

# Impacts of environmental compliance on harvesting operations in New Zealand – results of a survey



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# EXECUTIVE SUMMARY

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## Objective

In New Zealand the majority of environmental rules and regulations affecting forestry practices come under the RMA (Resource Management Act, 1991) and associated Regional and District Plans. Forestry activities most affected by environmental rules and regulations are harvesting and associated roading and earthwork operations.

To assess the impacts of environmental compliance on harvesting operations, a survey was undertaken of the forest industry. The objective of the survey was to:

- assess forest owners/managers perceptions of the costs and benefits of implementing environmental regulations, rules and best management practices on their harvesting operations,
- identify and summarise the key areas of the harvesting activity attracting the highest environmental constraints,
- summarise the key benefits of implementing the regulatory environmental standards required for harvest operations to the forest industry,
- identify any future harvesting research needs.

## Key Results

- A total of ten responses were received from a mail-out to 17 forest companies and consultants including the New Zealand Farm Forestry Association. The ten respondents managed medium (10 000 – 100 000ha) to large (> 100 000 ha) sized forest estates, no responses were received from small woodlot owners;
- soil erosion, water quality, and protection of riparian areas were identified by respondents as the three key areas attracting the highest environmental compliance costs;
- the key environmental regulatory rules or requirements affecting harvesting productivity and cost were those restricting harvesting practices and timing of harvest along boundaries of indigenous vegetation and in the vicinity of riparian areas and water courses, earthworks, and water and sediment control measures;
- environmental compliance requirements attracted additional costs across all aspects of the harvesting process, increasing harvesting costs anywhere from an estimated 1-10% for the majority of respondents. The highest estimated financial impacts (>15%) were on the administrative aspects of harvesting followed by roading and tracking upgrade and establishment, and post-harvest requirements;
- the key environmental compliance factors contributing to harvesting administrative costs related to the RMA and resource consent process including; consent fees, expert advice fees, delays awaiting approval, multiple consent requirements, preparation of submissions and attendance at planning meetings, mediation, hearings and appeals, compliance auditing, and increased monitoring requirements; and
- respondents identified few direct financial benefits from implementing regulatory environmental standards. Most respondents stated they were implementing environmental standards as part of good environmental practice regardless of regulatory requirements and expressed preference for a non-regulatory or less regulatory approach.

## Conclusions

This survey has identified a number of key areas in the harvesting process that attract more rigorous environmental standards and associated environmental compliance costs. These

results confirm and quantify anecdotal knowledge and provide direction for future harvesting research aimed at reducing environmental compliance costs including;

- research to identify cost-effective practices which reduce soil disturbance and soil loss in association with harvesting activities, particularly roading, tracking, landing and skid site up-grade, establishment and maintenance;
- research to identify cost-effective alternative methods and practices which allow harvesting activities in and around waterways and their associated riparian areas that meet environmental standards; and
- communication of research results and facilitation of knowledge uptake to the forest industry

A review of past work that has contributed to the environmental standard development in the above areas and identification of gaps in knowledge or priority areas that could make environmental compliance easier would aid in the development of any new research.

With regard to the administrative costs of environmental compliance associated with the RMA, a process is currently underway to develop national environmental standards for plantation forestry. If successful, this should go some way to addressing the concerns around the resource consent process and inconsistencies in rules.

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## Introduction

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In New Zealand the majority of environmental rules and regulations affecting forestry practices come under the RMA (Resource Management Act, 1991) and associated Regional and District Plans. Some forestry activities are permitted (i.e. do not require a resource consent) provided the forest manager complies with a suite of permitted activity rules. These rules vary between regions with the Southland and Otago regions having no specific rules for forestry through to some regions having detailed rules and conditions for a range of forest activities. The criteria determining whether an activity is permitted or requires a resource consent, also varies between regions. In addition forest companies operate under their own and/or industry codes of practice (i.e. Environmental Code of Practice for Plantation Forestry (New Zealand Forest Owners Association, 2007), certification schemes such as FSC (Forest Stewardship Council – [www.fsc.org](http://www.fsc.org)) or guidelines provided by the regional or district council. Forestry activities most affected by environmental rules and regulations are harvesting and associated roading and earthwork operations. Forest companies with forests in a number of regions can end up with a range of environmental compliance conditions in order to undertake harvesting and associated operations.

