# Wilding Pine Control Guidelines

## A guide to choosing the right control method

Wilding Pine Network

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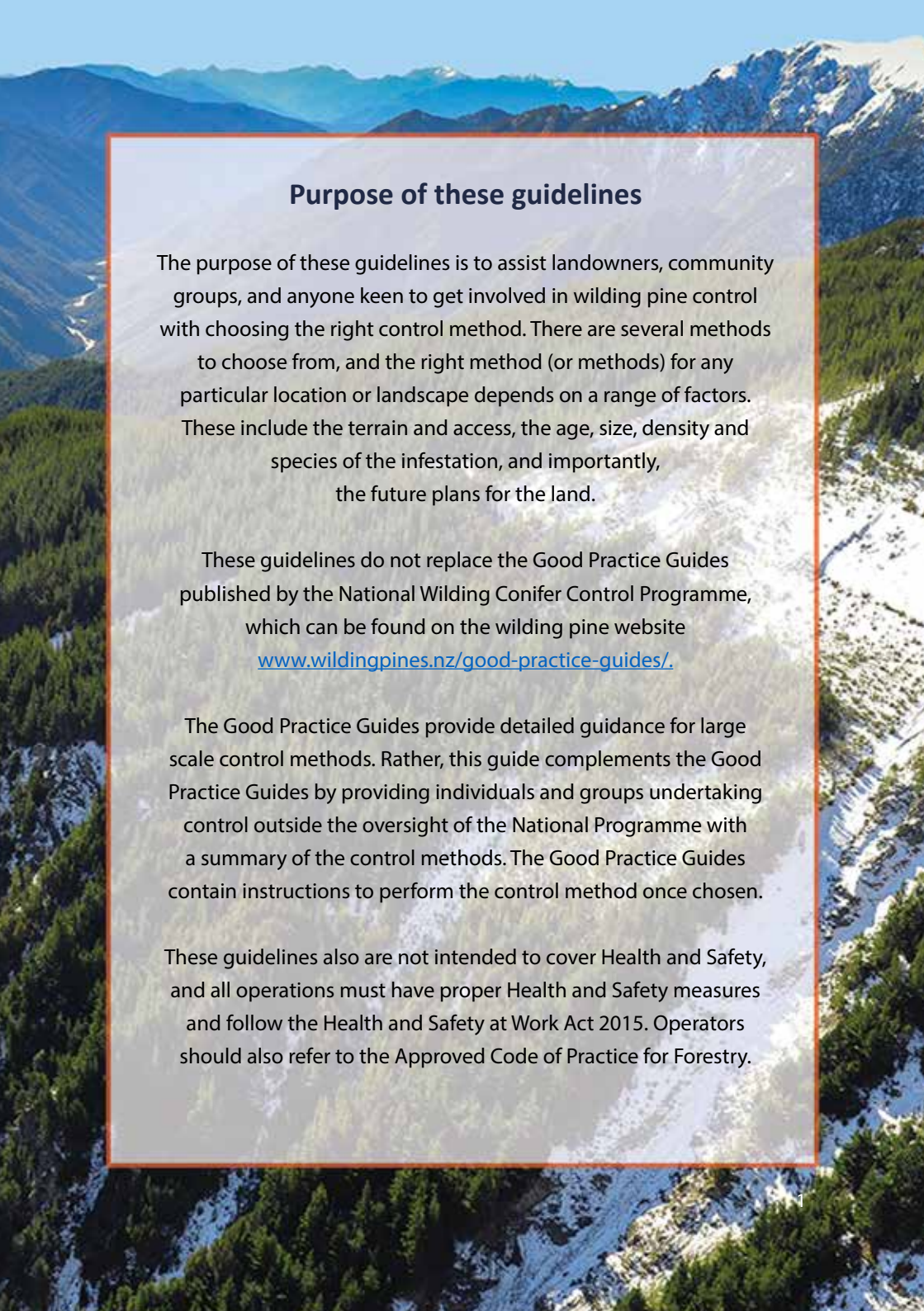

## Purpose of these guidelines

The purpose of these guidelines is to assist landowners, community groups, and anyone keen to get involved in wilding pine control with choosing the right control method. There are several methods to choose from, and the right method (or methods) for any particular location or landscape depends on a range of factors. These include the terrain and access, the age, size, density and species of the infestation, and importantly, the future plans for the land.

