The right tree in the right place

New Zealand Wilding Conifer Management Strategy 2015–2030

Cover image: looking towards Mt Cook with wilding conifers in foreground (Corsican pine, larch and Douglas fir)

Disclaimer

This draft strategy was updated in December 2014. Check that this is the most recent version of the document by contacting **wildingconifer@mpi.govt.nz**

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New Zealand Wilding Conifer Management Strategy

Why is wilding conifer management important?

Wilding conifers:

- are spreading at around 5 percent annually and infesting tens of thousands of hectares every year;
- can be managed but failure to respond to their spread can lead to the costs of control escalating exponentially;
- can cause the loss of native ecosystems and species extinctions, impact our iconic tourism landscapes, reduce water yields, and increase the risk of wild fires;
- can limit future economic land-uses and increase the cost and complexity of pasture development and commercial forestry.

Why does NZ need a strategy?

The strategy aims to support effective collaboration between land occupiers, researchers, regulators and communities to address the critical overarching issues facing wilding conifer management.

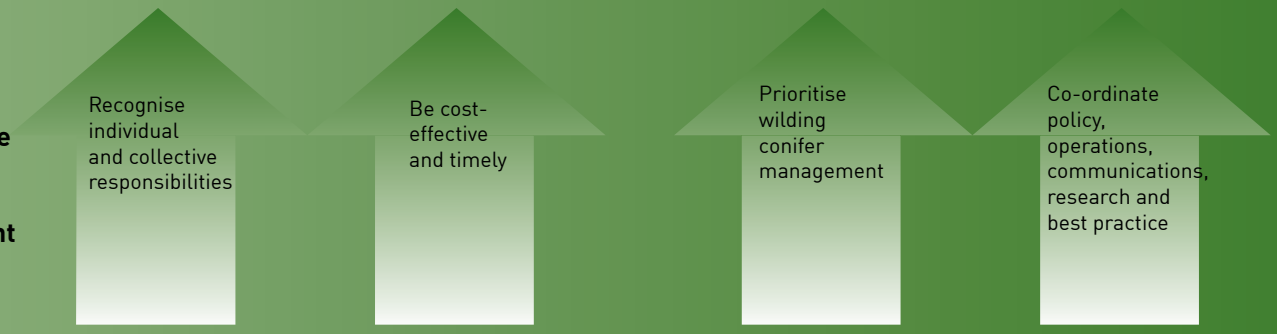
Wilding conifer management is complex.

- It often involves a wide range of parties with different drivers or objectives.
- Control operations can be large and long-term, requiring significant investment across multiple parties and land tenures.
- There is a need for better leadership (at all levels), co-ordination and prioritisation of control efforts.

What is NZ trying to achieve?

- Key parties collaborate to minimise the negative impacts of wilding conifers
- Communities are aware and taking actions for prevention and effective management
- Beneficial conifer plantings continue
- Land occupiers do not establish high spread risk conifer plantings, and reduce or prevent spread from new and existing wilding conifer populations
- Wilding conifer management and control is timely and cost-effective

What are the best ways to improve management of wilding conifers?



Radiata pine in mānuka with forest behind. Mt Richmond Forest Park, Nelson.

Executive summary

Wilding conifers are a serious and pressing established pest in New Zealand. They reduce the productivity of primary industries and damage the environmental, social, cultural and landscape values that New Zealand is renowned for.

Large areas of the country have already been affected by these unwanted trees and if decisive action is not taken now, the opportunity to prevent them spreading further will soon be beyond our grasp.

The New Zealand Wildling Conifer Management Strategy is a non-statutory strategy which supports collaborative action between land occupiers, researchers, regulators and communities to address the critical issues facing wilding conifer management.

In 2011 a current state report identified that failure to respond to the spread of wilding conifers can lead to the costs of control escalating exponentially. The report recommended the development of a national strategy, and improved leadership, co-ordination and prioritisation to effectively address the risks of wilding conifer spread.

The Ministry for Primary Industries led the development of the strategy in collaboration with a multi-stakeholder working group. The strategy identifies actions for key parties involved in wilding conifer management under four principles: individual and collective responsibility, cost-effective and timely action, prioritisation and co-ordination.

While wilding conifers are pests, planted conifers are valuable resources. Two of the spread-prone conifer species in New Zealand are important commercial species which contribute significantly to forestry exports, New Zealand's third largest export earner after dairy and meat.

Effective management of wilding conifers supports New Zealand's brand of responsible natural wood products, protects productive farming and forestry land, protects conservation values including native ecosystems and plant species, and protects iconic landscapes for local communities and tourists.

To achieve the vision of the right tree in the right place, there is a role for all New Zealanders to be aware of this expanding issue, and support taking action.

Contorta pine invading farmland.

Introduction

Why have a strategy?

Wilding conifers are an issue that can only be addressed by landowners, community groups, industry, researchers, local and central government working together. This strategy aims to support effective collaboration between land occupiers, researchers, regulators and communities to address the critical overarching issues facing wilding conifer management.

The management of wilding conifers can be complex and often involves a wide range of parties with different drivers or objectives. Control operations can be large and long-term, requiring significant investment across multiple parties and land tenures. Fortunately, predicting and controlling the spread of wilding conifers is feasible.

The parties involved in the development of the strategy have sought to find a balance between realising the considerable benefit of appropriate conifer plantings, while minimising the adverse effects associated with conifer spread. This strategy seeks to enable each party to understand what role they play in the wider management of wildings, through direct funding or in-kind contributions, and to increase confidence that others are fulfilling their roles.

We are at a crossroads in the management of wilding conifers. New control methods provide an opportunity to turn the tide of wilding conifer invasion across our iconic landscapes and protect the value of our production and conservation lands for future generations. If we do not act now, the infestations and cost of wilding conifer management will become overwhelming.

What is the strategy?

It is an agreement that provides a shared vision and agreed responsibilities and actions to support effective wilding conifer management across the country. It is not a detailed action plan: instead it documents the essential features of the system to support wilding conifer management and provides a focus for where improvements need to be made. The strategy itself is a non-statutory document; however, its objectives will be achieved using a broad range of tools and approaches. This is likely to include appropriate and well informed regulation.

The intended audience of the strategy is broad. Industry groups, research organisations, regional and district councils, agencies involved in wilding conifer management, land occupiers, and community groups all have an interest in how New Zealand manages wilding conifers to protect both conservation values and commercial opportunities.

The strategy will be championed by the New Zealand Wilding Conifer Management Group(NZWCMG)[1], and implemented by all parties.

The strategy aims to support regional, local or organisational planning, prioritisation and co-ordination activities necessary for effective wilding conifer management by addressing some of the broader and often challenging issues at the national level. Actions have been identified for key stakeholders reflecting a drive for practical system improvements, and transparency. A summary of specific actions attributed to lead organisations can be found in Appendix I.

Effective collaboration will be guided by the following overarching principles. Wilding conifer management:

- recognises individual and collective responsibilities;
- is cost-effective and timely;
- is prioritised;
- is co-ordinated.