Overseas studies have shown that regulatory requirements, practices and BMP's (Best Management Practices) can impact on the economics of harvesting and associated operations (Blinn et al., 2000; Kilgore & Blinn, 2004; Montgomery et al., 2005). In New Zealand, forestry owners and managers carry most of the responsibility for ensuring that their staff and contractors comply with regulatory environmental standards. However, it can often be difficult to accurately assess the costs accrued in the implementation of regulatory requirements and BMP's against economic and environmental benefits to the forestry manager, landowner and the wider society. Forest companies and contractors can have difficulties in identifying a subsequent economic benefit to their business (Blinn et al., 2000).

Plantation forests in New Zealand cover approximately 1.8 million hectares and contribute \$3,502 million (9.6% of total exports) to New Zealand's export industry (NZFOA, 2008/2009). Environmental compliance costs are part of the cost of doing business. To assess the impacts of environmental compliance on harvesting operations, a survey was undertaken of the forest industry.

## Survey Method

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The impacts of environmental compliance on harvesting operations in New Zealand were assessed through the use of a written questionnaire. The objective of the survey was to:

- assess forest owners/managers perceptions of the costs and benefits of implementing environmental regulations, rules and best management practices on their harvesting operations;
- identify and summarise the key areas attracting the highest environmental constraints;
- summarise the key benefits to the forest industry; and
- identify any future harvesting research needs.

A draft questionnaire was developed and critiqued by Scion staff and sent to two forest companies for review before a final questionnaire was e-mailed out to 16 forest companies and forestry consultants that own or manage forest estate in New Zealand. The survey was also sent to the Farm Forestry Association in an attempt to capture responses from the landowners and managers of smaller forestry blocks, as the effects of environmental compliance may differ from that experienced by the larger forest companies. A reminder e-mail was sent out in the week prior to the response deadline, along with followed-up phone calls.

The survey consisted for two Sections. Section A provided background information on the forest area managed by the respondent and Section B asked the respondent to identify the key environmental areas and rules affecting harvesting operations. The respondents were also asked to estimate the financial impact of environmental compliance on the various stages of harvesting from planning through to post-operational monitoring, maintenance and rehabilitation and to base their response on the last financial year. In order to protect confidential or sensitive information respondents were not requested to provide actual costs and instead were asked to express the cost of environmental compliance as a percentage of total costs. Respondents were also asked to identify the key financial and non-financial benefits of adhering to regulatory environmental standards. A copy of the questionnaire is in Appendix 1.

## Results

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Responses were received from ten forest companies, a 59% response, covering approximately 45% of the New Zealand plantation forest estate. No responses were received from the smaller woodlot owners. For a few respondents where regulatory requirements were minimal, costs and benefits incorporated to varying degrees their own in-house environmental requirements. One respondent's results were based on a calendar, rather than a financial year.

### A. Background information

Six respondents managed forest estates ranging from 10 000-100 000 ha in size and four managed estates >100 000 ha in size. No responses were received from forest estates < 10,000 ha. The survey responses covered all regions of New Zealand as most forest companies had forests in more than one region (Table 1). The annual area harvested by respondents ranged from 350-8900 ha and total volume harvested from 200 000-4000 000 m<sup>3</sup>. The proportion of area harvested by hauler versus ground-based operations ranged from 10% to 95%. Only two forest companies expected an increase in hauler-based harvesting over the next 5-10 years.

**Table 1:** The number of survey responses for each region of New Zealand. Regions are based on the New Zealand Forest Owners Association definition.

<b>Region</b>	<b>No. of survey responses</b>
Northland	2
Auckland/Coromandel	2
Central North Island	4
East Coast	3
Hawke's Bay	3
Southern North Island	1
Nelson/Marlborough	4
West Coast	1
Canterbury	1
Otago/Southland	3

NB. Forest companies frequently had forests in more than one region.

### B. Impact of environmental compliance on harvesting

#### *Environmental issues in harvesting operations*

The respondents were presented with a list of environmental areas and asked to rank, in order of importance, those environmental areas which were most time consuming & expensive in terms of meeting regulatory requirements when undertaking harvesting operations. Respondents were given the option of listing any other environmental areas of importance to their harvesting operations. Soil erosion, water quality, and riparian areas were identified by respondents as the three key areas attracting the highest environmental compliance costs (Table 2, Figure 1). Biodiversity and landscape/aesthetics were identified as attracting lower compliance costs. Four additional environmental areas were identified by the respondents (Table 2) with historic and archaeological sites ranked in second place by two forest companies, and waahi tapu ranked third by another company.