These guidelines do not replace the Good Practice Guides published by the National Wilding Conifer Control Programme, which can be found on the wilding pine website www.wildingpines.nz/good-practice-guides/.

The Good Practice Guides provide detailed guidance for large scale control methods. Rather, this guide complements the Good Practice Guides by providing individuals and groups undertaking control outside the oversight of the National Programme with a summary of the control methods. The Good Practice Guides contain instructions to perform the control method once chosen.

These guidelines also are not intended to cover Health and Safety, and all operations must have proper Health and Safety measures and follow the Health and Safety at Work Act 2015. Operators should also refer to the Approved Code of Practice for Forestry.

## Information about the Wilding Pine Network

The Wilding Pine Network supports the removal of wilding pine infestations in Aotearoa New Zealand through advocacy and advice. We connect communities with scientists and agencies involved in wilding control. As an independent network, we additionally advise the National Wilding Conifer Control Programme and advocate for the NZ Wilding Conifer Management Strategy 2015-2030.

Our members are government agencies, regional councils, community groups and trusts, environmental NGOs, forest owners, landowners, and Crown Research Institutes.

If you'd like to get in touch with us, please email us here:
**info@wildingpinenetwork.org.nz**
or visit our website here:
**www.wildingpinenetwork.org.nz**

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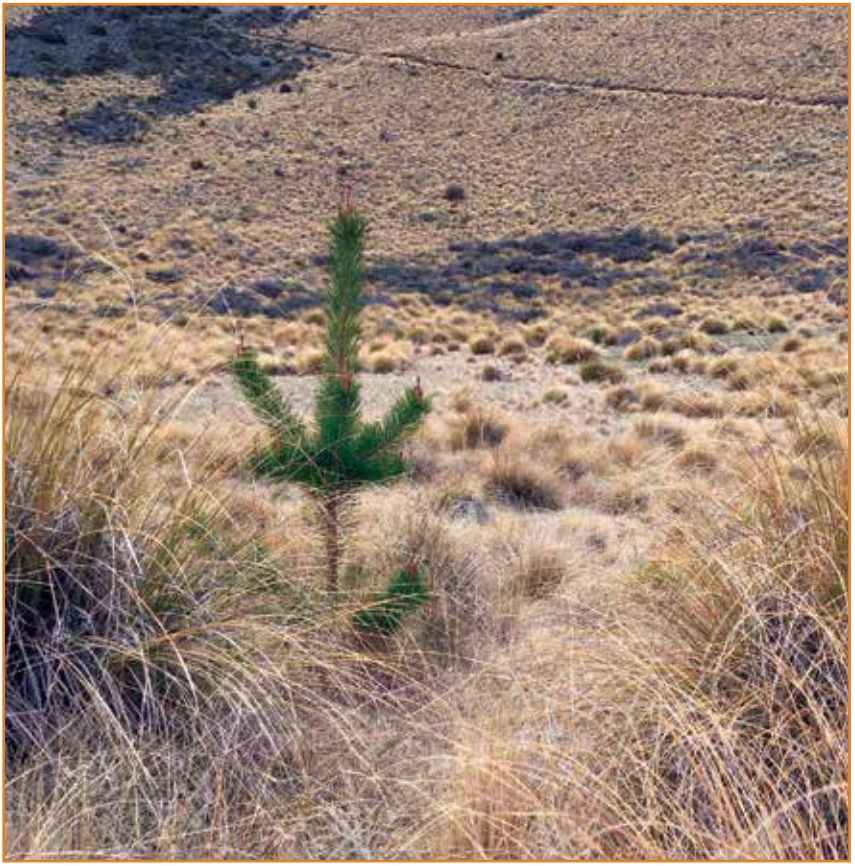
# Table of Contents

Section 1:

## Considerations before starting wilding control

There are a number of factors to consider before undertaking wilding pine control at a site:

- your budget,
- site factors such as access,
- other vegetation present,
- and your plan for the site after control.



Before starting to control wildings at a site, you should have a general idea of how you'd like to use the site following control. This post-control goal will help you understand your control objectives, and the control method you use can help you reach this goal more quickly. For example, mechanical removal of wildings enables conversion to pasture, but mechanical removal could also make native restoration more costly because it may be more difficult for the native plants to establish.