1 NZWCMG was established as a stakeholder oversight group for a research programme on South Island wilding conifers, and has more recently expanded its role to address policy and management across the country.

Vision

The right tree in the right place

Aim

Prevent the spread of wilding conifers, and contain or eradicate established areas of wilding conifers by 2030

Outcomes

Key parties collaborate to minimise the negative economic, environmental and landscape impacts of wilding conifers.

Communities are aware and taking actions for the prevention and effective management of wilding conifers.

Beneficial conifer plantings continue.

Land occupiers[2] do not establish high spread risk conifer plantings, and prevent or reduce spread from new and existing wilding conifer populations.

Wilding conifer management and control is timely and cost-effective.

How was it developed?

In 2011 the Ministry for Primary Industries (MPI) commissioned Pacific Eco-Logic to produce an independent report on the current status of wilding conifers in New Zealand on behalf of the NZWCMG.[3] A summary report[4] was produced, outlining issues with the current state and making key recommendations for improving wilding conifer management. The development of a national strategy was considered to be the best way to address the recommendations made in the Pacific Eco-Logic report. Both the current state report and the summary report can be accessed on the NZWCMG website (www.wildingconifers.org.nz).

This strategy development was led by MPI, informed by a multi-stakeholder working group, and tested widely through the NZWCMG and other relevant forums. Members of the strategy working group cover a range of perspectives including Department of Conservation (DOC), Land Information New Zealand (LINZ), New Zealand Defence Force, regional councils, district councils, Scion, New Zealand Forest Owners Association, Federated Farmers, community groups and MPI.

The strategy draws on recommendations from the Pacific Eco-Logic report and advice from the NZWCMG on which actions will provide the greatest benefit.

2 [definition from the Biosecurity Act 1993] occupier,—
(a) in relation to any place physically occupied by any person, means that person; and
(b) in relation to any other place, means the owner of the place; and
(c) in relation to any place, includes any agent, employee, or other person, acting or apparently acting in the general management or control of the place

3 *Wilding conifers in New Zealand: Status report*, December 2011 V A Froude, Pacific Eco-Logic Ltd http://www.wildingconifers.org.nz/index.php?limitstart=3

4 *Wilding conifers in New Zealand: Beyond the status report*, December 2011 V A Froude Pacific Eco-Logic Ltd http://www.wildingconifers.org.nz/index.php?limitstart=3

Extent and impacts of wilding conifers

In the right place conifers can provide economic, environmental, social and cultural benefits, such as timber resource, increased carbon sequestration, decreased erosion, nutrient filtration, improved water quality and shelter, and shade for stock. In the wrong place wilding conifers compete with native vegetation, change existing ecosystems, reduce available grazing land, limit future land-use options, visually change landscapes, can affect surface flows and aquifer recharge in water sensitive catchments, and can result in damaging wild fires.

A large area of New Zealand is affected by the spread of introduced conifer trees at various densities. In 2007 the area affected by wilding conifers was estimated at approximately 805,000 hectares in the South Island, and approximately 300,000 hectares in the North Island. Recent estimates by DOC including sparse spread indicates that the area affected is now approximately 1.7 million hectares. Approximately 5 percent of the area affected by wilding conifers is densely populated (>400 stems/ha), 20 percent is moderately populated (20–400 stems/ha) and 75 percent is sparsely populated (<20 stems/ha).[5]

The original sources of these self-established trees were plantings for erosion control, research, shelter and landscaping, and production forests. The plantings frequently date back two to three generations and were developed by both private occupiers and government organisations such as catchment boards, the New Zealand Forest Service and the National Water and Soil Conservation Organisation. The management of these legacy plantings and the subsequent spread from these stands is one of the issues the strategy seeks to address.

Two of the ten most spread-prone conifer species (for the list see page 12 of the current state report 2011) in New Zealand are important commercial forestry species (radiata pine and Douglas fir). They make up 96 percent of the plantation estate and are the principal contributors to the $4.3 billion of forestry exports.[6]

Wilding conifer spread is influenced by a number of factors, including the species of tree, position and shape of the source population, wind strength and direction, frost and drought, the surrounding vegetation type and land management practices. Risk of wilding tree spread into or within new sites can be estimated using the wilding tree risk calculator at www.wildingconifers.org.nz (this will be updated periodically as new research becomes available).

Industry understanding of wilding spread and the factors that contribute to the dispersal of seed has been steadily improving over the past generation. While improved practices are minimising the potential for spread from higher altitude plantings there continue to be opportunities for further improvement. The adoption of new practices is not confined to commercial forest owners. There is a need to improve wider land owner understanding of how to manage new and existing shelter, landscape and erosion plantings on higher altitude and exposed sites.

5 C. Howell, personal communication, 4 August 2014
6 *New Zealand Forest and Wood Products Industry Strategic Action Plan*, March 2012 http://woodco.org.nz/images/stories/pdfs/ForestWood_Strategic_Action_Plan.pdf

Contorta pine spreading near Lake Pūkaki

Current management of wilding conifers

The 2011 status report estimated that in 2007 approximately $6 million was spent directly on wilding conifer control across central and local government. An additional unquantified amount is spent annually by community trusts and private occupiers (in cash and in-kind).

There are many successful examples of collaborative and locally co-ordinated wilding conifer management. Despite this, there remain many areas where a lack of awareness, lack of clarity around accountability and too little funding has resulted in insufficient action and emerging risks not being adequately addressed. This uncertainty has not only hindered effective policy implementation, but has made it difficult to gain support from stakeholders, the wider community, and potential funders.

The legislative frameworks required to support effective wilding conifer management are largely in place through the Resource Management Act 1991 (RMA) and the Biosecurity Act 1993; however implementation of requirements within the Acts has been variable due to the lack of national co-ordination or leadership on this issue.

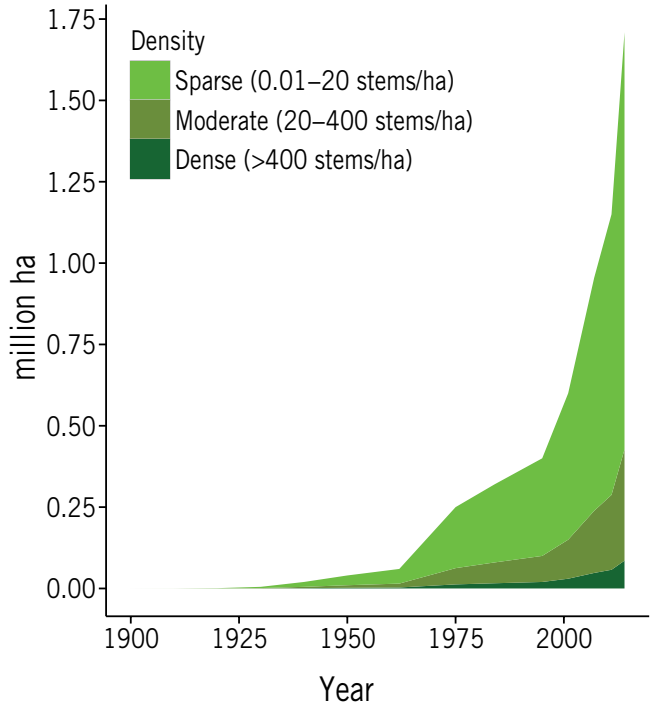
The RMA provides for rules to be established by territorial local authorities about how natural and physical resources (including land) are managed to promote sustainability.

