



ADAPTING TO A CHANGING CLIMATE: CASE STUDY

PLANTATION FORESTS

Risk management within a changing climate

TIMBERLANDS LIMITED

- An independent forestry management company, with its main office based in Rotorua and a sister company, Timberlands Pacific Pty Ltd, based in Tasmania, Australia.
- Provides a full range of forest management services for owners of large forests.
- Together, the two companies employ a total of close to 100 people and manage the following forestry operations on an annual basis:
 - Management of 225 000 hectares of forest plantations.
 - Establishment of 6800 hectares.
 - Pruning and thinning of 11 000 hectares.
 - Harvesting and marketing in excess of 2.8 million tonnes.
 - A log merchandising yard, processing 1.2 million tonnes.

Managing the risks associated with fire, wind and biosecurity are a normal aspect of forestry business. However, Timberlands recognises that New Zealand's climate is inherently changeable, and is likely to become more so. The forest managers have decided that additional steps must be taken to protect the resource and to plan for response and recovery.

Shifts in climate could see environmental conditions change over time from region to region, causing some areas to become more fire- or wind-prone, and others less so. Equally, climate changes could alter the range of pest species or weeds suited to any given area. While these changes are expected to be gradual, the increase in intense weather events has potential for causing immediate damage. Robust risk management strategies will ensure that forest managers are prepared for all eventualities, no matter what climate change may bring.

MANAGING RISK FROM FIRE – PREVENTION AND SUPPRESSION

Fire management strategies for forest owners focus on prevention and suppression. If a fire does break out, significant measures can be taken to reduce the consequent damage.

Timberlands minimises the outbreak of fire through stringent security, awareness and

RISKS FROM CLIMATE CHANGE

- Climate change is likely to increase fire risk in some regions, while decreasing it in others.
- Eastern regions of New Zealand already prone to dry periods are likely to experience hotter, drier and windier conditions in the summer months, with severe droughts expected to increase in frequency and intensity.
- These conditions will result in a longer fire season for those regions, with subsequent increases in the incidence of fires and plantation area burned.
- Predictions also indicate that extreme wind events will rise in frequency and severity for many regions of New Zealand.
- The westerly wind speed component is expected to increase during the winter and spring periods, leading to an increase in mean and extreme wind speeds.
- At the same time, upper and eastern parts of the North Island may be subject to more severe extra-tropical cyclones.



communication of fire dangers. This is primarily achieved under the Pomicelands Rural Fire Plan, which details levels of fire readiness, dependent on fire hazard, and ensures the fire risks are adequately communicated to the public. To date, incidents have been small but there are periods of high fire danger so the fire-risk precautions and preparations are managed appropriately.

Like most plantation forest owners and managers, Timberlands utilise the Coordinated Incident Management System (CIMS). This system provides a generic framework that can be adapted for any emergency situation to coordinate response and recovery efforts.

Timberlands take the following steps to manage fire risk:

- Currently undergoing a five-year programme to update all fire-fighting equipment.

“Wind is outside everyone’s control so it’s easy to think there is nothing you can do about it. Yet, there are still steps that can be taken to protect high-risk sites and to ensure the best chances of recovery from windthrow events.” Colin Maunder



- In addition to providing training for all staff, contractors are also trained in fire response.
- In times of extreme fire risk conditions there are additional staff on standby, who work half days and can rest and train for the other half to ensure optimum response preparedness.
- Equipment is always on standby and adequate water supplies are maintained throughout the forest.
- Additional security is provided to reduce the potential of fire being caused by trespassers.

MANAGING RISK FROM WIND EVENTS

In those regions where there is a predicted increase in the severe wind climate, it is likely that the annual frequency of winds sufficient in magnitude to cause widespread damage to forests could increase substantially.

Despite the fact that wind damage occurs on a reasonably regular basis, forestry companies seldom manage the risk in a formal manner, such as they do with fire. Timberlands Environmental Manager Colin Maunder says that while tens of thousands of dollars are spent on fire resources, in reality a company is more likely to suffer from wind damage than fire in a given year.

“Wind is outside everyone’s control so it’s easy to think there is nothing you can do about it. Yet, there are still steps that can be taken to protect high-risk sites and to ensure the best chances of recovery from windthrow events.”

Timberlands has recently drafted a risk management plan aimed at minimising the impacts of wind. It also describes the salvage process should damage occur. Mitigation steps range from using silvicultural techniques to modelling wind-blow risk prior to harvesting. In future, they expect wind modelling to become an integral part of establishment and harvesting procedures.

Silvicultural techniques to minimise risk include:

- Ripping the soil for good root penetration.
- Using correct planting techniques to ensure roots are not bound.
- Thinning and pruning to reduce canopy area.
- Modelling the risks to adjacent stands at time of harvest. If the surrounding stands are found to be at high risk then harvesting can be delayed until the risk is reduced, or the susceptible stands could be harvested at the same time, depending on their age.

