Permitted activity costs

Time will be spent by regional councils "getting up to speed" with the NES.

Under permitted activities, there are many activities that incur some costs because of extra conditions e.g. every activity requires a completion statement for councils, setbacks increase along certain boundaries i.e. with houses, certain restrictions are applied when using machinery etc. These costs are also mitigated somewhat, since under the NES there will be a single set of permitted activity conditions. Councils indicate that there will be increased costs.

While it is difficult to estimate what the increase might be, it is likely to be approximately 10%. [25] This is also in line with forestry company views. The calculations are set out below.

[25] Council and forestry industry interviews in the initial analysis.

Table 15 Permitted activity costs under the NES

Issue	Value	Calculation/Comment	Source
Status quo	$320,000	$20,000 x 16 councils ($320,000 per annum)	Council interviews
With NES	$352,000	Estimated increase under the NES 10%	Council interviews
Costs	$32,000	Per annum	

Source: HG and NZIER

Plan development benefits

Regional councils are likely to reduce their expenditure on plan development.

Under the status quo ten regional councils are assumed to spend $200,000 each year on forestry related matters as part of each ten yearly plan review cycle.[26] This is considered reasonable given the effort that has gone into several key regional council plan provisions relating to forestry.

In the 'with-NES' scenario this amount is assumed to reduce by 40%, increasing to 50% as matters of interpretation and workarounds with the NPSFM are developed. The reduction in plan costs recognises that the NES gives guidance on planning matters, with the remaining costs reflecting the on-going need to maintain objectives and policies, and also the risk associated with the ability to be more stringent and 'out-of-scope' issues. The calculations are set out below.

Table 16 Plan development savings under the NES

Issue	Value	Calculation/Comment	Source
Status quo	$320,000	$20,000 per annum for 16 councils	Council interviews
With NES	$192,000	Reduced by 40%	Council interviews
Benefit	$128,000	Per annum	

Source: HG and NZIER

Plan alignment

It is also expected that regional councils will incur some costs associated with aligning their plans with the NES. These have been valued at $15,000 per regional and unitary council.

As a result the total cost for this aspect is calculated as follows: $15,000 multiplied by 16 councils = $240,000 (spread over the first 3 years).

4.1.5. District councils

District councils will also reduce their plan development costs.

[26] NZIER Harrison Grierson estimate.

We have assumed that district councils would spend on average $75,000 (or $7,500 per annum for each council) on forestry related matters as part of each plan review cycle.

In the 'with-NES' scenario this amount is assumed to reduce by 30%. This is considered a reasonable level of cost reduction given the on-going need to maintain objectives and policies, and also the risk associated with the ability to be more stringent, which we expect may be more likely to be exercised by district councils for SNAs and outstanding natural features and landscapes..

The calculations are set out in Table 17. [27]

Table 17 Plan development savings under the NES

Issue	Value	Calculation/Comment	Source
Status quo	$375,000	50 councils spend $7,500 per annum	Council interviews
With NES	$262,500	50 councils reduce spending by 30%	Council interviews
Savings	$112,500	Per annum	

Source: HG and NZIER

Increased permitted activity reporting

District councils interviewed indicated that relatively limited permitted activity monitoring is currently undertaken. Some additional costs are expected as a result of the reporting requirements in the NES.

We have assumed that currently 30 district councils expend the equivalent of 1 week on permitted activity monitoring for forestry each year (5 days @ $800/day = $4,000 for 30 councils, or $120,000 per year). [28]

Under the NES it is assumed that this cost would increase by 10%. [29] Therefore the annual costs would increase by $12,000 per annum.

Plan alignment

It is also expected that district councils will incur some costs associated with aligning their plans with the NES. As these changes would likely take place without any Schedule 1 processes this has been valued at $5,000 for 30 councils 150,000 spread over 3 years). [30]

[27] Costs are based on an average estimate for a number of district councils.

[28] Council conference call phone interview in 2011 and further interviews in 2014.

[29] NZIER Harrison Grierson estimate.

[30] NZIER Harrison Grierson estimate.

Training

Some staff training will also be necessary under the NES, particularly for those district councils that have large areas of forestry. We have estimated that 10 councils will spend an average of $4,800 each on training ($48,000 incurred in the first year). [31]

District councils also pass on direct consent processing costs to those applying for forestry consents.