The Biosecurity Act provides for management agencies (in particular, regional councils) to establish pest management plans to manage the impacts of pests on economic, environmental, social or cultural values.

There is an opportunity for greater collaboration regionally and nationally, and for more cost-effective control of wilding conifers through surveillance and early intervention. If action is delayed, the impacts of wilding conifers and control costs will increase exponentially.

The figure below provides an indication of the rate of increasing area of New Zealand known to have wilding conifers present (spread and density estimates by DOC, based on published and unpublished data).

Figure 1. Approximate area and density of wilding conifers in New Zealand (1900–2014)



How we will improve wilding conifer management

1. Recognise individual and collective responsibilities

Strategy objective:
1.1 Clarify roles and responsibilities

For wilding conifers to be managed effectively and in a timely manner, a co-ordinated, system-wide approach is required, with each party involved undertaking distinct and complementary roles, supported where appropriate by relevant legislation.

A lack of agreement on who is responsible for different management activities has frequently led to delays or ad-hoc management across a range of situations in which wilding conifers become a problem.

The NZWCMG has sought to clarify and agree roles and responsibilities across the system, in a way that supports the most efficient management decisions.

Central government is well placed to:

- provide national leadership, including working with the NZWCMG to provide oversight of strategy implementation;
- contribute to the management of legacy infestations on the basis of the wider public good benefit[7], and as a land occupier for Crown-administered land;
- oversee operational control on Crown-administered land;
- promote consistency and alignment of legislation;
- co-ordinate research to improve management tools and best practice;
- comply with regional pest management plan "good neighbour" rules under the Biosecurity Act 1993;
- promote awareness and support community initiatives.

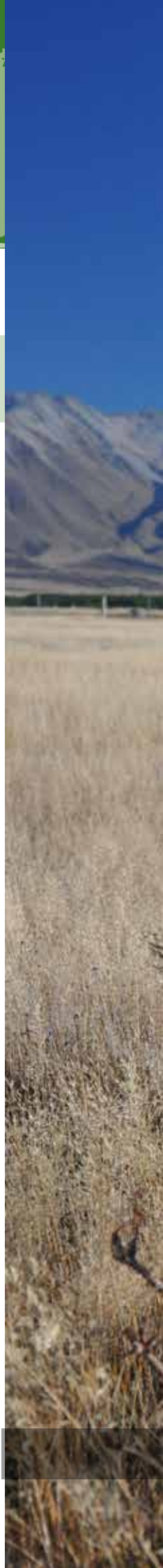
Regional councils are well placed to:

- provide leadership at the regional/local level;
- enable wilding conifer control in regional plans;
- facilitate the development of control plans;
- co-ordinate control operations where multiple parties are involved;
- contribute to the management of legacy infestations on the basis of the public good benefit to regional/local communities;
- establish appropriate rules in regional pest management plans to ensure that land occupiers are undertaking their roles as outlined on page 14.

Territorial local authorities are well placed to:

- contribute to the management of legacy infestations on the basis of the public benefit to local communities;
- establish appropriate rules in district plans to ensure that land occupiers are undertaking their roles as outlined on page 14.

7 Including contribution on the cost share basis outlined under objective 2.2. "Public benefit" in reference to wilding conifer management includes a reduction in the loss of biodiversity, and reduced impact on landscape values.



Young contorta pine following control. Seed source in background

Land occupiers are well placed to:

- avoid high risk plantings in high spread risk areas, and manage spread from conifer plantings on their land where that spread is or will impact neighbouring land;
- draw on best management practices (and industry standards) in planting and managing sites with the potential for spread;
- work collaboratively with local government, central government and neighbours to manage "legacy" wilding conifer infestations;[8]
- take early action to remove wilding conifers received either by long distance wind dispersal, or following the removal of legacy infestations;
- support the management activities of a neighbouring conifer plantation by allowing access to control fringe spread;
- consider the management cost of a change in land-use which could increase the risk of spread, for example, retiring land from grazing effectively stops ongoing wilding conifer prevention;
- comply with any relevant legislation including regional pest management plan provisions under the Biosecurity Act, or any land-use rules under the RMA;
- meet principles agreed in any forestry accord developed through the implementation of this strategy.

8 Including a contribution on the cost share basis outlined under objective 2.2.

Key Participants in Wilding Conifer Management Governance

Actions:

1.a. Encourage the key parties involved in conifer management to fulfil their role as outlined under objective 1.1 of the strategy.

1.b. Develop and agree protocols under an accord for the effective prevention and management of wilding conifer spread from planted forests, shelterbelts, amenity plantings and woodlots.

2. Be cost-effective and timely

Strategy objective:
2.1 Gain funding for efficient and timely intervention

Adequate funding of early intervention for both Crown and private land occupiers will allow removal of seed sources, reduce further spread and result in reduced control costs over the longer term.

Wilding conifer infestations frequently cover a range of land tenure and if early action has not been or is not taken, the cost of managing these sites can grow beyond the resources of the affected occupiers. The lack of clarity around who should bear the cost of wilding conifer management has frequently resulted in delayed action and prevented the removal of established infestations.

Early intervention to control the spread of wilding conifers ("a stitch in time saves nine") is highly cost-effective, when compared to later management and control of the resulting ongoing spread.

Additional and timely funding

Adequate funding to remove seed sources created by historic conifer plantings and long distance dispersal events will realise longer-term cost savings, and reduce future impacts. It will also increase the willingness of other parties to undertake appropriate wilding conifer management.

Improving access to funding for land occupiers and community trusts will improve efficiencies in wilding conifer management and protect the investment in work already done.

Strategy objective:
2.2 Support fair allocation of costs associated with wilding conifer control

Cost share model for collective action

A cost share model has been developed to provide a basis for negotiation when working on collective action management programmes. Actual cost shares for each site will need to be agreed by the parties involved on a case-by-case basis. The model suggests cost shares for scenarios of different origin or source plantings, and land tenure. The suggested cost shares will encourage all parties to do what they can to reduce the costs of the programme. For background information on how the cost share model was developed see Appendix II.

Many of the wild conifers currently causing problems for land occupiers are a result of trees that were deliberately planted in the past. As there is a lag phase, where the impacts are not felt for many years after initial spread, it is unfair to hold current land occupiers wholly responsible for problems initiated by previous government policies, or caused by previous occupiers and neighbours.