**Table 2:** Key environmental areas incurring environmental compliance costs in harvesting operations, ranked by respondents. ( 1 = most time consuming and expensive)

Environmental area	Respondent									
	1	2	3	4	5	6	7	8	9	10
Soil erosion	3	7	1	2	3	1	1	1	3	1
Water quality	1	1		3	1	3	2	2	2	2
Riparian areas	3	3		1	5	2	3	3	1	3
Rare, threatened or endangered species, habitats and ecosystems	3	2	3	5	7	7	7	5	5	4
Soil quality	3	6		NA	4	5	6	7	6	7
Biodiversity	4	4		4	8	6	8	4	4	5
Landscape/aesthetics	5	5		NA	6	4	4	6	7	6
Other areas identified by respondents:										
Historic/archaeological sites	2				2		9			
Protected watercourses			2							
Waahi tapu										3
Powerlines										4



**Figure 1:** Harvesting around a waterway and riparian area in steep hill country in Golden Downs Forest

## ***Key environmental rules and regulations associated with harvesting***

Respondents were asked to list the key environmental regulatory rules or requirements affecting harvesting productivity and cost. The results were summarised and a number of key areas were identified:

- rules and regulations restricting harvesting practices and timing of harvest along boundaries of indigenous vegetation under various protections (i.e. The New Zealand Forest Accord, 1991; identified as conservation/landscape areas or habitat for indigenous and endangered species);
- rules and regulations pertaining to the protection of riparian areas, water courses and associated water quality and water supply values, including the restriction and timing of harvest activities;
- rules and regulations associated with earthwork activities (i.e. roading and tracking) and water and sediment control;
- rules and regulations aimed at minimising soil disturbance and erosion;
- standards for culverts, temporary bridges and stream crossings;
- requirements to leave small areas of indigenous vegetation intact;
- harvesting constraints at the catchment level;
- rules pertaining to the discharge of stormwater; and
- rules for aerial spraying.

## ***Impact of environmental rules and regulations on the harvesting process and harvesting costs***

Respondents were asked to rate the impact of environmental regulation compliance on each phase of the harvesting process (Table 3), to estimate the percentage increase in costs attributable to complying with environmental requirements (Table 4), and to identify the key factors contributing to any additional costs.

**Table 3:** The impact of environmental compliance requirements on the harvesting process as rated by the respondents. Numbers in the table refer to the number of respondents that rated the impact as either low, medium or high.

<b>Harvesting phase</b>	<b>Level of impact</b>		
	Low	Medium	High
Harvest planning	2	7	1
Roading and tracking upgrade and establishment	3	4	3
Landing and skid site upgrade and establishment	3	6	1
Hauler extraction and processing	7	2	1
Ground-based extraction and processing	7	2	1
Post-harvest monitoring, maintenance and rehabilitation	4	3	3
Administration	4	2	4

The majority of respondents rated the impact of environmental compliance requirements as low to medium for most phases of the harvesting process. Of all the harvesting phases, administrative costs had the highest score in the high impact category. Harvest planning and roading, tracking, landing and skid site upgrade and establishment were rated mainly medium or high. The impact on post-harvest requirements was rated fairly evenly across the three impact levels. The extraction and processing of timber in both hauler and ground-based operations were least impacted by environmental compliance requirements.

**Table 4:** Estimated increase in harvesting costs attributed to environmental compliance requirements. Numbers in the table refer to the number of respondents that rated the increase in harvesting costs in that category.

Harvesting phase	Percentage increase in costs (%)					
	0	1-5	6-10	11-15	15-20	>20
Harvest planning		3	3	3		1
Roading and tracking upgrade and establishment		5	1	1	2	1
Landing and skid site upgrade and establishment		3	3	3		1
Hauler extraction and processing		7	2			1
Ground-based extraction and processing		7	1	1		1
Post-harvest monitoring, maintenance and rehabilitation		3	3	2	1	1
Administration		3	2	1	1	3

Environmental compliance requirements attracted additional costs across all aspects of the harvesting process, increasing costs anywhere from 1-10% for the majority of respondents (Table 4). The highest financial impacts (>15%) were on the administrative (4 respondents), roading and tracking upgrade and establishment (3 respondents), and post-harvest aspects of harvesting (2 respondents).

