2022 Quantifying Forest Industry Investment in Fire Risk Management Study

NEW ZEALAND FARM FORESTRY ASSOCIATION

FOREST OWNERS ASSOCIATION

The FOA/FFA Fire Committee would like to thank all those who responded to our Fire Survey, and provided detailed data about forest fire protection costs.

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The Forest Growers Levy Trust provided funding for this project.

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Summary

The Forest Owners Association (FOA) /Farm Forestry Association (FFA) Fire Committee established a 2022 project – Quantifying Forest Industry Investment in Fire Risk Management, referred to as the Fire Survey – to gain an understanding of the current annual costs to forest owners for plantation forest fire protection.

The survey is the latest in a series of studies providing information about forest fire protection costs. It comes at a time when recent average annual losses of plantations to wildfires have been relatively high and when the Government is reviewing how the national firefighting service, Fire and Emergency New Zealand (FENZ), is funded.

The Fire Committee surveyed FOA members, requesting information about fire protection costs in the financial years 2019-2020, 2020-2021, and 2021-2022. Details of firefighting resources, including trained personnel, were also requested. Managers were also asked for information about tree crop insurance coverage. Finally, data relating to contractors' in-forest activities, such as road-building, harvesting, and log cartage, were collected to better understand their Fire Service Levy payments.

Twenty-one of the 23 largest forest owners/managers in New Zealand responded to the survey, representing a total of 1,081,068 hectares (around 62% of the total plantation forest estate of 1.74m ha). An agreed methodology was used to 'gap fill' and increase the total area analysed to 1.348m ha (77% of the total plantation estate).

We conclude that:

$21.4 million — Total fire protection costs paid by large-scale forest owners, ***including*** insurance, are around $21.4 million per year ($15.87/ha/yr).

$11 million — Total fire protection costs paid by large-scale forest owners ***excluding*** insurance are around $10.97 million per year ($8.16/ha/yr).

31% increase in cost — Forest owner's annual operating fire costs per hectare between the MartinJenkins 2016 study and this FOA/FFA 2020 study have shown an increase of 31% from $6.23/ha to $8.16/ha.

38.5% insured — Around 38.5% (518,425 ha) of the large-scale forest estate is insured against tree crop losses.

$2.7 million — Fire Service Levy payments of over $2.7 million per year are paid by contractors operating in road-building, harvesting and log cartage sectors. These costs are passed onto forest owners by contractors.

1,159 ha — Over the past 36 years, the six-year annual average loss before 2015 ranged from 321 ha to 589 ha. Unfortunately, this average loss in the 2015-2021 six-year period has increased to 1,159 ha.

Forest owners with an area of managed forest estate over 50,000 hectares generally self-insure against losses from wildfires by owning forest fire equipment and maintaining a team of trained firefighters. The estimated total forest area involved with this group is around 600,000 hectares.

Some forest managers with forest plantation estates between 20,000 and 50,000 hectares also have firefighting capabilities. However, a number hold very little fire equipment and rely heavily on FENZ and other forest owners. Around 35% of the plantation area in this ownership size range is insured. The 2021-22 annual insurance premium paid is now estimated to exceed $10.8 million. The total forest area managed by this group is approximately 640,000 hectares.

Large-scale forest owners contribute significantly to the rural fire sector's readiness in terms of workforce and equipment, substantially increasing the resources FENZ has available for wildfire suppression. The forestry sector also contributes to national activities, such as the National Fire Prevention Campaign and Rural Fire Research, and through in-kind support for activities such as FENZ Working Groups/Committees, national and regional Incident Management Teams, and international firefighter deployments.

One hundred and eight three NZ Farm Forestry Association members, representing small and medium forest owners, responded to a survey about tree crop insurance. Approximately 35% of the forest estate from these owners has insurance coverage.

FENZ is funded via the collection of a Fire Service Levy (FSL), levied on insurance policies for a range of property and equipment. While tree crop insurance is exempt from the FSL, contractors providing in-forest services such as road-building, harvesting, and log cartage pay this levy. This survey has shown that the levy total is at least $2.7m/year to the forestry contracting sector, which is passed onto forest owners via contract charges.

A successful outcome for managing fire in the New Zealand forest and rural landscape requires an effective partnership between FENZ and forestry stakeholders. The results of this 2022 Fire Survey study mean forest owners are now better informed and better positioned for any consultation with the Government when changes are being considered to the FENZ fire levy system. Any changes should acknowledge forest owners' annual contributions to protect their plantation assets from forest fires.

Scope and approach

Scope

The remit for this study was to survey forest owners, requesting information about all available costs associated with the fire protection of the managed forest estate in New Zealand. The FOA and FFA members were asked to contribute to this assessment.

This report shows individual fire protection activity costs for more than 1.3 million hectares of managed forest estate in New Zealand. The study also included an assessment on what tree crop insurance is held by forest owners. Individual forest owner costs are not disclosed or published in the final report.

The study also includes an assessment of the fire equipment assets owned and a list of heavy earth-moving equipment available within the forest to the forest owner. Also contained in this report is an overview of the number of fire management staff and forest firefighters available to resource the management and suppression of any unwanted fires.

Approach

A cost request was made for the 2019-20, 2020-21, and 2021-22 financial years from forest owners using a tailored data Excel spreadsheet template developed in collaboration with the Fire Committee project sub-committee as subject matter experts. The template included operating costs, insurance, capital, indirect costs, external income, and detailed guidance on completing the spreadsheet.

Each forest company listed in the NZFOA 2020-21 Facts & Figures booklet (Appendix B) was contacted by the author, or a member of the project sub-committee, requesting the required information. Following the distribution of the data template, the author worked with the sub-committee members to liaise with the NZFOA members involved in collecting the required information. Those not visited were contacted by phone.