The model takes this into account and categorises the origin of wilding conifer spread by legacy plantings, RMA authorised plantings, or future plantings against land tenure.

For each scenario, a cost share is proposed for each of the parties who exacerbate the spread of wilding conifers, and those who benefit from wilding conifer control.

Table1: Suggested cost shares for collective wilding conifer management

	Preventing spread across boundaries		Control of wildings within one privately occupied property		Control of wildings within one Crown-occupied property	
Legacy plantings and legacy wildings	**Exacerbators:**		**Exacerbators:**		**Exacerbators:**	
	Neighbouring land occupiers who destock or change land-use to reduce grazing pressure	10%	Land occupiers who have wilding conifers	20%	Land occupiers who have wilding conifers (that is, central government agency)	20%
	Land occupiers who have wilding conifers spreading beyond their property	10%				
	Beneficiaries:		**Beneficiaries:**		**Beneficiaries:**	
	Central government	35%	Land occupiers who have wilding conifers	20%	The land occupier who has the wilding conifers (that is, central government agency)	20%
	Regional government	30%	Neighbouring land occupiers/owners who are not currently affected	10%	Neighbouring land occupiers/owners who are not currently affected	10%
	Neighbouring land occupiers/owners	15%	Central government	30%	Central government	30%
			Regional government	20%	Regional government	20%
RMA plantings where specific conditions don't apply	**Exacerbators:**		The suggested cost shares are based on the biosecurity funding principles, which promote efficiency by encouraging parties to: • change their behaviour to reduce the costs of control or risks of wilding conifer spread; • assess whether the benefits of control outweigh the costs; • determine whether control is being delivered cost-effectively. The suggested cost shares are a basis for negotiation, and a guide for designing mechanisms that would result in roughly the right allocation of costs. A group considering collective wilding conifer control should adjust on a site-by-site basis based on fairness or practicality. However, it is considered that in all cases both exacerbators and beneficiaries should bear some of the costs. For further information on how to apply the cost share framework see Appendix III.			
	Neighbouring land occupiers who destock or change their land-use to reduce grazing pressure	15%				
	Land occupiers/owners who have wilding conifers spreading beyond their property	15%				
	Local government	25%				
	Beneficiaries:					
	Central government	10%				
	Regional government	20%				
	Neighbouring land occupiers	15%				
Future planting of high risk species	**Exacerbators:**					
	Land occupiers who plant high risk species	80%				
	Neighbouring land occupiers who destock or change their land-use to reduce grazing pressure	10%				
	Beneficiaries:					
	Central government					
	Regional government	10%				
	Neighbouring land occupiers					

Actions:

2.a. Determine options for funding wilding conifer control, including establishment of a national fund to address highest priorities.

2.b. Investigate options for assisting community trusts to obtain funding in a timely way.

3. Prioritise

Strategy objective:

3.1 Prioritise wilding conifer management

The steps and criteria outlined below are intended to inform the development of agreed control priorities and approaches at the national level. This should inform subsequent prioritisation at a regional or local level and support appropriate and cost-effective management.

Land occupiers and management agencies manage wilding conifers to protect a range of different values. These values include protection of productive agricultural or forestry land, protecting indigenous vegetation and biodiversity, maintaining water yields, or preserving landscapes for recreational, cultural or aesthetic enjoyment.

While a reduction in the negative impacts of wilding conifers is a common end goal for those undertaking control, the management strategies adopted, budgets and timeframes can be difficult to align. Taking a co-ordinated approach to prioritisation allows parties to understand how their priorities fit within a local, regional or national context. This supports strategic and efficient resource allocation, within parties' abilities to reallocate effort.

Any prioritisation will be based on the best information that is available at the time of assessment. Priorities will be reviewed through time as improved monitoring and mapping (objective 3.2) provides better information, and as the management environment changes (through land-use change, new tool development, etc).

Steps to inform prioritisation of wilding conifer control

The approach to prioritisation will be primarily about reaching agreement between the broad range of stakeholders, based on their collective knowledge and experience, rather than a highly analytical process.

The process outlined below will be used to prioritise wilding conifer control work at a national level.

1. Determine distribution and extent of sites

Identify the distribution, density, age category, spread and species of wilding conifer sites.

2. Identify the goal of wilding conifer control at each site

Identify the purpose of managing wilding conifers and what outcomes are expected to be achieved. The values to be protected may be environmental, economic, social and/or cultural including:

Environmental	Economic	Social
• Biodiversity (protect ecosystem or particular species) • Maintenance of current natural resource mix	• Maintenance of specific land-use productivity • Direct risk to human livelihood • Minimisation of direct off-site effects	• Maintenance of landscape appearance • Social/community impact

3. Agree appropriate management approach for each site

The evaluation of management approach will consider the characteristics in the table below. Feasibility of the proposed management approach will also be considered. Feasibility considers the cost of control, current distribution, the expected duration of control, and potential barriers to delivery.

Management approach	Characteristics
Exclusion	Zero or low density, high value of land's current state, cost-effective to exclude, risk of invasion.
Eradication	Ability to remove all individuals, low-risk of reinvasion, ability to recover site to desired outcome, an area which benefits.
Progressive containment	Defendable boundaries, feasible to remove sources or stop further spread, long-term funding for knockdown and ongoing maintenance.
Sustained control	Integrated pest management outcomes, externality impacts, widely distributed, long-term funding commitment, occupies almost all suitable habitat.

4. Prioritise sites

National prioritisation of sites will take into account the criteria below. Priority will be given to those sites where investment will result in the greatest return in terms of protecting vales, avoiding future cost or leveraging additional funding support.

- **Spread risk** – considers the establishment, reproductive and dispersal abilities of the species. This can be determined by using the wilding tree risk calculator at www.wildingconifers.org.nz (this will be updated periodically as new research becomes available).
- **Potential distribution** – considers the geographic area that could be invaded.
- **Impacts** – considers the magnitude of economic, environmental and social effects that species would have on landscape values.
- **Level of existing support** – those areas where there is already considerable support; for example, in the form of community trusts, will be ranked higher than those where support is uncoordinated or does not exist.
- **Total cost**
  Total cost = control costs ($/hectares/year) X current distribution (hectares) X duration of control (years).
- **Probability of success** – considers the probability of successfully achieving the management approach.

5. Agree priorities and cost shares

Action:

3.1a. Prioritise wilding infestations based on best information available, to inform allocation of funding and control effort.

Strategy objective:
3.2 Develop consistent monitoring and mapping

Standard criteria for data collection and a national system for recording and mapping data on wilding conifer spread will improve the quality of information available to occupiers and decision-makers.

Data on wilding distribution, density and control efforts are currently gathered and recorded in varying ways by the range of parties involved. This makes it difficult to aggregate information and gain a national picture of the issue, or to assess overall progress being made through management activities.

A nationally agreed approach to monitoring will allow:

- a better measure of wilding spread and density trends over time;
- more accurate assessments of control costs and effectiveness;
- national prioritisation; and
- improved modelling of predicted spread.