Decisions to salvage wood after a windthrow event are influenced by:

- **SIZE OF AREA AFFECTED:** Anything over 50 hectares is considered a major wind event. Lesser events tend to result in small patches of windblown trees scattered throughout the estate.
- **AGE OF TREES:** Anything over 16 years should be considered for harvest. For stands under five years, replanting could be the best option.

- **TYPE OF DAMAGE:** Uprooted trees can last for 1-2 years on the ground without degrade, whereas broken stems are susceptible to insect pest and fungal attack so must be salvaged as soon as possible.
- **TIME OF YEAR:** While winter conditions may reduce incidence of pest attack, adverse weather can seriously impact access and harvesting rates.
- **THE AVAILABILITY OF STORAGE AREAS:** With access to sprinkler systems or shallow ponds to avoid rotting.

Restricting forest access is also an important aspect of risk management. In the event of extreme wind conditions, Timberlands has protocols in place to ensure safety warnings and access restrictions are properly communicated. They have also identified the need for specific crew training to ensure the safety of forest personnel.

MANAGING BIOSECURITY RISK

INSECT PESTS AND DISEASES

Predictions around New Zealand's changing climate are that conditions will see the environment become more suited to a wider range of pests, pathogens and diseases. It may also become more difficult to manage or eradicate those already present.

It is likely that climate change will increase the risk of establishment of new species from warm-temperate or subtropical regions and generally result in greater abundance of insect pests due to their better survival over winter.

Climate change is unlikely to greatly influence the distribution of the main needle-cast diseases of radiata pine in New Zealand, as these are already found throughout the country. *Dothistroma* needle blight, the most common disease in Timberlands' forests, is routinely treated with copper sprays. However, the incidence of this disease may increase with rising humidity.

Timberlands carries out regular forest health checks as part of a national surveillance system administered by the New Zealand Forest Owners' Association.

- Extensive aerial surveys are conducted once a year to check for obvious signs of damage.

Key points

1. Fire management strategies for forest owners focus on prevention and suppression. If a fire does break out, significant measures can be taken to reduce the consequent damage.
2. Timberlands has recently drafted a risk management plan aimed at minimising the impacts of wind. It also describes the salvage process should damage occur. Mitigation steps range from using silvicultural techniques to modelling wind-blow risk prior to harvesting.
3. Restricting forest access is also an important aspect of risk management, given that high winds can create a number of serious hazards.



Dothistroma needle blight is the most common disease in Timberlands' forests. The incidence of this disease may increase with rising humidity.

FOR MORE INFORMATION

- Visit the Timberlands website at www.tll.co.nz
- For information on the Rural Fire Authority and their Fire Risk Management Plans, visit www.nrfa.org.nz
- For information about Coordinated Incident Management Systems read the Guide to the National Civil Defence Emergency Management Plan 2006 at www.civildefence.govt.nz
- The report *The effect of climate change on New Zealand's planted forests: impacts, risks and opportunities* can be downloaded from the

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- Ground surveys, which involve driving systematically through the forest at a maximum speed of 15 kph, look for signs of insect pests or symptoms of disease. Any issues or organisms detected during ground surveys are sent to the Crown Research Institute, Scion, for diagnosis.
- Detailed inspections are carried out at random stops, and a form is filled out. This form is sent to Scion for inclusion in the National Forest Health Database.

WEEDS

Of equal concern to forest managers is the potential proliferation of new and existing weed species. Climate change is likely to result in range expansion within New Zealand of a number of native Australian tree species, such as *Eucalyptus* and *Acacia* spp., and the proliferation of currently ornamental and potentially invasive weed species, such as *Melaleuca quinquenervia* (broad-leaved paperbark) and *Pueraria montana* (kudzu).

Climate change is also likely to affect growth rates of weeds through changes in CO₂ concentration, root-zone water storage, temperature and changing length of the growing season. These changes to weed composition and growth rates resulting from climate change are likely to have a detrimental effect on tree growth.



The changes to weed composition and growth rates resulting from climate change are likely to have a detrimental effect on tree growth. Pictured above is *Buddleia*, a common weed species in New Zealand.

Timberlands are proactive in controlling all major weed species during the establishment phase of new forestry crop to ensure survival of the young trees. Sites are usually sprayed with a broad-spectrum herbicide prior to planting. After the trees are planted, they generally require protection from weeds for up to two years. The nature of this weed control, and the methods by which it is applied, will depend on the site and the mixture of weeds present.

**THIS IS ONE IN A SERIES OF CASE STUDIES CALLED
ADAPTING TO A CHANGING CLIMATE THAT CAN BE FOUND AT
WWW.MAF.GOV.TZ/CLIMATE CHANGE**

Published by Ministry of Agriculture and Forestry
PO Box 2526, Wellington 6140.
Freephone: 0800 008 333
Web: www.maf.govt.nz

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