4.1.6. Small forestry managers/owners

Plan savings

Some information is available on small forestry managers/owners. While less accessible a range of costs and benefits have been identified based on the information provided by members of the NZ Farm Forestry Association.

It is understood that some inputs have been made into the district and regional plan process by small forestry owners, e.g. the regional branches of the NZ Farm Forestry Association regularly submit on district and regional plan changes. Likewise, individual small foresters will also submit. However, the involvement of these groups is not as extensive relative to large foresters and tends to 'piggy-back' off the large foresters at times. We have therefore estimated that small foresters spend a third of the time that large foresters do on plan advocacy and that there will be a 50% saving with the introduction of the NES.

Savings are calculated in the following table.

Table 18 Plan savings for small foresters under the NES

Issue	Value	Calculation/Comment	Source
Status quo	$123,000	478,744 hectares x 76 cents x 1/3	MPI, Small forester interviews
With NES	$61,500	50% reduction	Small forester interviews
Costs	$61,500	Per annum	

Source: HG and NZIER

Resource consent costs

In relation to resource consents, annual charges, in-house compliance costs and permitted activity costs, feedback indicates that this part of the industry can be broken into 2 sub-sectors: [32]

- group 1 – assumed to be 2% of the small forestry sector by area of forest. The practice of this sub-sector is to ignore resource consent processes, and therefore avoid these costs. No change is expected as a result on the NES

[31] Council interviews.

[32] Again, because of the disparate nature of the group the figures should be treated as indicative.

- group 2 – assumed to be 98% of the small forestry sector by area of forest. The practice of this sub-sector is to comply with resource consent requirements largely at harvesting. Therefore, related costs are assumed to be considerably lower than those incurred by the large corporate companies (assumed 80% less). This equates to cost increases due to the NES in the order of 33 cents per hectare for consents, 6 cents per ha for in-house compliance, 5 cents per ha for council annual charges and 2 cent per hectare for permitted activity costs.

For consents, we have also assumed a 2% reduction cost due to small foresters learning from each other in the consenting process. All costs are driven by consent numbers. As the number of consents increase in the status quo, over time consenting cost decline.

The cost calculations for small foresters are set out the following table.

Table 19 Consenting costs for small foresters under the NES

Issue	Value	Calculation/Comment	Source
Group 1	No change	2% of the small foresters	Small forester interviews
Group 2	Incurs increased costs	98% of small foresters	Small forester interviews
Consents	$160,000	$0.33 x 489,000 hectares. First year only. Group 2 only.	Small forester interviews
Compliance costs	$29,000	$0.06 x 489,000 hectares. First year only. Group 2 only.	Small forester interviews
Annual council charges	$23,000	$0.05 x 489,000 hectares. First year only. Group 2 only.	Small forester interviews
Permitted activities	$8,000	$0.02 x 489,000 hectares. First year only. Group 2 only.	Small forester interviews
Note: Numbers rounded.			

Source: HG and NZIER

4.1.7. NGOs and local communities

The increase in consents will mean that NGOs and local communities are likely to spend more time examining consent processes. However, this will be mitigated somewhat since they will only focus their attention on specific areas and consent types.

We estimate an increase of 10% (approximately $10,000 per annum). [33]

[33] Estimated by NZIER and Harrison Grierson.

Table 20 Increasing consenting costs for NGOs and local communities

Status quo	Assume 0.2 of a FTE (100k) spent on plan advocacy with 5 NGOs
With NES costs	$10,000 per annum

Source: HG and NZIER

Plan advocacy savings

Plan advocacy savings are likely to fall under the NES. We expect that NGOs and local communities plan advocacy costs will drop by 40%.

We estimate that 5 groups spend $20,000 each (0.20 of a FTE per annum). [34] Costs drop from $100,000 to $60,000 per annum.

Table 21 Reduction in plan advocacy costs

	Value	Calculations/comment	
Status quo	$100,000	(0.2 of a FTE x $100,000) x 5 entities	NGO interviews
With NES	$60,000	40% savings	
Savings	$40,000		

Source: HG and NZIER

Cost to local democracy

There is some debate amongst councils and NGOs as to whether the NES will reduce district and regional democracy. Some believe it will since national rules are being implemented, while others suggest that local issues are protected since forestry companies will have to apply for more consents and therefore they will be under more scrutiny. It has be tentatively characterised here as a cost but it has not been quantified.