Gaps in the data were identified, and an estimate was applied using methodologies developed and tested with the sub-committee members to confirm a position on missing data.

Introduction

When plantation forests were first established in New Zealand in the late 1800s, fire prevention measures were quickly found to be essential. Ideas on equipment, strategies, and legislation were gleaned from North America, and as a result, fire prevention became part and parcel of plantation management.

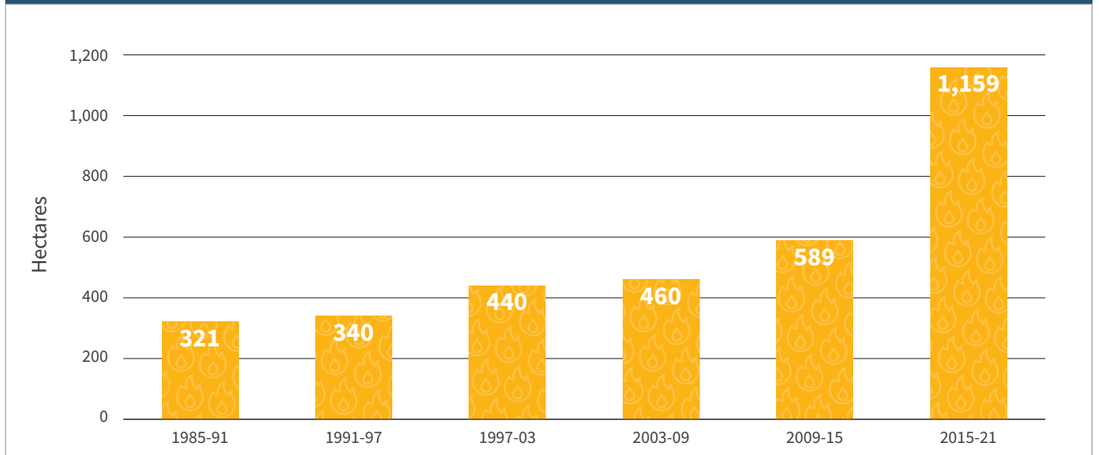
The area of plantation forests in New Zealand currently sits at around 1.74 million hectares (NZFOA 2021-22), with radiata pine comprising approximately 90 percent of this total. These plantation forests have formed the basis of critical forest-based industries, contributing $6.53 billion of export earnings in 2021-22 and providing many social and environmental benefits.

Due to the value of the protected asset, fire has always been an essential consideration for New Zealand plantation forest managers. Since 1984 fires have resulted in losing over 19,800 ha of plantation forest. Over the past thirty-six years, the six-year annual average loss before 2015 ranged from 321 Ha to 589 ha. Unfortunately, this average annual loss in the 2015-2021 six-year period has increased to 1,159 ha (Fig 1).

The most significant legislative change in managing fire in the forest and rural landscape in fifty years occurred in 2017. It included the establishment of Fire and Emergency New Zealand (FENZ) as a result of combining the national urban NZ Fire Service and the decentralized rural fire services into a single fire and emergency services organisation. FENZ has a primary urban fire protection focus, with most of its expenditure allocated to protecting the urban environment. FENZ also has a regulatory role in managing fire in the forest and rural landscape and provides support to forest owners when forest fires occur.

Many of New Zealand's largest forest owners continue to benefit from retaining a solid in-house fire protection resource to reduce the risks associated with forest fires. Medium-sized and smaller forest owners rely more heavily on a combination of insurance, FENZ resources, and potentially in-house crews from nearby forests to mitigate fire risk.

Fig 1: Annual average losses for forestry plantations from wildfires 1985-2021 (6 yrs)



Source: NRFA, FENZ, NZIF & Rural Fire NZ

A short history of forest fires in New Zealand

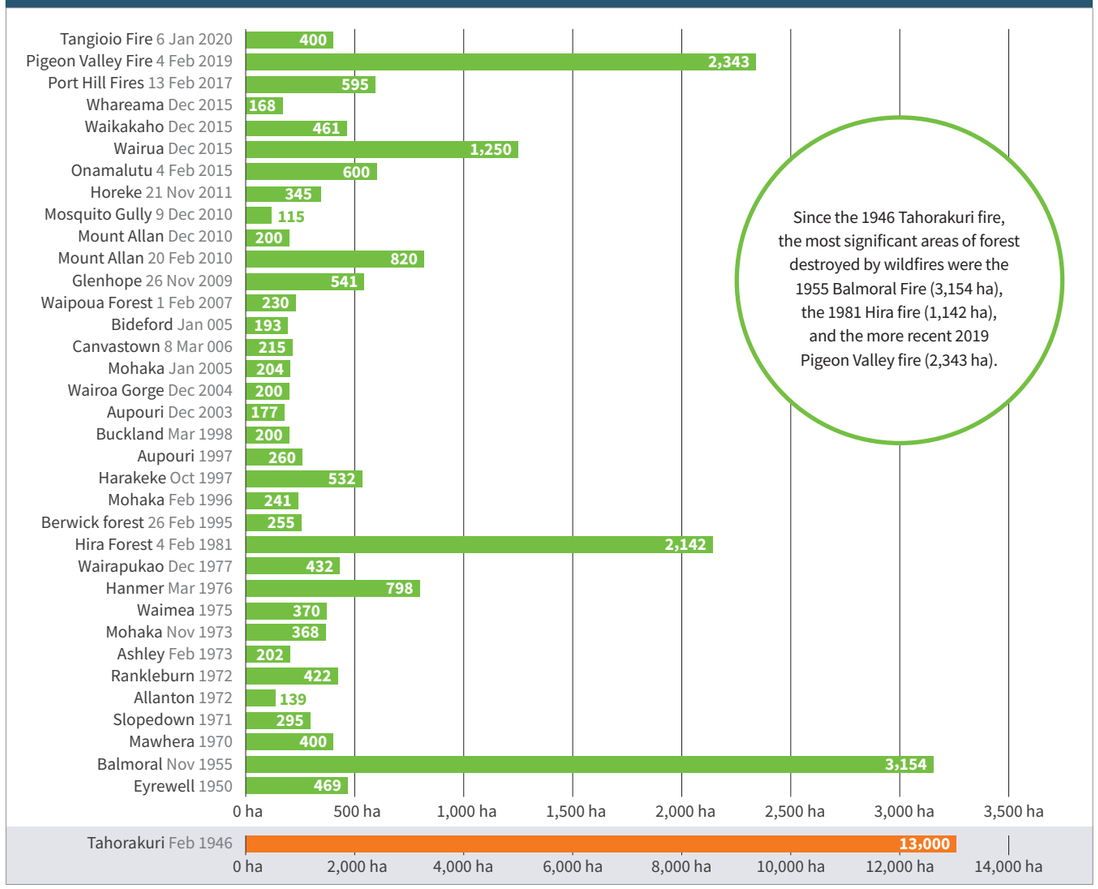
Since plantation forestry commenced in New Zealand in the late 1800s, managers have had to deal with the risk of unwanted forest fires. The most significant forest fire in New Zealand in the past eighty years was the Tahorakuri fire in February 1946.