Finally, you need to be aware of the site conditions such as predominant weather patterns and the optimal time for control. You also need to consider the surrounding land use and whether there are any seed sources nearby. Ideally, there is not a significant seed source adjacent to your project site, unless you or your neighbour have a plan to remove these trees in the near future. Otherwise, you will need to commit to ongoing wilding control for the longer term.

### *Some Rules of Thumb:*

***Early control:*** Early control when trees are small (refer photo) is always best if it is possible. It's the lowest cost.

***Prioritise control areas:*** You and your community will need to decide how to prioritise wilding control work in your area. It is key to remove seed sources if you can to limit the amount of ongoing control needed. If upwind areas are cleared first, they are least likely to be reinvaded.

***Ongoing Maintenance:*** Even though pine seeds are only viable up to 5-6 years in the soil, one round of control is not enough to clear wilding pines from a site. Therefore, you need to do an initial round of control and then several rounds of maintenance control every 2-3 years until you don't see any more seedlings emerging.

***A note about which herbicides to use:*** You must use the right herbicide for the species and for the control method. Check the Good Practice Guides from the National Wilding Conifer Control Programme for more details, and follow the manufacturer's instructions for application.

## Section 2:

# Control Methods Toolbox

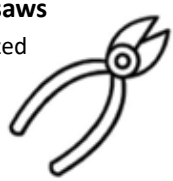
In general, wilding pine control methods can be divided into two categories: ground control and aerial control. Ground control can be manual labour or mechanical. Aerial control is done using a helicopter or drones. As a rough guide, choice of control technique depends on the size of the area and the density of wildings – see page 8 for more details about wilding densities.

## Wilding Control Techniques - Ground

FOR SPARSE TO MODERATE DENSITIES

**Hand pulling, loppers and hand saws**

For small-sized wildings



**Chainsaws**

For medium-sized trees. Chainsaws should only be used by experienced people

**GBBA**

Ground-based

Bark Application - for small to medium-sized trees

**Cut Stump**

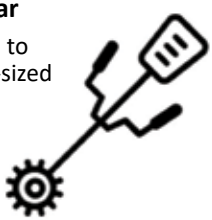
For small to medium-sized trees

**Drill and Fill**

For small to medium to large-sized trees. Suitable for areas with sensitive surrounding vegetation

**Scrub Bar**

For small to medium-sized trees



FOR MODERATE TO DENSE DENSITIES

**Mechanical Control**

Mechanical control can be done by a digger or a mulcher. Some large machines can handle large-sized trees

**Burning**

For medium to large-sized trees. Should only be used by experienced professionals who have obtained all permits and consents

## Wilding Control Techniques - Aerial

**ABBA**

Aerial basal bark application.
For sparse to moderate densities

**AFSA**

Aerial foliar spray application.
For dense wilding infestations

**SKID-HOPPING**

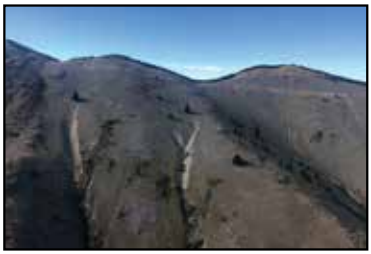
For large-sized trees at sparse densities

## Section 3:

# Which control method should I use?

Several factors will influence your decision about which control method to use:

- density and size of trees (see photos for idea of visual appearance)
- species
- site factors (terrain, access, surrounding vegetation)
- land use after control and your control objectives (see Section 10).
- resources at your disposal (i.e., your budget, use of helicopters)

| | Isolated trees | Dense trees |
|---|---|---|
| Small |  *Photo: Keith Briden* |  *Photo: Adam Ross* |
| Medium |  *Photo: Adam Ross* |  *Photo: Adam Ross* |
| Large |  *Photo: Adam Ross* |  *Photo: Adam Ross* |

The species of conifer can influence your choice of control method because species produce their first cones and seeds at different ages. The age of coning also varies depending on location and microclimate. Knowing this will help you determine when to control an area and how often you'll need to do follow-up control. You should aim to control trees before they start to cone to prevent further spread.