4.1.8. Changes in government expenditure

Implementing the NES

We have estimated the Ministry for the Environment or Ministry for Primary Industries will conservatively spend $100,000 for the first year and $75,000 per annum for the next two years for implementation of the NES. These costs are mainly to do with explanatory documents for local councils and workshops on the NES.

[34] NZIER Harrison Grierson estimate.

Plan advocacy

DoC also spend money on plan advocacy associated with forestry. In line with other stakeholders, we expect plan advocacy costs to drop by 40%. We have estimated that DoC spend the equivalent of one FTE on plan advocacy per year ($100,000 per annum). [35] The NES benefit therefore is $60,000 per annum.

Resource consent costs

DoC also input to the resource consent process. Across all land use activities this is a significant sum, however forestry related work only makes up a small proportion of this effort. It has therefore been assumed, that under the status quo DoC's input equates to 10% of a FTE (i.e. $10,000 per year).

This increase under the NES as consent numbers increase, although it has been assumed that the degree of the increase will be off-set to an extent by the consistency created by the single set of provisions. Therefore, DoC's consent costs are expected to increase by 50% or $15,000 per annum.

The net benefit of the NES is $5,000 per annum.

4.1.9. Valuing certainty

Achieving certainty is a key driver for the NES, and stakeholders interviewed expected that benefits would accrue in terms of regulatory certainty and in terms of environmental outcomes i.e. forestry companies would operate under the same rules throughout and NGOs would not have to re-litigate environmental regulations established in other regions. Earlier versions of the CBA have been criticised for not explicitly recognising this benefit, notwithstanding acceptance of the benefit.

Valuing certainty is problematic. We have no real way of showing how much government, the industry, NGOs and other stakeholders value certainty. We can partially reflect certainty by estimating the money spent on the NES process since 2010 by the various participants (particularly, councils, government, forestry companies, and NGOs). [36]

We have made a conservative estimate of the resources spent on the process in the following table by government, consultants, industry, NGOs and others. This includes:

- time spent in meetings (mainly in Wellington) by the industry in setting up the NES process and on-going meetings (estimated at $100,000 per annum since 2010)
- time spent by government in NES policy development ($150,000 per annum since 2010)
- resources spent on consultants (varies between $2,000 and $80,000 per annum since 2010)
- resources spent by NGOs (estimated at 20,000 per annum since 2010).

[35] FTE includes salary and overhead.

[36] There are many benefits that come from certainty and not all can be valued e.g. one benefit is the improved opportunity for councils and contactors to train and practice since approaches will be the same in each area. Another benefit will be the ability of forestry managers to further standardise their systems since only one forestry regulatory regime will dominate.

We have assumed that if the NES was not enacted that industry, NGOs and government would make periodic attempts to pass an NES over the forecast period to improve certainty.[37] To estimate attempts to gain certainty we have used past expenditure and forecast spending in the status quo to show the value of the NES to some stakeholders i.e. we are using past expenditure to indicate potential future expenditure to achieve certainty.

4.2. Summary of costs and benefits

4.2.1. Benefits

There are a number of quantified and unquantified benefits associated with the NES, therefore it is difficult to pin down with any accuracy the value of the total benefits.

Of particular concern is the lack data on the environmental benefits, although we expect those gains to be marginal. There is also no information on how an NES will improve firm and government performance over and above the reduction in administrative and compliance costs.[38]

Other benefits are to do with plan development and plan advocacy which is expected to reduce as a result of the NES. This has an impact on councils, forestry companies, environmental groups and government. The benefits are summarised in the following table.

[37] Implicit is the assumption that uncertainty continues because of the inconsistencies of the status quo. The inconsistencies occur because of uneven application of forestry rules applied in each region over the period.

[38] Work could occur on these potential marginal benefits and costs but timing and resources preclude this e.g. understanding how a more standardised approach to regulatory practice would impact on forestry company productivity as systems are standardised is alluded to in the certainty section. However the cost of retrieving this information and calculating its impact is a project in itself.