The key factors, identified by respondents as contributing to environmental compliance costs of harvesting are summarised below. For some respondents with low regulatory requirements there is little or no differentiation between the regulatory and in-house factors contributing to their environmental compliance costs, therefore no attempt has been made to separate them in the summary below.

#### **A. harvest planning:**

- Resource consent process including; consent application, consent fees, providing information to regulatory authorities, preparation of harvest plans for resource consent submissions, expert advice, stakeholder consultation, site visits, interpreting rules and regulations of different regional and district councils, and delays awaiting approval;
- identifying roading, landing and harvesting solutions that minimise soil disturbance and other environmental impacts; and
- harvest planning issues to protect small areas of riparian or native vegetation.

#### **B. roading and tracking upgrade and establishment:**

- Roothing and tracking infrastructure, location, design & maintenance;
- controlling and containing earthworks, pulling tracks back in, double benching to hold spill back, end-hauling;
- water control structures, soil stabilisation measures (e.g. grass seeding), sediment control and culvert costs; and
- resource consent applications, increased documentation, consent fees, expert advice fees, inspections, and delays awaiting approval.

#### **C. landing and skid site upgrade and establishment:**

- Resource consents, documentation, site inspections, monitoring;
- controlling and containing earthworks for landings;
- slash management & stabilisation, i.e. benching under skids for slash retention, stacking and pulling back of slash;
- restrictions around the location and size of landings and skid sites;
- water control and awareness on waterways; and
- hauler sites generally incurred higher compliance costs than skid sites.

#### **D. hauler extraction and processing:**

- Lost productivity from requirements to suspend loads to avoid ground disturbance, to protect waterways, water quality, riparian vegetation, protected indigenous vegetation and to avoid modification of archaeological sites;
- unable to anchor in native areas or on banks of large waterways, less deflection therefore increased logging cost;
- pulling back trees, extra windfall due to constraints from regulations;
- slash retention, tracking for slash, recovering slash;
- minimisation of soil and stream disturbance;
- use of non-optimal configurations to meet environmental requirements (streams, riparian areas, biodiversity);
- specialist staff providing advice and monitoring environmental compliance; and
- resource consents, documentation, site visits.

#### **E. ground-based extraction and processing:**

- Preserving refuge areas and riparian zones;
- paying for lost productivity which could be affected by pulling back trees; extra windfall due to constraints from regulations;
- minimisation of tracking and general soil disturbance and compaction;
- sediment controls on tracks;
- resource consents, paperwork, site visits, monitoring;
- minimising disturbance to water quality;
- slope restrictions for ground-based operations; and
- seasonal operational constraints, i.e. for wet areas.

#### **F. post-harvest monitoring, maintenance and rehabilitation:**

- road, track and landing rehabilitation (i.e. pulling soil and slash back on to skids, windrowing);
- birds nest management i.e. burn/pullback/chip ;
- water control structures, soil stabilisation (i.e. grass seeding/oversowing), sediment control;
- post-harvest auditing and inspections;
- post-harvest surveys (i.e. fish, vegetation);
- BMP management;
- management of logging slash and debris at times around streams;
- lengthy delays in gaining permission to burn cut-over, too late to burn and establish next crop, land left fallow; and
- any specific resource consent conditions beyond company best management practices.

#### **G. administration**

- Resource consents, consent fees, expert advice fees, staff time, delays awaiting approval, multiple consents when one global consent would suffice, ensuring compliance with resource consents, follow-up on non-compliance matters;
- time involved in managing multiple plans and rules, inconsistencies in plans and rules between councils, continual changes in Regional and District plans, duplication in regional and district council requirements, inconsistencies between councils;
- preparation of submissions and attendance at planning meetings, mediation, hearings and appeals, inefficient and ineffective submission and consultation process;
- compliance auditing, increased monitoring requirements, pages and pages of forms and notes for record keeping;

- archaeological site management;
- environmental training, publication of manuals/flyers;
- water quality & supply (easements), water monitoring; and
- FSC audits and maintenance of FSC standards (non-regulatory but mentioned by a number of respondents).