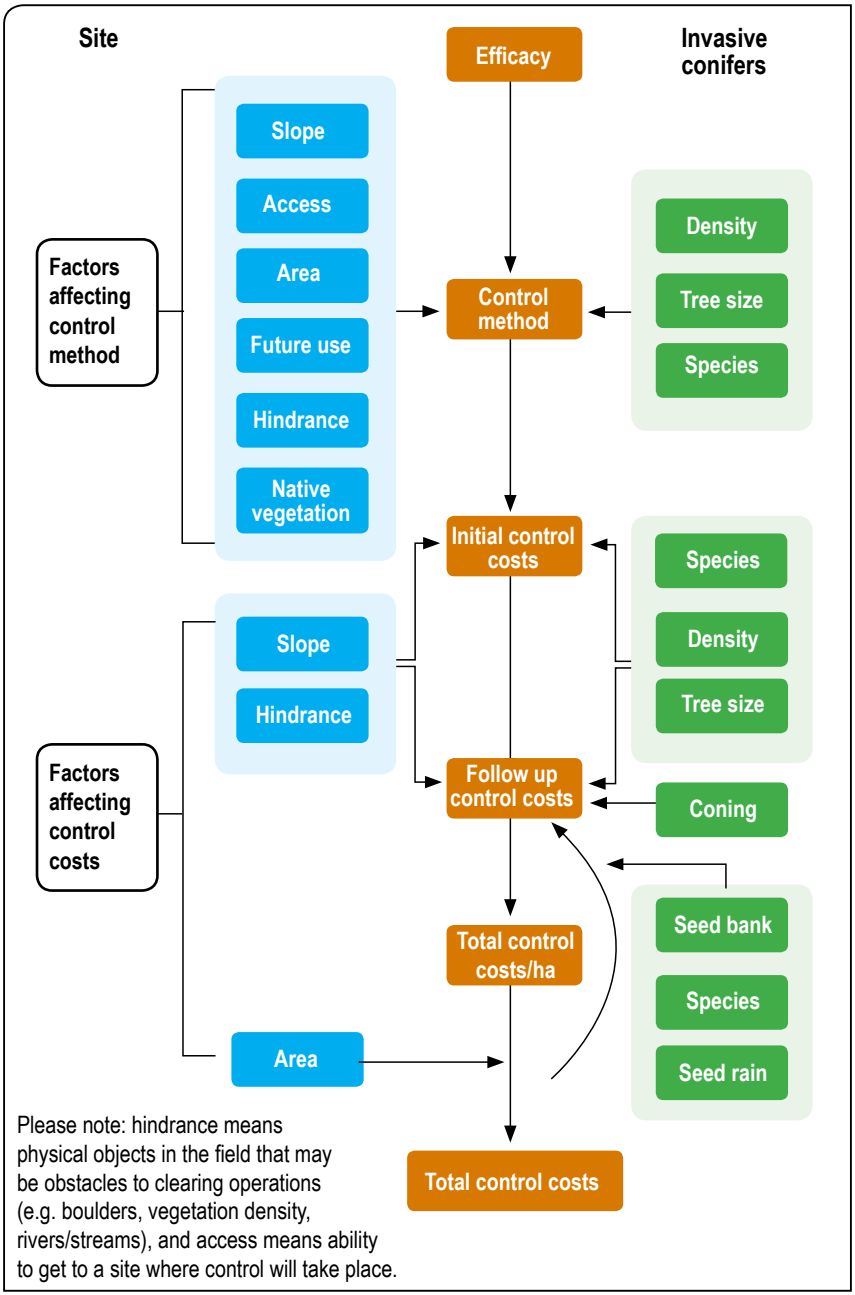
Site factors such as terrain and access will influence which control method to use too. If a site is too steep, you won't be able to use mechanical methods. If there is sensitive vegetation in or near the infestation, you'll need to be careful to protect that vegetation from any accidental damage during control.

You additionally will need to consider your budget and available resources. Some control methods may have consent and compliance costs (e.g., if boom spraying using a helicopter), so other methods may be less expensive depending on the area.

Finally, you should factor in public and landowner support for control methods into your decision, if you are working on land that is not your own.

The flowchart on page 10 illustrates the factors which affect the choice of control method.