Following a prolonged drought, a fire, thought to have started by a cigarette butt, broke out alongside the Wairakei-Oruanui Road in the Taupō region on 7 February 1946. The next day, fanned by a strong wind, it crossed the Waikato River south of the Aratiatia rapids and threatened the Taupo Township. On 9 February, the wind changed, and the fire travelled northeast, ultimately sweeping both sides of the Waikato River towards Reporoa.

This fire swept over 100,000 hectares of countryside in a few days and destroyed over 13,000 hectares of young plantation forests, mostly radiata pine.

As a result of this fire (which was regarded as a national calamity), the Forest and Rural Fires Act 1947 was instituted by Parliament. This provided a rural fire control structure throughout the country and laid the foundation for a rural firefighting organisation.

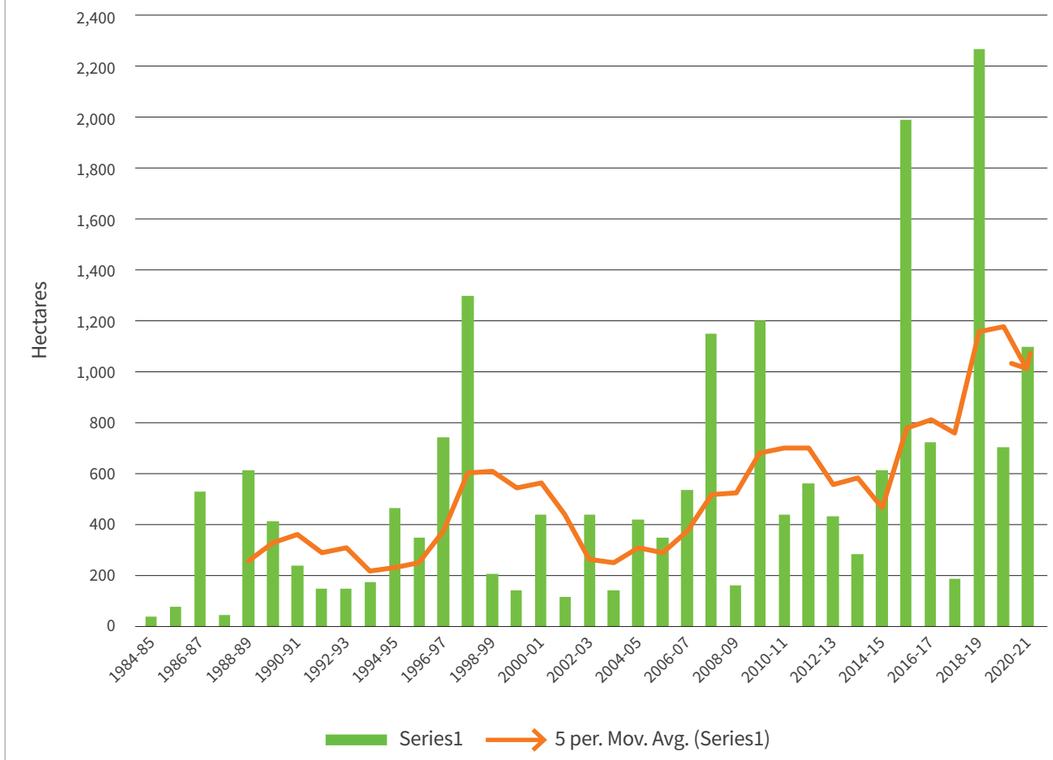
Fig 2: Notable New Zealand forest fires 1950-2022 (76yrs)



Source: NRFA, FENZ, NZIF & Rural Fire NZ

Fig 3 provides details of the area of plantation fires annually since 1984, showing an upward trend since around 2015 and corroborating the data shown in Fig 1.

Fig 3: Annual plantation area burnt by wildfires 1984-2021



Source: NRFA, FENZ, NZIF & Rural Fire NZ

Forest Fire Risk Management Guidelines

Forest managers have followed the risk management process for years by applying best practice principles.

To support this position, forest owners have taken the lead in creating awareness within the sector of the critical functions required to protect plantation forests from unwanted fires. To help achieve this objective in today's environment, the Forest Fire Management Guidelines were developed by the NZ Forest Owners Association with support from the NZ Farm Forestry Association. The guidelines were published in 2018 and are now widely used by the forest industry.

These Guidelines describe the application of the 4Rs of emergency management – Reduction, Readiness, Response & Recovery. They are specific to forest fire management and enable forest owners and managers to engage with other stakeholders, e.g., FENZ managers, farmers, contractors, etc., to ensure consistency in managing fire in the forest and rural landscape.