Further development of predictive modelling will help land managers identify low risk areas suitable for afforestation, and high risk areas where planting of certain species will require management to prevent spread.

Actions:

3.2a. Agree consistent standards for collecting, recording and sharing data on wilding conifer distribution, density and control efforts.

3.2b. Develop a national tool to map wilding conifer distribution, and provide a repository for ongoing monitoring data.

3.2c. Refine prediction modelling of wilding spread based on the best information available.

4. Co-ordinate

Strategy objective:
4.1 Promote consistency in policy across organisations

The legislative frameworks needed to support the implementation of this strategy are largely in place. The agreed roles and responsibilities in this strategy provide a sound basis to inform greater consistency and alignment in the way these are implemented.

Inconsistent regulation exaggerates the tension that exists between managing conifers as both a resource and a pest. Regional councils are responsible for ensuring the wider community is protected from the impacts of wilding conifers while land occupiers should not have unnecessary compliance costs imposed on responsibly managed forest plantations.

Promoting consistency and alignment of national and local regulation relating to wilding conifers will need to be ongoing. A particular opportunity exists in relation to local government regulation of both plantings of spread-prone conifers and management of existing wilding conifers. It is expected that appropriate regulation will help drive more efficient management decisions and reduce the long-term cost of wilding conifers.

Currently the responsibility for managing wilding conifer spread is addressed differently from region to region through varying district and regional council policies and rules under the RMA, and regional council rules in regional pest management plans.

Greater consistency will ensure:

- roles and responsibilities agreed in this strategy are supported;
- the inaction of a few does not undermine the positive action and management investment of others; and
- peripheral legislation does not cause unintended barriers to the management of wilding conifers.

Central and regional leadership

A national policy mechanism such as a national environmental standard or national policy statement could promote consistency through the development of best practice guidance for regional policy statements or district plans developed under the RMA.

The development of land-use rules under the RMA could incorporate the wilding conifer "risk calculator" to assess and reduce the risk of new wilding conifers establishing. The calculator can found on www.wildingconifers.org.nz. The calculator has been critically reviewed and will be updated periodically as new research becomes available.

Greater consistency in regulation will provide greater certainty for those parties planting new conifers, resulting in an overall improvement in management.

The development of an appropriate and consistent approach to management of wilding conifers in regional pest management plans will provide an instrument to ensure any control required of the landowner causing the spread and imposing cost on a neighbouring property is effective and reasonable. Any regulation in regional pest management plans, under the Biosecurity Act 1993, will need to take into account the value of commercial species in managed forests.

Actions:

4.1a. Work collaboratively to develop agreed best practice regional pest management plan rules, or local strategies, which address wilding conifer spread across boundaries without capturing appropriate plantings; that is, investigating new regulatory options such as development of site-led rules.

4.1b. Develop best practice RMA policies and rules as a proactive means of addressing wilding risks associated with new plantings. This could include a refined version of the wilding risk calculator.

4.1c. Promote consistency across local government including exploring national policy mechanisms to ensure consistent regulation relating to wilding conifer management.

4.1d. Promote alignment of national policy relating to wilding conifer management.

Strategy objective:

4.2 Co-ordinate regional and local operations across organisations

A co-ordinated approach to wilding conifer control operations will provide efficiencies through sharing of baseline costs.

Overarching regional co-ordination makes it easier to fund large control operations from multiple sources of funding, enables sharing of baseline costs, reduces duplication, and provides a degree of protection for investment in wilding control. The benefits of this approach have been realised in areas such as Mid-Dome, Southland, Wakatipu Basin, Roaring Meg, Queenstown, the Marlborough Sounds and in the Central North Island where collective working groups have assumed responsibility for large infestations and have worked with councils and agencies to improve co-ordination and access to funding.

The Canterbury Wilding Conifer Strategy 2010–2015[9] is another example of agency collaboration for more effective planning, prioritisation and delivery of wilding conifer control work which supports multiple values.

Maintaining the NZWCMG will ensure a forum exists which can promote co-ordinated operations.

Action:

4.2a. Facilitate co-ordinated control amongst land owners and other stakeholders.

9 Canterbury Wilding Conifer Strategy 2010-2015 http://ecan.govt.nz/publications/General/wilding-conifer-strategy.pdf

Strategy objective:

4.3 Increase understanding of wilding conifer impacts, inspire public action through education and support for community initiatives

Increased public understanding through education and support for community initiatives will help inspire action.

The public, land occupiers and decision-makers are not always aware of the potential impacts of wilding conifers. This can result in a lack of timely action to address establishment and spread. A lack of awareness of the long-term wilding risks associated with poorly managed conifer plantings can also result in new wilding infestations establishing.

Wider support from the general public and funders for wilding conifer control will enable more cost-effective early intervention. Those with an interest in wilding conifer management can advocate for wilding conifer management to land occupiers, the public, and agencies, dispersing key messages through a range of channels including websites, workshops, billboards and events.

Visibility of the results of different management decisions over time will aid decision-makers and encourage early control of emerging infestations and prevention of expensive wilding problems.

Action:

4.3a. Develop communications plan to raise awareness of issues relating to wilding conifer management and build advocates, including:

- undertake social marketing/behaviour change programme to key audiences;
- develop a visual tool to show changes over time from different conifer species and management approaches;
- promote good news stories of control successes.

Strategy objective:

4.4 Support ongoing research to improve cost-effectiveness of control, and reduce risk of establishment

Significant improvements in prevention, control and monitoring tools can greatly improve efficiency. Continuing to develop additional tools and further refine existing tools will enable land occupiers to "do more for less".

Research into factors for establishment and spread of wilding conifers can inform and direct management. Identifying pathways to prevent spread can be the most efficient way to control wilding conifers. Integrated management incorporating ecological knowledge of spread, establishment and control methods allow more effective decision-making and management.

Recent developments in herbicide control tools have realised significant benefits at some sites. New ground-based chemical application methods are four to ten times faster than traditional manual control. The aerial spot spray application method is more than five times faster than using a helicopter to move people to manually control trees. The new tools and methods enable a greater area to be treated for the same cost, significantly increasing efficiency and making the effective wilding management more achievable.

The NZWCMG will continue to support research into the range of tools to improve wilding conifer management.

Actions:

- 4.4a. NZWCMG maintain oversight of research and identify priorities and needs to support wilding conifer management.
- 4.4b. Explore any opportunities for addressing research needs.

Strategy objective:

4.5 Promote information sharing of best practice and technological gains in control methods

Up-to-date best practice for wilding conifer control tools, monitoring methods and land management options can be difficult for land occupiers to access.

The NZWCMG is well placed to continue their work of collating and disseminating agreed best practice and, where necessary, ensure gaps in best practice are filled. Increased access to best practice information will result in improved efficacy.

Actions:

4.5a. Promote development and uptake of current best practice for wilding management.