*Flow chart overleaf from Edwards, P, Sprague, R, and Stahlmann-Brown, P. 2021. Removing invasive conifers - considerations, complexity and costs. Environmental Research Communications, 3, 071004.*


Site
Efficacy
Invasive conifers
Slope
Access
Area
Future use
Hindrance
Native vegetation
Factors affecting control method
Control method
Density
Tree size
Species
Initial control costs
Species
Density
Tree size
Slope
Hindrance
Factors affecting control costs
Follow up control costs
Coning
Seed bank
Species
Seed rain
Total control costs/ha
Area
Total control costs
Please note: hindrance means physical objects in the field that may be obstacles to clearing operations (e.g. boulders, vegetation density, rivers/streams), and access means ability to get to a site where control will take place.

Section 4:

## Health and Safety

It is very important that you understand and abide by your obligations under the Health and Safety at Work Act 2015. Everyone must understand what to do to keep themselves and others safe. This will involve a Health and Safety Management Plan, wearing appropriate PPE (Personal Protective Equipment), site briefings before work commences, and reporting any incidents. You also will need to follow WorkSafe's guidance.

*Photo: Dave Hansford*

You may also need to have a fire mitigation plan (i.e., what to do on site in the event of a wildfire) depending on the site and type of work you are doing. Fire is a serious risk to workers and surrounding land. The risk of starting an accidental wildfire increases with temperature, wind, drought, low humidity, and flammable vegetation. Please see the template fire mitigation plan - www.wildingpines.nz/good-practice-guides/.

Please also see the Fire and Emergency NZ's site on fire risk across the country: https://fireweather.niwa.co.nz This will provide guidance on when a fire plan is needed.

For more information about your Health and Safety obligations, please see the WorkSafe NZ website, in particular WorkSafe's Approved Code of Practice for Safety and Health in Forest Operations (https://www.worksafe.govt.nz/topic-and-industry/forestry/safety-and-health-in-forest-operations/). If you are using herbicides, all application equipment must comply with the Health and Safety at Work (Hazardous Substances) Regulations 2017.

## Section 5:

# Ground-control

## *Introduction*

Ground control is used on accessible sites. Ground control via manual labour is used for sparse to moderate densities, while mechanical control is used for dense infestations.

Wildings can be felled, pulled up, or mechanically controlled in any season, subject to safety considerations (e.g., wasps, fire risk), whereas success with herbicide treatments can be seasonally dependent.

Please see Section 4 on Health and Safety and make sure proper Health and Safety practices are followed at all times.

## *Hand-pulling / Hand-saws or loppers*

***When method is used:*** For seedlings and saplings at a scattered density, but not suitable for adult trees or when the infestation is dense.

***How it's done:*** Small seedlings (less than two years old) can usually be pulled up at the base. If the seedlings can't be pulled or they are too large, cut them at the base. It is crucial to remove all green needles, so that the tree won't grow back. This is ensured if a chemical is applied to the cut stump (see page 20).

***Tools:*** Gloves and a hand-saw or secateurs/ loppers

***Safety considerations:*** Care must be taken when using a hand-saw or secateurs, and the proper technique should be used when pulling up seedlings.

***Comments:*** The hand pulling method recommended preserves the quality of surrounding native vegetation the most, and is best done in moist soil conditions. It is suitable for volunteer days but requires that people are committed to the task.

*Photos opposite: Biosecurity NZ*

## *Chainsaws / Felling*

***When method is used:*** Useful for medium to large trees when at a scattered to moderate density on readily accessed terrain.

***How it's done:*** Trees are felled with the chainsaw using the appropriate technique. In some instances, a small axe is useful for ensuring that all green foliage is removed close to the ground.

***Tools needed:*** Chainsaws, associated safety and felling equipment

***Safety considerations:*** Anyone using a chainsaw must be trained, wear the appropriate safety gear, and adhere to the Approved Code of Practice for Forestry. This method is not recommended for inexperienced people.

*Photo: Dave Hansford*

***Comments:*** If the wilding trees are large and surrounded by native bush or shrubland, it is recommended not to use this control method, as felling can create light-gaps where new wildings can establish and can damage surrounding vegetation. In such situations, it is recommended to use the Drill and Fill technique (see page 22).

## *Scrub Bar*

***When method is used:*** Suitable for a wide range of wilding tree sizes, usually more effective at higher densities. Most useful on relatively flat terrain with few stones.

***How it's done:*** Scrub-bars can cut down trees up to 15cm in diameter at the base. This method can be used in conjunction with felling by chainsaws for larger trees.