Table 22 Summary of benefits

Stakeholders/resource	Explanation	Costs /benefits
Environmental benefits	Retention of sediment and soil erosion during harvesting	Unquantified benefit
	Improved biodiversity and in stream habitat values during harvesting	Unquantified benefit but expected to be less than the soil erosion and sediment benefit
	Improved mitigation of flood effects	Unquantified benefit. Expected to be less than the biodiversity and in stream habitat benefit
Tāngata whenua	Unknown	Unsure whether a benefit or cost
Large foresters	Benefit from reduction in plan advocacy costs	$384, 000 in first year, increases in later years to $479,000 (year 5)
Small foresters	Benefit from reduction in plan advocacy costs	$61,000 per annum
Regional councils	Benefit from reduction in plan costs	$128,000 per annum
District councils	Benefit from reduction in plan costs	$112,500 per annum
NGOs	Benefit from reduction in plan advocacy costs	$40,000 per annum
Government	Reduction in plan costs	$60,000 per annum
Certainty	Increased certainty for stakeholders	$350,000 in first year
Total benefit	**Over 30 years (PV 8%)**	**$12,484,000**

Source: HG and NZIER

4.2.2. Costs

Costs associated with the policies are substantial (relative to the benefits), and spread out over the 30 years of the CBA. These are mainly accrued by the forestry industry (small and large companies), local government, government, and to a lesser extent NGOs as the consenting, in-house compliance and permitted activity charges increase.

The main costs will fall on large forestry companies as the number of consents and the amount of work required to service permitted activity requirements increases. Also, council charges increase as more monitoring is required under the NES which in turn increases the in house compliance costs.

Smaller forestry owners/operators will also face increased charges, particularly at harvest time as consenting costs increase as well as internal compliance costs and annual council charges increase.

Another major cost for forestry companies is the opportunity cost associated with not planting the setbacks: this is expected to be $280,000 per annum.

The increased costs associated with forestry company industry activities will increase costs for regional and district councils. Regional and district councils will face costs associated with plan changes, permitted activities and training costs. These costs are much less than those incurred by forestry companies/owners.

NGOs face an expected slight increase in costs associated with plan monitoring since they will spend more time examining consent processes.

Government will also incur costs associated with:

- implementing the NES. These costs are expected to be incurred over the first three years of the NES
- as consents increase the amount of time that DoC spend monitoring consent processes is also likely to increase.

Table 23 Summary of costs

Stakeholders/resource	Explanation	Costs /benefits
Large foresters		
Consents	Consents are required more frequently	$516,000 in first year. Decreases over time as status quo consents increase. Also consents become slightly cheaper.
Council annual charges	Increased monitoring	$57,700 in first year. Reduces slightly each year
In house compliance	Increased compliance monitoring costs	$18,000 in first year. Reduces slightly each year
Permitted activity costs	Increases further as more conditions are applied	$12,000 in first year. Reduces slightly each year
Small foresters		
Consents	Increased costs as more consents required	$160,000 in first year. Reduces with consents and familiarity with the consent process
Council annual charges	Increased monitoring by councils	$23,000 in first year. Reduces with consents and familiarity with the consent process
Compliance cost	More documentation required	$29,000 per annum
Permitted activity costs	Increases further as more conditions are applied	$7,000 in first year. Reduces with consents and familiarity with the consent process
Regional council costs		
Plans	Some plan changes required	$80,000 for the first three years
Permitted activity	More documentation required	$32,000 per annum
Training	Some further training needed	$77,000 in first year only
District councils		
Plans	Some plan changes required	$50,000 for the first three years
Permitted activity	More documentation required	$12,000 per annum
Training	Some further training needed	$48,000 in first year only
NGOs		
	Increased monitoring of consents	$10,000 per annum
Government		

Stakeholders/resource	Explanation	Costs /benefits
Plan advocacy	Increased monitoring of consents	$5,000 per annum
Implementation costs	NES costs	$100,000 in first year, $75,000 in two subsequent years
Wider costs		
Opportunity cost of setbacks	No replanting within 5 metres of stream	$281,000 per annum
Total costs	**Over 30 years (PV 8%)**	**$11,138,000**

Source: HG and NZIER

4.3. Results

The section above has indicated the basis on which the partial CBA has been developed. The results are summarised in Table 24 for the NES. On the basis of the central "typical" assumptions, the quantified analysis returns a net benefit, and this is robust against changes in the discount rate (in either direction). However, the robustness of the analysis is influenced by:

- the potential bias in the information provided [39]
- the potential magnitude of unquantified costs and benefits, such as environmental benefits associated with in stream habitat and biodiversity and flood effects – MPI has commissioned separate reports on these matters, which will be incorporated into its overall policy analysis.

