



UPDATES IN WILDING CONIFER MANAGEMENT

Minimising the environmental impacts of wilding conifers in New Zealand.

CONIFERS OUT OF CONTROL

Wilding conifers are self-sown trees growing in areas where they are not wanted. The very factors that make *Pinus* spp. and other conifers the mainstay of New Zealand's forestry industry also enable them grow almost anywhere in New Zealand: in coastal areas, sandy and stony soils, at high altitudes and areas that receive more than 600 mm of rain a year. Pines are prolific producers of seed, and the seeds of certain conifer species can be dispersed over long distances by the wind. The seed does not need special treatment to sprout and grow. The current dominant wilding conifers are *P. contorta*, *P. nigra*, larches (*Larix* spp.) and, increasingly, Douglas-fir (*Pseudotsuga menziesii*).

Wilding conifers are a particular problem in the hill and high country of New Zealand and, in 2012, were estimated to be infesting approximately 1.2 million hectares (or 4.5%)

of New Zealand. They compete for forest space with native trees and plants, alter and degrade ecosystems, are visually intrusive and compromise historic landscapes, and increase the risk of fire.

Primary sectors such as forestry and agriculture are affected by wilding conifers either directly via the costs to manage spread or indirectly through 'green' trade regulations or land lost to dense infestations. At the current extent of infestation, the cost to New Zealand to remove wilding conifers and restore affected natural and semi-natural ecosystems is estimated to be close to \$750 million. Control and management costs are increasing exponentially as the range and density of wilding conifers continues to increase. The development of a National Wilding Conifer Management Strategy for New Zealand in 2013 reflects the government's commitment to stop this invasion and minimise any further economic and environmental impacts.

HERBICIDE CONTROL

Scion, in collaboration with the Department of Conservation and the Wilding Conifer Management Group, has developed some cost-effective, aerially-applied herbicide treatments for the management of wilding conifers. The

focus has been on ways to control dense wilding infestations while optimising aerial application techniques that minimise spray drift onto surrounding vegetation. A treatment and delivery system to kill isolated and scattered individual trees in remote and difficult to reach locations has been developed.

TDPA

Dense wilding infestations are controlled with TDPA - a mixture of the herbicides triclopyr, dicamba and picloram together with ammonium sulphate, an emulsified spray oil to ensure the spray adheres to its target, and an organo-silicone surfactant, to enhance surface penetration. This mixture is applied aerially at 400 L/ha total spray volume to ensure good target coverage.

An aerial spot treatment has proved to be a highly effective way to kill individual scattered trees, including those in difficult to reach places. The herbicide triclopyr butoxy-ethyl ester in a paraffinic oil carrier is applied to the centre tree crown using a helicopter and a custom built spot-gun. Aerial spot treatment is at least 5 times more cost effective than flying someone to each tree to cut it down manually, commonly called skid-hopping, and causes very little collateral damage to the surrounding vegetation.

The Department of Conservation has been using these treatments operationally to manage wilding conifers since early 2012.

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MANAGING WILDING CONIFERS

A Sustainable Farming Fund research programme for the New Zealand Wilding Conifer Management Group has been run by Scion since July 2013. This programme is designed to support better wilding conifer management nationally. The main objectives are to: (i) improve and develop ways to enable stakeholders to conduct outcome-based monitoring; (ii) realise the potential costs for wilding control; and (iii) carry out ecological research on seed production and seedling establishment of Douglas-fir to improve the current wilding risk calculator.

One year into the programme we have:

- Set up the first systematic national inventory across identified risk areas. This provides statistically sound estimates of the levels of the severity of invasion in infested areas.
- Developed a smartphone application and protocol for ground based monitoring that enables trusts and wilding interest groups to gather and share monitoring data.
- We have developed an online control cost calculator (www.wildingconifers.org.nz) that enables users to estimate the cost of control on a particular site and for a specific control method.



- Initiated research on Douglas-fir seedling establishment and coning, which will continue over the next two years.

New detection and inventory methods will also be explored over the next year.

LOOKING TO THE FUTURE

The land area affected by the invasion of wilding conifers will increase steeply if there is no intervention to minimise their spread, threatening New Zealand's unique biological heritage and landscapes. The control of wildings needs to be more cost effective, possibly through better surveillance and early intervention. This has been identified as a priority for New Zealand in the National Wilding Conifer Control Strategy.

We are looking to identify stakeholders' priority questions for wilding research. Once these have been identified, the next step will be to characterise the underpinning science programme that will address these questions. In this way, the strategic framework for a science programme funded through MBIE can be identified together with the best science teams with the capability to deliver on priority outcomes.

WHO WILL BENEFIT

The widespread nature of this invasion across conservation and productive land means a number of stakeholders stand to benefit from a programme that aims to enhance New Zealand's ability to stop the spread of wilding conifers. These stakeholders include:

- Department of Conservation
- Ministry for Primary Industries
- Farming communities, especially in the high country
- Land and territorial authorities
- Regional and district councils
- Māori landowners
- Small, medium and large forest owners, including farm foresters
- New Zealand citizens.

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