***Tools needed:*** Scrub-bar, tungsten-tipped blades, sharpening gear, associated safety equipment

***Safety considerations:*** Anyone using a scrub-bar must be trained and wear the appropriate safety gear. This method is not recommended for inexperienced people.

*Photo: Biosecurity NZ*

*Photo opposite: Dave Hansford*

*Photo: Biosecurity NZ*

## *Cut Stump with herbicide application*

***When method is used:*** Used for scattered to moderate densities of medium-sized trees. Especially useful for multi-stemmed trees and for when the base of trees is obscured by vegetation or stones - you want to make sure the trees will die even if you cannot remove all the green material.

***How it's done:*** Trees can be either lopped, sawed, or cut with a chainsaw near the base. Immediately after cutting, a herbicide gel should be applied to the cut stump surface.

***Tools needed:*** Cutting instrument of choice, provided you have the necessary training to use it; herbicide gel; associated safety equipment

***Safety considerations:*** Certification is needed for use of some chemicals. Care should be taken if mixing chemicals, and appropriate safety gear and gloves should be worn. Refer to the chemical's label for instructions and any stock withholding periods.

***Comments:*** For more information about cut stump and which herbicide to use, please refer to the Good Practice Guide at: www.wildingpines.nz/good-practice-guides/.

## *Drill and Fill*

***When method is used:*** Used for medium/ large trees, often in bush or shrublands where felling can create canopy light gaps and promote new wilding establishment. Ring-barking trees is not recommended as the results are too variable.

***How it's done:*** Trees are drilled with a motorised drill and the holes are filled with herbicide. Large trees will require more drilled holes. It's important that drill holes go right round the whole trunk.

***Tools needed:*** Motorised drill; 13-20mm bit; herbicide in spill-proof container; associated safety equipment (gloves, safety glasses, earmuffs, appropriate clothing)

***Safety considerations:*** Caution should be taken when accessing trees and using the drill and herbicide. Beware of creating decaying trees in areas of human use such as near tracks or fences – trees should not be drilled where they will become a hazard to human safety if they fall.

***Comments:*** For more information about drill and fill, hole size/ spacing, and which herbicide to use, please refer to the Good Practice Guide at: www.wildingpines.nz/good-practice-guides/.

*Photo: Biosecurity NZ*


POISON

*Photo: Biosecurity NZ*

## *GBBA (Ground-based Basal Bark Application)*

***When method is used:*** Most useful for medium-sized soft-bark trees with readily accessible stems, where scattered infestations can be reached on foot.

***How it's done:*** Chemical is sprayed directly onto the bark of trees all around the stem. Note: Can be difficult to ensure that all trees have been treated (compared to felled trees).

***Tools needed:*** Knapsack sprayer; associated safety equipment (gloves, safety glasses, appropriate clothing)

*Photo: Rowan Sprague*

***Safety considerations:*** Caution should be taken when spraying trees to avoid splash-back; care should be taken with mixing chemicals and only water-tight containers should be used to avoid spillage. Those mixing and applying the herbicide should have the proper training to do so.

## *Mechanical – Mulching or removal via a digger/ bulldozer*

***When method is used:*** For dense wilding stands. Mulching can be used for small to medium sized trees, and diggers/ bulldozers can clear medium-large sized trees. In some instances, wilding trees can also be logged for timber.

***How it's done:*** Only for use by skilled and appropriately trained operators. On uneven ground mulching may not remove lowest green branches, leaving the risk of regrowth. If clearing wildings using a digger or bulldozer, wildings can be cleared into windrows. This is not recommended unless replanting because this method will disturb the soil and can create ideal conditions for new wilding seedlings. In such circumstances, it is vital to consider vegetation successions (i.e., sow desired seed or arrange for follow-up wilding control).

***Tools needed:*** Heavy machinery – for use only by skilled professional operators.

***Safety considerations:*** Care must be taken to ensure the site is suitable for mechanical control. If windrows are left on site, consider the residual risk of increased fire intensity.

*Photo top: Mechanical wilding control*

*Photo bottom: Ground cover left after mechanical mulching is minimal*

## *Burning*

***When method is used:*** Conducting a safe burn is a major operation, requiring an experienced and qualified team; suitable for privately owned land subject to consent processes; can be a cheap control method for small to medium-sized wildings at moderate to dense stockings.