Table 24 Results in the central scenario

Discount rate	6%	8%	10%
PV cost	13,099,000	11,138,000	9,525,000
PV costs	14,924,000	12,259,000	10,299,000
Net benefit	1,825,000	1,121,000	774,000
Benefit cost ratio	1.14	1.10	1.08
Numbers rounded			

Source: HG and NZIER

4.3.1. Sensitivity to changes in assumptions

- Sensitivity analysis was done on the benefits and the costs and the more important scenarios are set out in in certainty benefits by 50%.
- Table 25).

Five scenarios are of note:

[39] To try and avoid bias we asked a standard set of questions of each interviewee, used our professional judgement, and our experience from many other evaluations of National Policy Statements and National Environmental Standards. We also tried to – as far as possible – cross check answers from a different source.

- scenario 1: the introduction of template plans. We have little information of what the impact of template plans will be or even their make-up. However, along with further amalgamations they must be considered as a possibility in the status quo. It is likely that their impact will be:
  - a 50% drop in the benefits associated with the NES after 10 years since plans are likely to become more standardised
  - a 50% drop in costs (except for the opportunity cost of setbacks which stay unchanged) after 10 years since the status quo consent requirements will more closely resemble the NES
- scenario 2: a reduction in slope costs in the setback equation. In this scenario we only value land below 7% in gradient
- scenario 3: no reduction in consent costs from the first year. In the central scenario we have built in reductions in costs from "learning by doing". These reductions in cost are important and have a major impact total costs
- scenario 4: a reduction certainty benefits by 50%
- scenario 5: an increase in certainty benefits by 50%.

Table 25 Sensitivity analysis

PV 8%

	Scenario 1: Template plans	Scenario 2: Slope sensitivity	Scenario 3: Consents at constant price
PV costs	10,399,000	10,344,000	14,303,000
PV benefits	9,785,000	12,259,000	11,497,000
Net benefit/loss	-613,000	1,914,000	-2,805,000
Benefit cost ratio	0.94	1.19	0.80
	Certainty benefits reduced by 50%	**Certainty benefits increased by 50%**	
PV costs	11,174,000	11,174,000	
PV benefits	10,820,000	13,985,000	
Net benefit/loss	-354,000	2,811,000	
Benefit cost ratio	0.97	1.25	
Numbers rounded			

Source: HG and NZIER

Scenario 1 reduces the benefits (50%) and consent costs (50%) after 10 years. This has a negative impact on the benefit cost ratio but reduces the costs and benefits.

Scenario 2 reduces the costs by removing land over the 7% gradient from the setback equation. This improves the CBA result with a net benefit of $1,914,000 and a benefit cost ratio of 1.12.

Scenario 3 keeps consent costs constant throughout the CBA. This shows the value of learning and improving processes between industry and councils over time. It also shows the importance of the cost of consents within the CBA. With no learning the costs outweigh the benefits.

Scenario 4 and 5 decrease and increase estimated value of certainty. With a 50% reduction in certainty value the costs of the intervention roughly equal the benefits (albeit slightly negative 0.97). A 50% increase in certainty value increased the benefit cost ratio to 1.25.

5. Conclusion

We have assessed some of the costs and benefits of the proposed NES for plantation forestry. This review included previous analysis undertaken by the NZIER and Harrison Grierson (August 2011 and January 2012), documentation on the proposals, and further canvassed opinion from forestry companies and owners, local government and other interested parties on how the proposed standard is likely to affect their operations, and the costs and benefits that result.

The principal parts of the partial quantified analysis are:

- reduction in plan costs for forestry companies, councils and environmental groups (a benefit of the NES)
- the increased consent costs faced by forestry owners and managers (a cost of the NES)
- the increase in opportunity costs associated with setbacks faced by forestry owners and managers (a cost of the NES)
- increased costs associated with permitted activity compliance (a cost of the NES)
- increased internal monitoring costs for forest owners (a cost of the NES).