### ***Financial and non-financial benefits of maintaining environmental standards in harvesting operations***

Respondents were asked to identify the key financial and non-financial benefits in maintaining regulatory environmental standards for harvesting

A number of financial and non-financial benefits were identified by the respondents including:

- Maintaining high environmental standards was considered a core part of the business, a key performance criteria for clients and helped to attract and retain investors;
- probable financial benefits from soil protection;
- avoidance of legal proceeding and fines;
- improved record keeping and access to information; and
- enables environmental certification providing market access for certified wood.

Most respondents stated that they would implement the majority of environmental requirements regardless of whether they were regulatory or not as part of good land-use management and as environmentally responsible land managers. The following is a direct quote from one respondent which encapsulates this theme;

*'We are non-regulatory and maintain this is the best way of ensuring ownership of true environmental management; satisfaction of protection of the environment, good co-operation with neighbours, regulatory authorities & general public; helps achieve good safety performance; improves long term productivity; avoidance of high remedial costs or any environmental conviction.'*

### ***Additional comments***

The final part of the survey gave the respondents the opportunity to provide any additional comments.

The respondents indicated that they could accept regulatory environmental requirements when applied for sound background reasons and in a consistent manner. Inconsistency in the regulation of forest activities throughout the country was a concern to respondents. Practices that may be acceptable, effective and environmentally successful in one region were not acceptable in another. It was frustrating for companies operating in two or more regions when one council required resource consent applications for harvesting and associated activities, while another did not - all under the same act (RMA). Some respondents felt that rules were sometimes applied in an impractical manner (i.e. trying to protect small native enclaves or riparian areas), or resulted in potentially environmentally damaging practices.

Respondents raised the issue of having to pay for consents and associated costs to undertake harvest operations when they were already implementing their own in-house environmental standards or certification standards (i.e. FSC) which were similar to, or of a higher standard, than the regulatory requirements. One company initiated many practices and procedures to minimise environmental effects, which were adopted by regulatory authorities and included in resource conditions. Another mentioned significant increases in reporting and information gathering requirements over time, when minimal changes had occurred in their harvesting operational activities. However, one respondent noted that because they operate to a certain standard, regardless of regulatory requirements, the additional costs associated with regulatory requirements comprised a relatively insignificant proportion of total harvesting costs.

Another respondent identified the potential benefits of streamlining the whole process and utilising new science and technology to reduce the bureaucracy involved while still maintaining environmental outcomes. Respondents also considered that the non-regulatory approach worked well.

## **Discussion and Conclusions**

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While the focus of the survey was on regulatory environmental requirements associated with harvesting it was evident from the responses that environmental requirements were often a blend of regulatory rules and non-regulatory means such as in-house codes of practices or certification systems adopted by the company and there was often very little difference between regulatory and non-regulatory requirements. The situation in New Zealand is similar to that in North America where a range of regulatory and non-regulatory methods (i.e. educational and technical assistance) are used to encourage sustainable timber harvest practices (Kilgore and Blinn, 2004). Also similar to North America (Aust et al., 1996; Blinn et al., 2000), the respondents identified few financial benefits of implementing regulatory requirements compared with costs.

The key frustration for respondents was the time consuming and expensive process around the administrative aspects of the RMA and associated plans and rules. Most respondents stated they were implementing environmental standards at least equal to or higher than regulatory requirements and expressed preference for a non-regulatory or less regulatory approach. A process is currently underway to develop national environmental standards for plantation forestry and if successful should go some way to addressing the concerns around the resource consent process and inconsistencies in rules.

However, the survey has identified a number of key environmental areas such as soil erosion, water quality and riparian areas that incur the greatest environmental compliance costs. Similarly with roading, tracking, landing and skid site upgrade and establishment and the post-harvest site management aspects of harvesting. These topics could form the core of a future research harvesting programme, aimed at reducing environmental costs.

Future harvesting research that provides options to the forest industry to improve economic and operational performance of harvesting operations while achieving safety and environmental standards in sensitive areas would be beneficial. This would be particularly effective in areas attracting the more rigorous environmental standards.