Fire management in plantation forest lands must address the risk or threat of fire, personnel safety, and the achievement of other management objectives – such as the continuity of supply of the tangible and intangible benefits of the forest and the forestry supply chain. It may also accommodate the use of fire for specific purposes. The Forest Fire Management Guidelines are a vital tool in reinforcing that process.

Funding review of Fire and Emergency New Zealand

On 30 June 2017, the Forest and Rural Fires Act 1977 and its associated regulations were repealed and replaced by the Fire and Emergency NZ Act 2017. FENZ was established on 1 July 2017 under the Act.

It combined the national urban NZ Fire Service and the decentralised rural fire services into a single fire and emergency services organisation. This saw the regulatory role for managing fire in the forest and rural landscape now sitting with a centralised non-land management Government agency administered from Wellington. This legislative change ended a long history of active forestry involvement in a regulatory and governance role in managing fire in the forest and rural landscape, which began with the Forests Act 1874.

Since the merger in 2017 the Government then decided in 2019 to review the way FENZ is funded. The current funding system for FENZ involves a Fire Service Levy (FSL) on property owner insurance. The 2016/17 FSL collected was $392m. The FSL projected for collection by FENZ in 2022/23 is $713 million. FENZ has now proposed that the FSL be increased to $740m for 2025/26. In addition to the FSL, the Government makes a $10 million annual Crown contribution to FENZ funding.

In the first stage of the funding review (completed in 2020), the Government has maintained that an insurance-based funding system remains the best option in the medium term. Forest owners who insure their forests are currently exempt from the FSL; however, this could change with any new regulations.

To ensure any changes to the FENZ insurance-based funding are fair and reasonable, forest owners may reasonably ask that the Government acknowledges the annual contribution they provide in protecting their plantation assets. This cost should be highlighted as a component of the yearly fire services expenditure in New Zealand.

Past plantation forest fire expenditure studies in New Zealand

Over the past forty years, several studies have analysed the annual cost to forest owners in protecting their forest assets from wildfires.

A N Cooper and C Ashley-Jones 1987

The A N Cooper and C Ashley-Jones 1987 Economics of Fire Prevention in New Zealand Plantation report analysed the fire prevention costs for the NZ Forest Service from 1967 to 1982. They also analysed private forest owners' costs at that time. This study assessed the annual direct fire prevention cost for the NZ Forest Service at $8.02 per hectare. It also appeared the private plantation average was $11.00 per hectare. These costs did not include overheads and capital value of the equipment.

NZ Forest Owners Association 2005

In 2005, the NZ Forest Owners Association (NZFOA) completed a study on aspects of rural fire management in plantation forests. This research included two surveys of their members. The first survey covered fire administration, prevention, preparedness, suppression activities, associated expenditure, fire occurrence reporting, and loss/damage information. It had responses from 61 organisations, including 35 NZFOA members, representing 60 percent of the total net stocked area.

The second survey focused on relative trends in fire protection expenditure over the past three to four decades (Cameron and others, 2007). Based on the total number of hectares of NZFOA members, and the total spending on wildfire prevention, the survey calculated fire prevention costs per hectare. The study formed part of a broader project that included the following:

- Summarising the equity of current funding and resources provided by the forestry sector,
- Determining the average annual relative investment per hectare by forestry companies concerning rural fire comparable to that undertaken at the end of the NZ Forest Service era,
- Determining the relative threat that rural fire presents to forest owners in terms of cost per hectare spent vs. potential value per hectare lost to fire in New Zealand, and
- Comparison of this threat/loss with other losses such as wind and forest health.

Results from the study also provided insights into issues such as forest Insurance and risk management strategies, forest owner fire prevention and preparedness activities, and expenditure.

This study obtained current fire protection costs on a $/ha basis for the total forest estate and the net stocked forest area (in most cases, results were very similar). The average fire protection cost was $15.48 per stocked hectare or $12.36 per hectare of the protected area. Fire organisation ($6.94/ha and $5.12/ha, respectively) and fire administration ($5.95/ha and $4.78/ha, respectively) are the most significant contributors to those costs.

BERL 2009

BERL was commissioned by the National Rural Fire Authority in 2009 to study the economic costs of wildfires in New Zealand.

To estimate the cost of wildfires in New Zealand, BERL integrated the Least Cost plus Loss (LC + L) model and the Cost plus Net Value Change (C + NVC) model. BERL used the LC + L model in 1987 to investigate the Economics of Forest Fire Expenditure prepared for the New Zealand Forest Service. This model was used to establish forest fire costs with a specific focus on prevention, pre-suppression, and suppression expenditure. Since the late 1980s, there have been significant improvements to the LC + L model and the development of the C + NVC model. This research integrated these two models to capture both the immediate effects of wildfires and the medium and long-term economic costs.

The pre-suppression and suppression cost categories in the 2009 BERL study included:

- Public campaigns or advertisements to increase awareness of wildfire dangers
- Fuel management costs.

The empirical results of the 1987 BERL estimates of some expenditure categories provide an opportunity for comparisons between the two periods, 1985-86 and 2002-07.

The estimated expenditures in 1985-86 were: Pre-suppression $2.4 million (including publicity); and Suppression $3.4 million, for a total spending of $5.8 million. This involved the NZ Forest Service estate of 583,000 hectares of State forest.

At that time, there were 583,000 hectares of State plantation forest plus 548,000 hectares of private plantation forest, a total of 1,131,000 hectares. The expenditure per hectare on the State forest on the items of cost as above was $10 per hectare, and the estimates made then were that such spending in the private forests was $7 per hectare. This estimate indicates that such expenditure in the private forests would have totalled $3.8 million that year and in all forests $9.6 million.