We must stress that there are limitations in the quantified analysis due to the lack of information, particularly around environmental values. We expect that the size of environmental benefits is relatively small relative to the status quo; however, this is being further investigated in other reports commissioned by MPI.

The robustness of the analysis is influenced by the potential bias in the information provided and the potential magnitude of unquantified costs and benefits, such as uncertainty about how much consenting activity is likely to occur.

The figures in this report should be regarded as an order of magnitude calculation rather than a definitive measure and the analysis can use improved information if it becomes available. Such improved information would be required, for instance, how the mooted reforms to the RMA are likely to influence the costs and benefits.

Appendix A Further sensitivity analysis

Further scenario analysis was conducted on:

- the setback analysis: the land affected by setbacks was increased/decreased by 50% (Table 26)
- changes to land classification and its possible impact on consents (i.e. reduction in consents by 10%, 15%, 20%, and 25%.

A.1 Setbacks

Estimation of setbacks is a crucial cost in the analysis. Table 26 shows that any movement in the estimates has a significant impact on the net present value and the benefit cost ratio.

Table 26 Sensitivity analysis on setbacks

PV 8% $

	Setback costs increased by 50%	Setback costs decreased by 50%
Present value costs	12,718,000	9,558,000
Present value benefits	12,300,000	12,300,000
Net present value	-458,000	2,701,000
Benefit cost ratio	0.97	1.28
Numbers rounded		

Source: HG and NZIER

A.2 Reclassification of zones

Changes to the classification of land within the NES and its impact on consents is more difficult to assess. The main reason for this is that it is not the amount of land that impacts on consents but the type of land that is reclassified. To do this properly we would require the development of a "ground up" assessment of each forest. To overcome this problem we have set out four scenarios reducing consent numbers by between 10% and 25%. [40]

Unsurprisingly, the benefits increase as the percentage of consents drops. In three of the scenarios the number of consents in the status quo are greater than the specified scenario (25%, 20% and 15% reductions) by the end of the period. In two scenarios (25% and 20% reductions), the value of consents relative to the status quo means that the consents cost category associated with the scenario turns the cost into a benefit.

[40] We should also note that the reclassification of land and its impact on consent numbers has not been tested with forestry managers.

Table 27 Possible impact of land reclassification and its impact on consents

PV 8%

	25% Consent reduction	20% Consent reduction	15% Consent reduction	10% Consent reduction
Present value costs	4,117,000	5,432,000	7,305,000	8,720,000
Present value benefits	12,259,000	12,259,000	12,259,000	12,259,000
Net benefit	8,141,000	6,826,000	4,954,000	3,538,000
Benefit cost ratio	2.98	2.26	1.68	1.41
Numbers rounded				