## **Acknowledgements**

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## Appendix A

# New Zealand Forest Industry Environmental Compliance Questionnaire



### NZ Forest Industry Survey -

impacts of environmental compliance on harvest practices and costs

#### A. Background Information

1. What was the area of land in forestry owned or managed by you or your company in the last financial year? (Double-click on the appropriate box and highlight 'checked')

<input type="checkbox"/> < 10 000 ha	<input type="checkbox"/> 10 000 – 100 000 ha	<input type="checkbox"/> > 100 000ha
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2. What region of New Zealand are your forests in?

NB: If you are a company with forests in more than one region and are completing a separate survey for each region, mark the region you are reporting on. If you are completing one survey for your company which covers several regions, mark all the regions in which you have forests.

Northland	<input type="checkbox"/>
Auckland/Coromandel	<input type="checkbox"/>
Central North Island	<input type="checkbox"/>
East Coast	<input type="checkbox"/>
Hawke's Bay	<input type="checkbox"/>
Southern North Island	<input type="checkbox"/>
Nelson/Marlborough	<input type="checkbox"/>
West Coast	<input type="checkbox"/>
Canterbury	<input type="checkbox"/>
Otago/Southland	<input type="checkbox"/>

3. What was the approximate area harvested (ha) in the last financial year?	
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4. Approximately how many cubic meters were harvested in the last financial year?	
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5. What percentage of the harvested area was hauler-based?		ground-based?	
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6. In the next 5-10 years do you anticipate;

an increase in hauler-based harvesting	<input type="checkbox"/>
a decrease in hauler-based harvesting	<input type="checkbox"/>
no major change in the area of hauler-based harvesting	<input type="checkbox"/>

B. Impact of regulatory environmental compliance on harvesting operations and costs in the last financial year

1. Which environmental areas are the most time consuming & expensive in terms of meeting regulatory requirements when undertaking harvest operations (rank; i.e. 1 = most time consuming & expensive). If not applicable to your forest mark as NA

Soil erosion	
Soil quality	
Water quality	
Riparian areas	
Biodiversity	
Landscape/aesthetics	
Rare, threatened or endangered species, habitats and ecosystems	
List any other areas:	

2. List the main regulatory rules or requirements relating to the environmental areas in Question 1 that affect harvesting productivity and cost (up to a maximum of five)

1.
2.
3.
4.
5.

The following section focuses on the effects of regulatory compliance requirements on the harvesting process.

3. Harvest planning

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on harvest planning processes? (Double-click on the appropriate box and highlight 'checked')

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased harvest planning costs?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs associated with harvest planning? Please list.

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4. Roding and tracking upgrade and establishment for harvesting activities

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on roding and tracking?

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased roading and tracking costs?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs associated with roading and tracking? Please list.

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5. Landing and skid site upgrade and establishment

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on the establishment and upgrade of landings and skid sites?

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased the costs of establishing and upgrading landings and skid sites?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs associated with landings and skid sites? Are there any major differences between skid sites and landings. Please list.

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6. Hauler extraction and processing

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on hauler operations?

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased costs for hauler operations?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs associated with hauler operations? Please list.

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7. Ground-based extraction and processing

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on ground-based operations?

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased costs for ground-based operations?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs? Please list.

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8. Post-harvest monitoring, maintenance and rehabilitation

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on post-harvest operational requirements?

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased costs associated with post-harvest operations?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs associated with post-harvest operations? Please list.

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9. Administrative costs

a. In your estimation, what is the level of impact of regulatory environmental compliance requirements on harvest administrative costs? This section also includes the broader aspects associated with the RMA process including reviewing plans, submissions, hearings etc.

<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
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b. In your estimation how much have regulatory environmental compliance requirements increased harvest administrative costs?

<input type="checkbox"/> 0%	<input type="checkbox"/> 1-5%	<input type="checkbox"/> 6-10%	<input type="checkbox"/> 11-15%	<input type="checkbox"/> 15-20%	<input type="checkbox"/> >20%
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c. What are the key factors contributing to additional compliance costs for administering harvesting operations? Please list.

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10. Overall, what are the key financial and non-financial benefits to your operation or business of implementing the regulatory environmental standards required for harvest operations? Please list.

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Are there any additional comments you would like to make on the costs or benefits of regulatory requirements on harvesting operations?

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Thank-you for participating in this survey. Please return the completed survey by Friday 4<sup>th</sup> December 2009, by email, fax or post to:

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