For comparative purposes, BERL adjusted these numbers to reflect 2008 dollars and has used the Statistics NZ series for the Producer Price Index for industrial inputs. The 2008 price index was 2.04 times the 1987 index; consequently, the $9.6 million expenditure in 1985-86 would be equivalent to $19.6 million in 2008 prices.

These numbers indicate the 2002-07 pre-suppression costs were much higher than in 1985-86, and the suppression costs in 2002-07 were somewhat lower than in 1985-86.

The 2002-2007 research covers three broad categories of wildfire costs. BERL separated the economic cost of wildfires into pre-suppression, suppression, and after-fire costs. The latter two categories relate to the direct and flow-on effects of wildfires.

The following average cost of fire prevention per year for 2002 to 2007, outlined in Figure 4, is from the BERL report. The damage cost per stocked hectare of $3.16 is the after-fire cost, including the loss of carbon, crop, employment, processing, etc. In comparing the BERL 2009 findings with the 2022 FOA/FFA fire survey study, the 2009 fire suppression cost of $7.7m is also removed.

Excluding the after damages effects per year and fire suppression costs, the five-year average cost for the fire management of the stocked forest area from 2002 to 2007 was $10.68.

Fig 4: Average cost of fire prevention 2002-2007 ($/ha/yr)

Costs ($ha)	On total protected area	On total stocked area
Fire organisation	$5.08	$6.89
Fire administration	$4.78	$5.95
Fire prevention	$1.24	$1.76
Pre-suppression	$3.31	$4.14
Suppression	$1.44	$1.64
Damages	$2.75	$3.16
Average	**$12.36**	**$15.48**

Source: NZFOA

MartinJenkins 2017

The Government agreed to establish FENZ in 2017 following an extensive review of New Zealand's fire services. Included as part of the transition process, an estimate of the baseline cost of the rural fire service was made to inform the transition to the new organisation and to understand its likely costs.

The MartinJenkins 2017 report analysed the baseline costs of servicing New Zealand's rural fire sector. The primary purpose of this cost analysis was to inform the setting of the Fire Service Levy for 2018/19 and the development of FENZ operating budgets for the 2017/18 financial year.

The scope of the study included estimating costs related to rural fire mitigation and protection incurred by three different types of entities (Fig 5):

- 12 enlarged rural fire districts (ERFDs)
- 26 rural fire authorities (RFAs) (including Territorial Authorities in their capacity as RFAs)
- Forestry companies.

Fig 5: Normalised fire risk management operating costs by organisation type (2016)

2016 normalised costs by operation type and costs Category – including in-kind	RFAs	ERFDs	Forestry	Total	Percent
Personnel	$2.1m	$6.6m	$2.4m	$11.1m	32%
Training	$0.3m	$0.7m	$0.3m	$1.3m	4%
Equipment and vehicles	$1.3m	$2.7m	$1.5m	$5.5m	16%
Administration and overhead costs	$0.7m	$1.4m	$0.2m	$2.3m	7%
Building	$0.2m	$0.6m	$0.6m	$1.4m	4%
Fire suppression	$0.8m	$2.2m	$2.2m	$5.1m	15%
Depreciation	$0.4m	$1.3m	$1.0m	$2.7m	8%
Insurance	$0.1m	$0.3m	$0.2m	$0.6m	1%
Other	$0.9m	$1.7m	$2.4m	$5.0m	13%
Total	**$6.9m**	**$17.5m**	**$10.6m**	**$35.0m**	**100%**

Source: MartinJenkins 2017

The study analysed the costs for the 2013/14, 2014/15, and 2015/16 financial years. Fig 6 provides a breakdown of the 2016 normalised operating cost for the forestry sector. The annual fire protection cost figure allocated to forestry companies and normalised to 2016 was $10.6 million.

Since the FENZ Act took effect in July 2017, we compared the 2017 MartinJenkins study's total cost of $10.6m with the 2022 figure derived from our survey. The 2017 $10.6m figure includes $2.2m fire suppression costs. After the formation of FENZ, forest owners are no longer liable for fire suppression costs, so in our comparison, we deducted this $2.2m to produce a 2016 normalised forestry figure of $8.4m. This equates to $6.23 per ha/yr (based on a total plantation area of 1.348 million hectares).

Fig 6: Fire risk management operating costs by cost category (2014-2016)

Overall forestry costs	2014	2015	2016	2016 Normalised	Percent
Personnel	$2.3m	$2.4m	$2.7m	$2.7m	26%
Equipment and vehicles	$1.3m	$1.3m	$1.5m	$1.5m	14%
Administration and overhead costs	$0.1m	$0.1m	$0.2m	$0.2m	2%
Building	$0.5m	$0.5m	$0.6m	$0.6m	6%
Fire suppression	$0.1m	$0.2m	$0.7m	$2.2m	20%
Depreciation	$0.9m	$0.9m	$1.0m	$1.0m	9%
Insurance	$0.6m	$0.7m	$0.7m	$0.2m	2%
Other	$2.5m	$2.4m	$2.4m	$2.4m	21%
Total	**$8.3m**	**$8.6m**	**$9.7m**	**$10.6m**	**100%**

Source: MartinJenkins 2017

2022 FOA Fire Survey

The NZ Forest Owners Association 2022 Fire Survey was undertaken to investigate the current annual costs to forest owners for plantation forest fire protection since the urban-rural fire merger in 2017. The survey included questions about in-house firefighting capabilities, operating costs, and tree crop insurance levels.

A high response rate has provided a sound base for estimating the total annual forest fire protection costs for forest owners. Twenty-one of NZ's 23 largest production forestry entities returned data covering 1.1 million hectares (comparable to the forest area for the 2017 MartinJenkins study).

Respondents represented 1,081,068 hectares (around 62% of the total plantation forest estate of 1.74m ha). An agreed methodology was used to 'gap fill' and increase the total area analysed to 1.348m ha (77% of the total plantation estate).