Source: HG and NZIER

Appendix B NES Summary tables and NPS FM timetable

Table 28 Forestry NES summary table

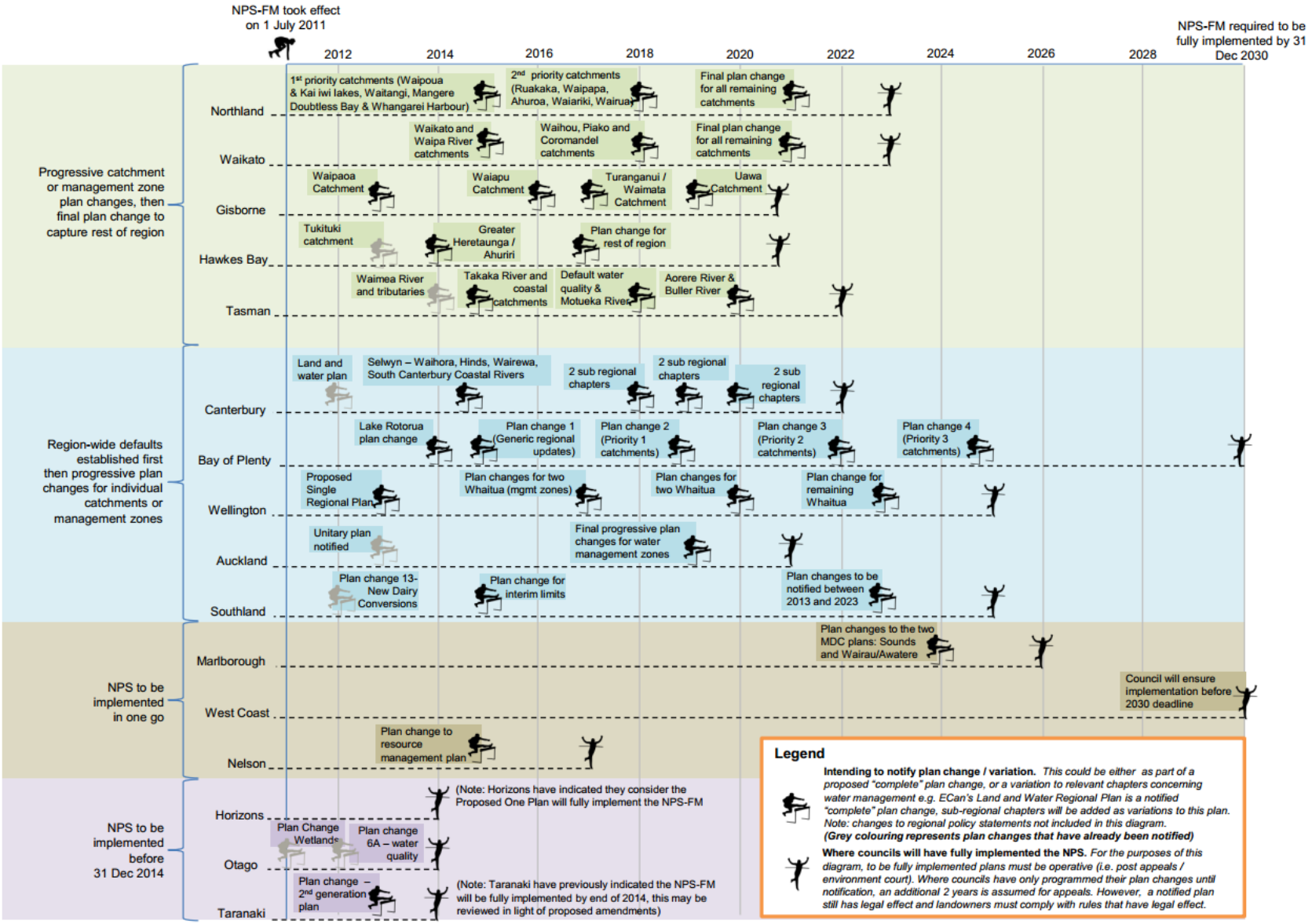
ACTIVITY	BASE STATUS	CONDITIONS / STANDARDS	DEFAULT	YELLOW	ORANGE	RED
AFFORESTATION – incl use of genetically modified stock approved by EPA. Relates to land not currently in use or not under plantation cover in the last 5 yrs.	PERMITTED (G,Y,O)	Wilding <12 (Dist) Property / Road setbacks (Dist) Water body setbacks (Reg)	RESTRICTED DISCRETIONARY Condition: wilding between12-16. Discretion restricted to specific non-compliance. DISCRETIONARY (if wilding score >or = 17) Consents in the orange zone to be non-notified.	PERMITTED	PERMITTED	RESTRICTED DISCRETIONARY (assume wilding condition applies & defaults to discretionary) Discretion restricted to matters relating to erosion susceptibility.
REPLANTING – site on which plantation existed within last 5 yrs. GM provision applies. As does note that if condition of consent requires it then it is permitted.	PERMITTED (ALL)	Clearance of indig vege (Dist) Water body setbacks (Reg) Replanting next to SNA (Dist)	CONROLLED Matters of control relate to stds not met. Consent requirement only applies to area not meeting permitted activity std.	PERMITTED	PERMITTED	PERMITTED
HARVESTING - incl several ancillary activities, but not earthworks for access or landings.	PERMITTED (G,Y,O)	Notice of commencement (Reg) Harvest Plan/ESCP (Reg) Ground disturbance outside riparian areas (Reg/Dist) Riparian disturbance (Reg/Dist) Slash & Debris Mgmt (Reg) Timing / Fish spawning (Reg)	CONROLLED Matters of control relate to stds not met.	PERMITTED	PERMITTED	CONTROLLED (except class 8e) Matters of control various relating to harvest plan / escp, method, extent & timing, water quality RESTRICTED DISCRETIONARY (class 8e) Discretion restricted to same as matters of control.
MLP	PERMITTED (All)	Slope & subsoil (Reg) Clearance of indigenous vegetation (Reg) Nesting times (Reg) Method (Reg) Water body Setbacks (Reg)	RESTRICTED DISCRETIONARY Discretion restricted to specific non-compliance. In relation to slope & subsoil specific matters of discretion relating ecological & aquatic effects, location relevant to water bodies, esc, method	PERMITTED	PERMITTED	
PRUNING & THINNING TO WASTE – excludes	PERMITTED (All)	Slash (Reg)	CONROLLED	PERMITTED	PERMITTED	PERMITTED