4.5b. Maintain www.wildingconifers.org.nz website is as the site to go to for information.

Appendix I:

Summary table of strategy actions

Overarching Principles	Specific Objectives	Strategy Actions	Lead	2015	2016	2017	2018	2019
Recognise individual and collective responsibilities	1.1 Clarify roles and responsibilities	1.a. Encourage the key parties involved in conifer management to fulfil their roles as outlined under objective 1.1 of the strategy.	MPI					
		1.b. Develop and agree protocols under an accord for the effective prevention and management of wilding conifer spread from planted forests, shelterbelts, amenity plantings and woodlots.	MPI and NZWCMG, district and regional councils, & forestry and farming bodies					
Be cost-effective and timely	2.1 Gain funding for collective action and timely intervention	2.a. Determine options for funding wilding conifer control, including establishment of a national fund to address highest priority sites.	MPI, DOC, LINZ, NZDF					
	2.2 Support fair allocation of costs associated with wilding conifer control	2.b. Investigate options for assisting community trusts to obtain funding in a timely way.	To be determined					
Prioritise	3.1 Prioritise wilding conifer management	3.1.a. Prioritise wilding infestations based on best information available, to inform allocation of funding and control effort.	MPI supported by NZWCMG					
	3.2 Develop consistent monitoring and mapping	3.2.a. Agree consistent standards for collecting, recording and sharing data on wilding conifer distribution, density and control efforts.	Scion, LINZ					
		3.2.b. Develop a national tool to map wilding conifer distribution, and provide a repository for ongoing monitoring data.	LINZ					
		3.2.c. Refine prediction modelling of wilding spread based on the best information available.	Scion					

Overarching Principles	Specific Objectives	Strategy Actions	Lead	2015	2016	2017	2018	2019
Co-ordinate	4.1 Promote consistency in policy across organisations	4.1a. Work collaboratively to develop agreed best practice regional pest management plan rules, or local strategies, which address wilding conifer spread across boundaries without capturing appropriate plantings, that is, investigating new regulatory options such as development of site-led rules.	MPI and Regional Councils					
		4.1b. Develop best practice RMA policies and rules as a proative means of addressing wilding risks associated with new plantings. This could include a refined version of the wilding risk calculator.	District Councils and Ministry for the Environment					
		4.1c. Promote consistency across local government including exploring national policy mechanisms to ensure consistent regulation relating to wilding conifer management.	MPI, MfE					
		4.1d Promote alignment of national policy relating to wilding conifer management.						
	4.2 Co-ordinate operations	4.2a. Facilitate co-ordinated control amongst land owners and other stakeholders.	Regional councils					
	4.3 Increase understanding of wilding conifer impacts	4.3a. Develop communications plan to raise awareness of issues relating to wilding conifer management.	MPI					
	4.4 Support ongoing research to reduce the cost of control and risk of establishment	4.4a. NZWCMG maintain oversight of research and identify priorities and needs to support wilding conifer management.	NZWCMG					
		4.4b. Explore any opportunities for addressing research needs.						
	4.5 Promote information sharing of best practice and technological gains in control methods	4.5a. Promote development and uptake of current best practice for wilding management.	NZWCMG					
		4.5b. Maintain www.wildingconifers.org.nz website as the authoritative site to go to for information.	NZWCMG					

Douglas fir invading susceptible native shrubland. Mt Richmond Forest Park, Nelson

Appendix II:

Controlling wilding conifers: considering where the costs could lie

Purpose

This paper provides a model to apply to specific collective action management programmes as a starting point to negotiate where the costs of a programme should lie, for inclusion in the New Zealand Wilding Conifer Management Strategy.

Proposed model for where costs fall in different situations

At the Wilding Conifer National Strategy Working Group meeting on 11 July 2013, the Group went through an exercise of identifying where the costs should fall for legacy, post-RMA plantings, and future plantings of wilding conifers in different situations.

Based on the analysis in this paper and the results of the working group's exercise, the table on page 29 provides a "starting point" for where the costs of wilding conifer management could fall. Users may like to consider making further adjustments to the allocation to reflect fairness and the practicalities of the particular situation. Users may also consider whether it makes sense for different parties to bear the costs at different times, for example for one party to pay for initial knock-down and another party to be responsible for ongoing control.

For example, in cases of long distant wind dispersal events, it would not be practical to establish who the exacerbators and beneficiaries are. From a practical point of view, there is a reasonable expectation that receiving land occupiers keep land clear, and are responsible for removing any seedlings while they are small.

There are at least four ways that a party could bear costs:

- direct costs;
- contributing funding;
- in-kind contributions;
- accepting impacts; for example, dealing with the impacts of distance spread could be considered equivalent to accepting an overall cost share of 10 percent.

Background

Introduced conifer species have been planted in New Zealand over many years for a variety of purposes. Conifers can provide a timber resource (including firewood), increase carbon sequestration, decrease erosion and in-stream sedimentation, and provide shelter and shade for stock. Conifers can be used as a raw product for industrial processes such as pulp and paper production and provide landscape amenity values.

Naturally regenerated or wilding introduced conifers have started from plantings established for a number of these purposes. Wilding conifers can have various adverse effects and pose a series of environment risks, as described below:

- local extinction of native plant communities and populations of native plant and animal species in some cases;
- lower productivity of extensive or marginal farmland;
- reduction in catchment flows where long-term seasonal soil moisture deficits occur (such as the Upper Ashley catchment) to levels that adversely affect in-stream aquatic ecosystems and existing direct uses of the water;

	Preventing spread across boundaries		Control of wildings within one privately occupied property		Control of wildings within one Crown occupied property	
Legacy plantings and legacy wildings	Exacerbators: • Neighbouring land occupiers who destock or change their land-use to reduce grazing pressure • Land occupiers/owners who have wilding conifers spreading beyond their property Beneficiaries: • Central government • Regional government • Neighbouring land occupiers/owners	 10% 10% 35% 30% 15%	Exacerbators: • The land occupier/owner who has the wilding conifers Beneficiaries: • The land occupier/owner who has the wilding conifers • Neighbouring land occupiers / owners who are not currently affected • Central government • Regional government	 20% 20% 10% 30% 20%	Exacerbators: • The land occupier/owner who has wilding conifers (i.e. the central government agency) Beneficiaries: • The land occupier/owner who has wilding conifers (i.e. the central government agency) • Neighbouring land occupiers/ owners who are not currently affected • Central government • Regional government	 20% 20% 10% 30% 20%
Post-RMA plantings where specific conditions don't apply	Exacerbators: • Neighbouring land occupiers who destock or change their land-use to reduce grazing pressure • Land occupiers/owners who have wilding conifers spreading beyond their property • Local government Beneficiaries: • Central government • Regional government • Neighbouring land occupiers/owners	 10% 10% 25% 10% 20% 15%				
Future planting of high risk species (afforestation)	Exacerbators: • Land occupiers who plant high risk species • Neighbouring land occupiers who destock or change their land-use to reduce grazing pressure Beneficiaries: • Central government • Regional government • Neighbouring land occupiers/owners	 80% 10% 10%				

- loss of landscape values, especially where those landscapes are characterised by indigenous tussock lands and other low stature indigenous vegetation;
- potential impact on Māori cultural values in some locations;
- externality impacts to neighbouring land causing land-use opportunity costs and increased fire risk.