1. Survey results: key findings

Production forest area (21 largest owners):	**1,081,068 ha**
The area added for compatibility with previous surveys ('gap-filling'):	**266,759 ha**[1]
The total area analysed from the survey returns	**1,347,827 ha**[2]

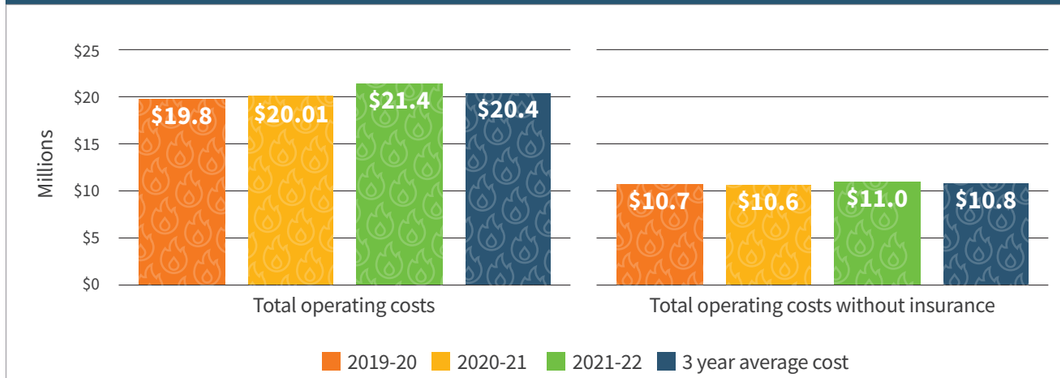
Total 2021-22 forest fire protection costs, *including* insurance	Total 2021-22 forest fire protection costs, *excluding* insurance
$21.4m/yr ($15.93/ha/yr)	**$11.0m/yr ($8.16/ha/yr)**

1 To provide a cost comparison with the 2017 MartinJenkins study results, we looked at the methodology used to quantify the costs for those forest owners whose data was not made available for the 2017 study. The project sub-committee agreed that the methodology used in the MartinJenkins study be included as a gap-filling component in this 2022 study to account for those forest owners who did not provide input into this survey. An additional forest area of 266,759 hectares was therefore added, so the total area used in this analysis is 1.348m hectares.

2 This area excludes the carbon farming area in survey returns (104,173 ha), and the small forest owner estate (estimated at 288,000 ha).

Fig. 7 provides a three-year overview of the total annual forest owner fire protection costs for the 1.348m ha analysed, including and excluding tree crop insurance costs.

Fig 7: Large-scale forest owners annual fire protection costs (covering 1.3m ha of plantations) 2019-2022



Source: NZFOA 2023

For the annual cost involved in the forest fire protection of the 1.348m hectares, the following table Fig 8 provides a full breakdown of expenditure for 2020-21, 2021-22 and 2022-23 alongside the three-year average.

Fig 8: Breakdown of fire protection expenditure 2019-2022

	2019-20	2020-21	2021-22	3yr Average	Percent
Total personnel costs	$1,167,225	$1,129,224	$1,276,020	$1,190,823	5.8%
Training	$241,925	$269,396	$137,277	$216,199	1.1%
Operating costs	$6,235,381	$6,046,221	$6,291,570	$6,191,057	30.3%
Building costs	$419,442	$394,073	$485,598	$433,037	2.1%
Equipment and vehicle costs	$958,265	$956,854	$982,909	$966,009	4.7%
Publicity and other fire prevention/reduction costs	$79,083	$71,319	$38,245	$62,882	0.3%
Total insurance cost	$9,032,343	$9,452,291	$10,791,727	$9,758,787	47.8%
Total depreciation cost	$895,331	$909,289	$884,072	$896,231	4.4%
Total fire suppression costs net of recoveries	$480,534	$580,455	$194,597	$418,529	2.1%
Administration and overhead costs	$247,747	$250,005	$302,896	$266,883	1.3%
Total operating costs	**$19,757,277**	**$20,059,127**	**$21,384,911**	**$20,400,438**	**100.0%**

Source: NZFOA 2023

2. In-forest firefighting capability

The 2022 Fire Survey also included a request to supply information about trained Incident Management Team (IMT) members, trained forest firefighters, and the level of firefighting equipment owned by or available to the forest owners/managers. Fig 9 (below) provides the results of the resources survey.

The survey results confirm the significant ongoing investment made by large forest owners to protect forests. Our results indicate that the industry invested approximately $11 million into fire protection operating costs (~$8.16 per hectare) in 2021-22 through maintaining its firefighting resources.

The maintenance of this firefighting resource also implies that large forest owners contribute significantly to the overall rural fire sector's readiness in terms of workforce and equipment, substantially increasing the resources that FENZ has available for effective fire suppression and extending its national coverage to respond. The forestry sector also contributes to national activities, such as the National Fire Prevention Campaign and Rural Fire Research, and through in-kind support for activities such as FENZ Working Groups/Committees, national and regional IMT, and international firefighter deployments.

Fig 9: In-house forest firefighting resources maintained by forest owners

Number of trained IMT members	Incident controllers	21
	Operations managers	47
	Logistic managers	18
	Planning managers	18
	Aviation managers	18
	IMT others	93
	IMT total	**215**
Number of trained crew leaders/firefighters		**870**
Forest firefighting equipment	Tanker 4 x 4	59
	Tanker 10,000 litres plus	7
	Smoke chasers	12
	Wajax HPLV	173
	Heavy pumps	85
	Slip-on units	12
Forest firefighter hose	25mm	12,240 metres
	41mm	40,020 metres
	75mm	7,275 metres
Heavy bulldozers		85
20 to 50-tonne excavators		256

Source: NZFOA 2023

3. Tree crop insurance

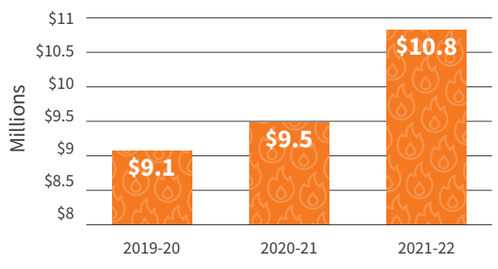
Our survey sought to understand what percentage of the total plantation forest area is covered by tree crop insurance.