ACTIVITY	BASE STATUS	CONDITIONS / STANDARDS	DEFAULT	YELLOW	ORANGE	RED
production thinning (thinning for sale), which is considered harvesting.			Matters of control relate to aquatic effects, stream flow, erosion, downstream infrastructure, property			
Forestry quarrying and gravel extraction (outside of river bed) for formation of forestry roads	PERMITTED (All)	Red Zone severe or > earthflow or slump erosion risk (Reg) Notice of commencement (Dist/Reg) Visibility from neighbouring property (Dist) Property setback (Dist) Water body setback (Reg) Fill/spoil (Reg) Use of public roads (Dist) Restoration (Reg) Water table (Reg) Quarry Mgmt Plan (Reg)	CONTROLLED (except for property setbacks & earthflow in Red Zone) Matters of control relate to stds not met. RESTRICTED DISCRETIONARY (for exceptions) Matters of discretion relate to location, duration, extent, ecological, stabilisation, rehabilitate, & traffic/roading	PERMITTED	PERMITTED	PERMITTED
EARTHWORKS (maintenance & upgrade of existing, intended to be re-shaping for drainage, not re-alignment or widening)	PERMITTED (All)	None	N/A	PERMITTED	PERMITTED	PERMITTED
EARTHWORKS (new)	PERMITTED (G, Y, O)	Notice of commencement (Dist / Reg) ESCP (Reg) Operation (Reg) Water body setbacks (Reg) Fill (Reg) Spoil (Reg) Sediment & Stormwater controls (Reg) Stabilisation (Reg) Design (Reg)	RESTRICTED DISCRETIONARY Discretion restricted to specific non-compliance.	PERMITTED	PERMITTED – except where slope >25 degrees RESTRICTED DISCRETIONARY for (exception) Discretion restricted to duration, location ecol effects, soil disturb, ESC	RESTRICTED DISCRETIONARY Discretion restricted to duration, location ecol effects, soil disturb, ESC
RIVER CROSSINGS (Reg only)	PERMITTED (low risk)	Notice of commencement Effects on other structures/ users Timing of works Fish passage Contaminant discharges ESC Maintenance Placement (in wetlands & near dwellings) Temporary culvert conditions	CONTROLLED (Medium risk) Conditions: • Not ford • Notice of commencement (p) • Effects on other structures/ users (p) • Fish passage (p) • Contaminant discharges (p) • ESC (p) • Maintenance (p)	N/A	N/A	N/A

ACTIVITY	BASE STATUS	CONDITIONS / STANDARDS	DEFAULT	YELLOW	ORANGE	RED
		Single culvert conditions Battery culvert conditions Drift Deck conditions Ford conditions Single span bridges up to 8m - conditions	• Placement (in wetlands & near dwellings) (p) • Culvert conditions • Bridge conditions Matters of control: timing, environmental effects, engineering design & monitoring. RESTRICTED DISCRETIONARY (High risk) Conditions: • Notice of commencement (p) • Effects on other structures/ users (p) • Contaminant discharges (p) • ESC (p) • Maintenance (p) • Placement (in wetlands & near dwellings) (p) • Culvert conditions • Bridge conditions Matters of discretion relate to design matters and measure to avoid, remedy or mitigate adverse effects. DISCRETIONARY if do not comply with RD conditions.			
ALL FORESTRY ACTIVITIES (other than those specifically provided for)	PERMITTED (All)	Completion statement Archaeological sites Fuel Vegetation clearance	DISCRETIONARY But seems to only apply to those activities not complying with the archaeological conditions	PERMITTED	PERMITTED	PERMITTED

Source:

Figure 2 NPS-FM implementation timeline



Source: Ministry for the Environment