Many of the wild conifers currently causing problems for occupiers are a result of trees that were deliberately planted in the past. It is unfair to hold current occupiers wholly responsible for problems caused by previous occupiers and their neighbours.

In addition, there is a long lag phase where the impacts of spread are not felt for many years after initial spread occurs. There is also an element of irreversibility as, once the wild conifers are well established, it becomes extremely expensive to remove them.

Wilding stands are categorised as "legacy" if they were established before the Resource Management Act 1991 came into force or spread from land planted before that time. Post-RMA plantings are those trees planted in accordance with the Resource Management Act, either as a permitted activity under a District Plan, or a consented activity with conditions. Future plantings refer to any plantings of high-risk trees after the wilding conifer strategy is adopted.

The biosecurity funding principles

The biosecurity funding principles[12] have the primary goal to encourage efficient levels of biosecurity intervention by ensuring biosecurity services are most appropriately funded by those that can:

- change their behaviour to reduce the costs of the service or the risks that give rise to the need for the service; and/or
- assess whether the benefits of the service at its current level of provision outweigh the costs and consequently influence the level of service provided; and/or
- determine whether the service at its current level of provision is being delivered cost-effectively.

Note that the biosecurity funding principles strive to ensure the most efficient way for costs to fall. They consider only **future** behaviours, and do not consider past behaviour. For this reason, the outputs may not reflect what is considered an equitable way for costs to fall and may need to be adjusted to take account of fairness and practicality.

Applying the funding principles to legacy plantings and legacy wildings

The benefits of controlling legacy plantings and legacy wilding conifers are preventing or reducing the following impacts (the parties who benefit are identified for each case):

- change in ecosystems and loss of native biodiversity – the public (could be national or regional public depending on the significance of the biodiversity);
- lower productivity of extensive or marginal farmland – occupiers and neighbours;
- lower water yield in water sensitive catchments – occupiers and users nearby and downstream of the affected area, that is, users within affected catchment;
- impacts on landscape values – occupiers and users nearby the affected area; the local community; visitors and tourists, and the public (options value);
- impacts on Māori cultural values – affected iwi;
- externality impacts (land-use opportunity costs and increased fire risk) – neighbours of affected area.

There are two types of exacerbators of legacy wilding conifers. The first are land occupiers who change their existing land-use from one that suppresses wilding conifer spread to a land-use that does not suppress spread. Note that the change in land-use could be either on the land that currently has legacy wilding conifers, or on the adjacent or nearby "receiving" land. These are "active" exacerbators in that they make an active decision that increases the risk of wilding conifers spreading.

12 Agreed by Cabinet as the approach to be used to determine how the costs of biosecurity services are distributed.

The second group of exacerbators are land occupiers who have wild conifers on their land and are not preventing them from spreading onto adjacent land. These are "passive" exacerbators.

Principle 1: Which party is best placed to change their behaviour to reduce the costs of the service or the risks that give rise to the need for the service?

There is little ability for those who value an affected area's ecosystem, landscape or Māori cultural value to change their behaviour to reduce the costs of wilding conifer control. However, the other beneficiaries may be able to change their behaviour to some extent to reduce the amount of wilding conifer control. For example, other beneficiaries can potentially achieve their desired outcomes in other ways (for example, by using their land for activities that are not affected by the presence of wilding pines or lowering water consumption). However, this may not be practical or reasonable in some situations. If biodiversity, landscape and Māori cultural beneficiaries were required to bear the costs of wilding control, the only way they could reduce their costs is by accepting lower levels of their desired outcomes.

All land occupiers are able to change their behaviour to prevent/reduce the spread of wilding conifers by:

- removing wilding conifers at wilding seed take-off points on their land (and other areas);
- planting species that are not spread-prone in boundaries to act as a barrier to spread;
- changing or maintaining their current land-use to one where fringe-spread seedlings are browsed.

Under this principle, there is a case for some beneficiaries to bear the costs (farmers who want to reduce the loss of productivity and those who use water in water sensitive catchments) and "active" exacerbators. There is a weaker case to charge other exacerbators and other beneficiaries.

Principle 2: Which party is best placed to assess whether the benefits of the service at its current level of provision outweigh the costs and consequently influence the level of service provided?

Those who receive the benefits of wilding conifer control are best placed to assess whether the benefits of wilding conifer control outweigh the costs. There is a strong case for beneficiaries to bear at least some of the costs of wilding conifer control under this principle, because it means they will not demand wilding conifer control if the costs outweigh the benefits. If they are not bearing any of the costs, they will have an incentive to demand more of the service (because they are effectively getting it for free).

Exacerbators are much less able to determine whether the benefits outweigh the costs. This is because they are generally not receiving benefits, but may be subjected to the costs.

Under this principle, there is a strong case for all beneficiaries of wilding conifer control to bear the costs.

Principle 3: Which party is best placed to determine whether the service at its current provision is being delivered most cost-effectively?

Land occupiers may have information that can improve the cost-effective delivery of wilding conifer control on their land that other parties do not have. As a result, there is a case under this principle for the costs of wilding conifer management to fall on land occupiers.

Overall assessment

From an efficiency perspective, there is a case for both land occupiers who have wilding conifers spreading beyond their property and those parties who benefit from wilding conifer control to bear the costs of control for legacy plantings and legacy wildings. Of those who benefit from control, there is a slightly stronger case for farmers who want to reduce the loss of productivity and those who use water in water sensitive catchments to bear the costs, rather than those who value the biodiversity, landscape and Māori cultural values. Of those who exacerbate the problem of wilding conifers, there is the strongest case for active exacerbators to bear the costs, rather than passive exacerbators.

Putting the three principles together, the case for which groups should bear the costs of managing legacy conifer plantings and legacy wilding conifers from strongest to weakest is as follows:

- beneficiaries of wilding conifer control;
- exacerbators who make an active decision to change their land-use to one that does not suppress the spread of wilding conifers between property boundaries;
- "passive exacerbators" who have wild conifers on their land and are not preventing them from spreading onto adjacent land.

The proportion of total costs of managing legacy plantings and wildings that each party should bear should be determined based on how strong the case above is in relation to each party.

It may not be fair to require current "passive exacerbators" of legacy plantings to be required to bear their full share of the costs of control. Current occupiers should not be held responsible for problems caused by previous occupiers and their neighbours. The cost allocations have been adjusted to reflect fairness.