Forest Areas insured	
Large forest owners	Small forest owners
518,425 ha (38.5%)	10,367 ha (35%)
Based on FOA survey	Based on NZFFA members survey

From the information provided, we estimate that around 38.5% of the large plantation forest estate in New Zealand is insured. In addition, our survey of farm foresters (NZ Farm Forestry Association members) indicates that some 35% of the small forest estate is insured.

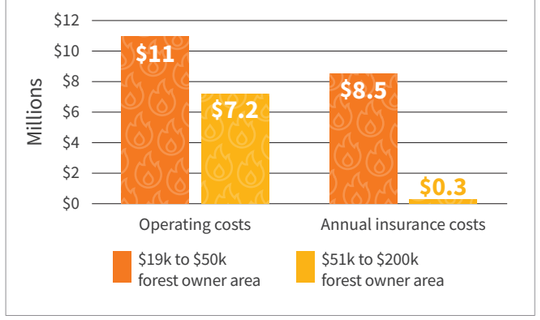
The survey information also enables an estimate of the annual tree crop insurance premium paid for the past three years as follows: 2019-20 – $9.1m, 2020-21 – $9.5m, and 2021-22 $10.8m Fig. 10. The average annual cost of forest insurance over the three years 2019-2022 covered by the survey is $9.8m.

Fig 10: Estimated annual tree crop insurance costs 2019-2022



The study also provides a breakdown of the fire protection expenditure information between medium and large forest owners. The area involved is 1.1m hectares, and Fig 11 compares forest companies that manage between 19,000 and 50,000 hectares and those that manage 51,000 to 200,000 hectares.

Fig 11: Breakdown of large-scale forest owner fire protection costs, with and without insurance



The breakdown of costs in Fig. 11 shows how these costs differ between insured forests and those that aren't. The survey results show that the largest forest owners, managing plantation areas greater than 50,000 hectares, will generally self-insure by owning forest fire equipment and having staff, including trained firefighters. This group invests in training and maintaining a forest firefighting capability involving 4 x 4 forest fire trucks, fire pumps, hoses, and waterway equipment to suppress unwanted fires quickly. The estimated total forest area involved with this group is 600,000 hectares.

Some forest managers managing 20,000-50,000 hectares also have a firefighting capability; others hold very little fire equipment and rely heavily on FENZ and other forest owners for fire suppression resources. The survey shows that this group is most likely to insure their forests rather than maintain their firefighting resources. These forest owners are estimated to have paid a combined annual insurance premium exceeding $8 million in 2021-22. The total forest area involved with this group is approximately 640,000 hectares.

The cost per hectare for insured forest varied from $5.85/ha to $38.61/ha with an average of $20.67/ha. The factors contributing to this variation in costs most likely include forest age class, the area involved, the first loss limit on the sum insured, the total insured value, etc.

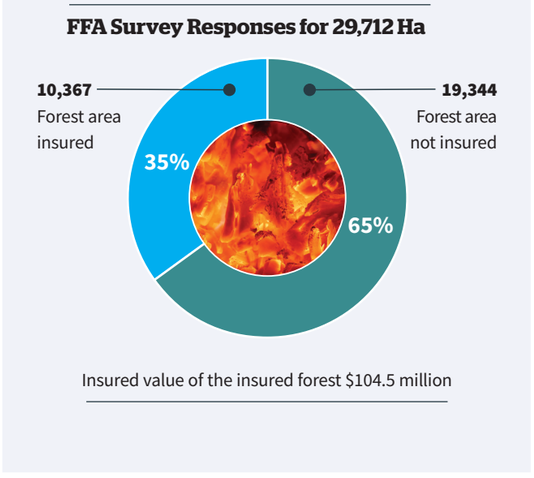
4. Small forest owner survey of insurance cover

NZ Farm Forestry Association members were also surveyed as part of this project using a short online survey. Owners were asked for details of their forest area, forest loss insurance, and carbon loss insurance.

The results indicate that approximately 35% of small forest owners have tree crop insurance cover for their forests and that the value of the insured forest resource is over $104.5m Fig 12. This sample is a small representative of the estimated 288,000 ha owned by small forest owners.

Fig 12: Breakdown of farm forestry tree crop insurance cover

Number of FFA survey responses	183
Forest area Ha – involved	29,712
Forest area Ha – not insured	19,344
Forest area Ha – insured	10,367
Insured value	$104,504,028



Source: FFA 2023

5. In-forest services – Fire Service Levy contributions

The current fire services legislation requires a Fire Services Levy to be paid by those with fire damage insurance policies. However, this excludes tree crop insurance, as forests are exempt from the FSL (Appendix A).

Owners of insured logging trucks, harvesting, and forest road construction/ maintenance equipment are however required to pay an FSL. The FSL is charged on the sum insured at the present rate of 10.6 cents per $100 insured value. This cost is passed on to the forest owners through roading, harvesting, and log cartage charges.

Based on the information provided by the FOA survey and Log Transport Safety Council (LTSC), the following assessment offers an estimated annual FSL paid by the owners of forestry roading, harvesting equipment, and logging trucks (Fig. 13).