Post-RMA plantings

District plans under the RMA outline how future activities will be controlled based on the potential environmental effect(s) the activity may have in an area. Within the district plans, activities are classified into five categories; permitted, controlled, discretionary, non-complying and prohibited. Resource consents are required for controlled, discretionary and non-complying activities. Applicants seeking consent for any activity are required to meet the conditions set out in the relevant district plan. This may include an assessment of the activity's effects on the environment.

It may not be fair to require owners of land where conifers were planted under the RMA to meet the same costs as owners of land with legacy plantings, as the district council took the effects of the forest on the environment into account when determining the appropriate conditions on land-use. This means that the costs borne by land occupiers of post-RMA plantings have been adjusted.

Applying the funding principles to future plantings

The benefits of preventing wilding spread from future plantings of spread-prone conifers are preventing or reducing the following impacts. The parties who benefit in each of these cases is identified below:

- downstream costs and impacts – the public (could be national or regional public depending on the significance of the costs and impacts);
- externality impacts – neighbours of affected area.

The exacerbators are those who plant spread-prone conifers, and neighbouring land occupiers who change their existing land-use from one that suppresses conifer spread to a land-use that does not suppress spread.

Principle 1: Which party is best placed to change their behaviour to reduce the costs of the service or the risks that give rise to the need for the service?

The neighbouring beneficiaries of preventing wilding spread from future plantings of spread-prone conifers may be able to change their behaviour by changing their land-use to one that suppresses the spread of wilding conifers. Similarly, those who would be subject to downstream costs without spread prevention from future plantings may be able to change land-use. However, in both cases, this is unlikely to be a practical or reasonable solution in most situations. In the case of downstream impacts, the only opportunity to change behaviour is by accepting these impacts to some extent.

The exacerbators of wilding spread from future plantings can change their behaviour to reduce the risk by planting species that are not spread-prone in boundaries to act as a barrier to spread, by choosing sites with low spread risk, or by choosing to plant a less spread-prone species. If, in the future, the costs of managing spread

from new plantings are borne by the person or group who plants the trees, they will be able to factor the costs into their decision about whether or not to plant.

Under this principle, there is a stronger case for exacerbators to bear the costs, as they are more easily able to change their behaviour to reduce the risks of spread. For trees planted in the future, this would result in the most efficient outcome, as the decision to plant new trees would be informed by the full costs and benefits of doing so.

Principle 2: Which party is best placed to assess whether the benefits of the service at its current level of provision outweigh the costs and consequently influence the level of service provided?

Those who receive the benefits of wilding conifer control are best placed to assess whether the benefits of wilding conifer control outweigh the costs. There is a strong case for beneficiaries to bear at least some of the costs of wilding conifer control under this principle, because it means they will not demand wilding conifer control if the costs outweigh the benefits. If they are not bearing any of the costs, they will have an incentive to demand more of the service (because they are effectively getting it for free).

Under this principle, there is a strong case for the beneficiaries of managing the spread from future plantings of wilding conifers to bear the costs.

Principle 3: Which party is best placed to determine whether the service at its current provision is being delivered most cost-effectively?

It is difficult to know which party is best placed to determine whether the service is being delivered cost-effectively, as it will depend on the specific actions taken to manage the spread.

Overall assessment

From an efficiency perspective, there is a case for parties who plant spread-prone conifers, and for parties who benefit from wilding conifer control to bear the costs of control for future plantings.

Putting the three principles together, the case for which groups should bear the costs of managing the spread of wilding conifers from future plantings from strongest to weakest is as follows:

- exacerbators who plant spread-prone conifer species in the future;
- beneficiaries of wilding conifer control;
- neighbouring land occupiers who change their existing land-use from one that suppresses wilding conifer spread to a land-use that does not suppress spread.

The costs of any programme to manage spread from future plantings of spread-prone conifers should fall based on the strength of the case above in relation to each group.

Appendix III:

How to apply the cost share framework

Explanation of the cost share framework

The cost share framework is not intended to be used in a prescriptive way to determine exact cost shares for different parties. It is intended to be a guide for those designing the control programme to choose mechanisms that would result in roughly the right allocation of costs to drive behaviour, noting that different mechanisms would result in different cost allocations (and therefore different behaviours).

This distinction is most obvious for future plantings of high risk species, where the exacerbators who are planting high risk species are responsible for bearing 80 percent of the costs, with only 10 percent being borne by exacerbating neighbours and beneficiaries respectively. In this example, the planters of high risk species could be required to put in place adequate measures to prevent spread from their property (through an appropriate regulatory mechanism). The adequacy of the measures would be determined based on the current activities of the neighbours. If the neighbours chose to change their land-use, they would have to bear any additional costs of spread onto their land. Similarly, any spread that occurs in spite of the measures (assuming these are implemented as required) would be the responsibility of the receiving landowner.

Users can consider whether it makes sense for different parties to bear the costs at different times; for example, for one party to pay for initial knock-down and another party to be responsible for ongoing control.

In cases of long distance wind dispersal events, it would often not be practical to establish who the exacerbators and beneficiaries are. From a practical point of view, there is an expectation that receiving land occupiers will undertake control of scattered trees and seedlings to keep land clear.

There are at least four ways that a party could bear costs:

- Direct costs – bearing the costs of control directly, for example, paying a contractor, undertaking control.
- Contributing funding – contributing money to the collective management programme.
- In-kind contributions – for example, contributing time, equipment, grazing, or access to assist with control.
- Accepting impacts – for example, dealing with the impacts of distance spread could be considered equivalent to accepting an overall cost share of 10 percent.

Where a neighbour is not increasing the risk of spread (therefore not an exacerbator) the costs will be spread across remaining parties on a proportional share basis. Contributions may be in kind rather than direct funding.

Example of how it works

For legacy plantings and legacy wildings, a programme will often have at least two components: preventing spread across boundaries, and control activities within the property. Therefore, parties are likely to have cost shares allocated to them more than once. For example, a land occupier who has wilding conifers should bear the costs as an exacerbator of spread across boundaries, an exacerbator of wildings within the property and a beneficiary of the control programme on their property. The mechanisms used in the programme should reflect their multiple roles within the overall programme.

Assuming that a programme comprises both components and the cost split between the two components is 30 percent preventing spread across boundaries and 70 percent control activities within the property, the overall cost shares for different parties could be (note the bold percentages are from the cost share table and the unbold percentages are derived from the cost split between the two components of the programme):

Neighbouring land occupiers who destock or change their land-use to reduce grazing pressure (**10%** x 30%)	3%
Land occupier/owner who has wilding conifers (**10%** x 30% + **20%** x 70% + **20%** x 70%)	31%
Central government (**35%** x 30% + **30%** x 70%)	32%
Regional government (**30%** x 30% + **20%** x 70%)	23%
Neighbouring land occupiers/owners who are not currently affected (**15%** x 30% + **10%** x 70%)	12%

Again, these percentages would be used by those designing the programme to identify how the overall costs of the programme should be allocated to the different parties, to inform their decisions about which mechanisms should be used.

Early spread in tussock land. More established wilding conifers in background. Queenstown area, photo provided by SCION