Fig 13: In-forest services – Fire Service Levy contributions

Number of logging crews[3]	400
Insured value per crew[4]	$4.5 million
Total	**$1.8 billion**
FSL 10.6 cents per $100 insured value	$1.908 million
Number of logging trucks & trailers[5]	2,000
Estimate of insured value per truck & trailer[6]	$400,000
FSL per truck & trailer	$424.00
FSL 10.6 cents per $100 insured value	$0.848 million
Total assessed annual FSL	**$2.757 million**

The total $2.757m paid in Fire Service Levies to FENZ by contractors working in-forest needs to be acknowledged.

3 FOA Survey
4 Personal comments – Board Chair Forest Industry Contractor Association
5 LTSC
6 LTSC advised that the purchase of a new logging truck and trailer is $670k to $700k

Conclusions

21/23 provided data — The FOA/FFA Fire Survey 2022 received a good response, with twenty one out of 23 of New Zealand's largest forest owners providing data about their fire protection costs over three financial years, 2019-2022.

62% of plantation forest estate — Respondents represented 1,081,068 hectares (around 62% of the total plantation forest estate of 1.74m ha).

77% of total — An agreed methodology was used to 'gap fill' and increase the total area analysed to 1.348m ha (77% of the total plantation estate).

38.9% large scale — An estimated 38.5% of the large-scale forest owners' estate is insured, with premiums totaling around $10.8m paid in 2021-22.

35% of small/ medium scale — An online survey of NZFFA members enabled us to conclude that around 35% of the small and medium-scale forest estate is likely to be insured.

$8-15 per hectare — A review of previous studies relating to fire protection costs enables some limited comparison between studies. The evidence suggests that, since 2009, direct fire protection costs per hectare have been in the ballpark of around $8-$15/ha. Whether or not the insurance cost is included is likely the most significant factor enabling future comparisons to be meaningful.

$31% increase — In comparing the cost per hectare between the 2016 MartinJenkins study and this 2022 FOA/FFA study the per hectare forest fire operating costs have increased by 31% from $6.23/ha to $8.16/ha.

$2.8 million — FENZ is funded via the collection of a Fire Service Levy (FSL), levied on insurance policies for a range of property and equipment. While tree crop insurance is exempt from the FSL, contractors operating in-forest services such as road-building, harvesting, and log cartage pay this levy. This survey has shown that the costs of the levy total at least $2.757m/year to the contracting sector and ultimately passed onto forest owners via contract charges.

In summary, we consider that the data provided by large-scale forest owners who responded to this survey are extremely valuable in providing the industry with a better understanding of the overall costs of forest fire protection. Industry representatives will be better informed when consulting with the government over future FENZ funding mechanisms.

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Appendix A

Schedule 3 s 47B

Categories of property exempted from Fire Service levy

Schedule 3: added, on 1 July 1986, by section 7(2) of the Fire Service Amendment Act 1986 (1986 No 18).

1 Any ship or anything in a ship, except while the ship is on land:
2 Any standing bush or forest:
3 Any road, street, or path:
4 Any railway track or pole, or any tramway track or pole:
5 Any bridge or viaduct either completed or in course of construction, or any boxing or falsework used in construction of any bridge or viaduct:
6 Any tunnel or cutting:
7 Any retaining wall, dam, breakwater, mole, groyne, fence, or wall:
8 Any drain or channel:
9 Any reservoir, swimming bath, water tank (other than a water tank installed as part of the water supply system of any dwelling or farm building), water tower, or septic tank:
10 Any water reticulation pipe (other than a water reticulation pipe which in the opinion of the Earthquake and War Damage Commission, constitutes a structural part of any building):
11 Any electric supply, telegraph, or telephone pole, line, or cable:
12 Any mine or quarry:
13 Any aircraft or anything in an aircraft except while insured under a contract which is substantially a contract of fire insurance:
14 Any goods in transit, except while insured under a contract which is substantially a contract of fire insurance:
15 Any hazardous substance (as defined in section 2 of the Hazardous Substances and New Organisms Act 1996:
16 Any livestock:
17 Any growing crops (including fruit trees and vines):
18 Any ensilage insured in the open field:
19 Any hay or other cut crops insured in the open field:

Appendix B

NZ plantation forest ownership – underlying land status

As at 31 December 2020

Firm/Entity	Underlying Land Status (Productive area (ha))				
	Freehold	Leasehold			Total
		Crown	Māori Inc.	Other	
Kaingaroa Timberlands Limited	1,398		184,867		186,265
Hancock Natural Resource Group	82,723	8,763	59,286	20,002	170,775
Rayonier Matariki Forests	56,786	27,193	18,236	17,499	119,714
Ernslaw One	59,947	40,257	7,442	1,981	109,627
NZ Carbon Farming Group Ltd	46,452			43,155	89,607
OneFortyOne	22,697		39,682	567	62,946
Summit Forests NZ Limited	4,737	3,021	27,743	3,541	39,042
Tasman Pine Forests Ltd	25,306		9,044	2,249	36,599
Pan Pac Forest Products	5,356	818	28,738	417	35,329
Global Forest Partners LP	33,659			95	33,754
Juken New Zealand	9,907	14,593	6,675	1,124	32,299
Crown Forestry (MPI)	1,541		18,487	9,003	29,031
Forest Enterprises	28,655	2,008		627	31,290
Ngai Tahu Forestry	32,431				32,431
Wenita	5,815			23,369	29,184
Port Blakely Ltd	27,231			1,845	29,076
Aratu Forests Ltd	31,783		2,130	1,100	35,013
Roger Dickie NZ	29,073				29,073
Lake Taupo Forest Trust	23,498		1,007	3,142	27,647
Lake Rotoaira Forest Trust	7,676		431	1,347	9,454
China Forestry Group Corporation	14,138	6,294	617	5,938	26,987
City Forests	22,338			1,393	23,731
P F Olsen Ltd				5,164	5,164
The Rohatyn Group	966				966
Totals	**574,113**	**102,947**	**404,385**	**143,558**	**1,225,004**

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