***How it's done:*** Requires regional council consents and an approved prescribed burn plan and permit from Fire and Emergency NZ. It may also require a Wildlife Act permit from DOC if there are lizards on site. Some burn operations spray trees several months in advance in order to dry out foliage.

***Tools needed:*** All appropriate equipment and labour to contain a fire to the target area.

***Safety considerations:*** The landowner must have the required consents and an approved prescribed burn plan and permit. The team carrying out the burn also must adhere to the fire permit rules and ensure the safety of all involved in the burn. This technique is not for amateurs and should not be used in an area where there is sensitive native vegetation.

For more information, see: www.wildingpines.nz/good-practice-guides/.

*Photo: Nick Ledgard*

Section 6:

# Aerial Control

## *Introduction*

Aerial control is used for sites which are less accessible, have very sparse infestations, or are dense and cannot be mechanically controlled. Since herbicide treatments are used in aerial control, these control techniques are applied during the growing season between spring-autumn. For some sites and areas, both ground or aerial control may be suitable, but helicopters may be preferred over ground control. This may be due to steep or rugged terrain, and/or large sparse trees, making it unsafe or uneconomical for ground control. The site may be a dense infestation of wildings which cannot be logged or mulched.

It is generally best to aerially spray wildings, particularly if you're using AFSA, when they are actively growing (i.e., in late spring, summer, and early autumn). The growing season will depend on the site. For example, in southern and inland montane areas the most effective time is from November to February. Variable results can be expected if chemicals are applied outside this period.

You should avoid spraying over actively flowing waterways, and do not spray when it's raining. See the Good Practice Guide from the National Wilding Conifer Control Programme for more guidance on spraying near waterways.

In some instances, helicopters may be used to transport ground crews to a site to complete control work. In this instance, the helicopter transport provider should advise and follow relevant safety procedures including a briefing before entering the helicopter. You will need to find out any

*Photo: Sprayed contorta. Dave Hansford*

pre-flight safety requirements and any limitations on the equipment you can take, before the day of the flight.

Please see Section 4 on Health and Safety and make sure proper Health and Safety practices are followed at all times.

## *ABBA (Aerial Basal Bark Application)*

***When method is used:*** Scattered infestations of small to medium-sized trees, particularly if the site covers a large area. ABBA may also be used if the site is particularly steep or hazardous.

***How it's done:*** Only for use by skilled operators. The stems of wilding trees are sprayed via a wand from a helicopter, making this technique very targeted. The chemical used will depend on the target wilding tree species. For more information about ABBA, please refer to the Good Practice Guide of the National Wilding Conifer Control Programme

***Tools needed:*** Helicopter and pilot must abide by CAA regulations and use appropriate safety gear.

***Safety considerations:*** All appropriate precautions when using helicopters must be followed, and spraying herbicide over any flowing waterway must be avoided. Monitor weather conditions on the day of spraying to avoid non target damage and spray back onto the helicopter. This technique should only be used by skilled operators.

For more information, see: www.wildingpines.nz/good-practice-guides/.

*Photo: Biosecurity NZ*

## *AFSA (Aerial Foliar Spray Application)*

***When method is used:*** Dense, closed canopy infestations. AFSA can also be used for spot spraying of scattered infestations of small to medium trees.

***How it's done:*** Only for use by skilled operators. The needles of the wilding trees are sprayed from a boom on a helicopter. For more information about AFSA, please refer to the Good Practice Guide of the National Wilding Conifer Control Programme.

***Tools needed:*** Helicopter and pilot must abide by CAA regulations and use appropriate safety gear.

***Safety considerations:*** All precautions about the use of helicopters must be followed, and all flowing waterways must be avoided. Weather conditions must be monitored on the day of spraying to minimise spray drift. This technique should only be used by skilled operators, and you may also need consent from your regional council.

For more information, see: www.wildingpines.nz/good-practice-guides/.

*Photo: Aerial sprayed wildings near Mt Cook - Jo Ritchie*

*Photo: Dave Handsford*

## *Skid-hopping*

***When method is used:*** Clustered but sparse infestations in remote areas. In some areas, this method can be more suitable than ABBA for large trees.

***How it's done:*** Only for use by skilled operators. A helicopter pilot flies a small crew to an area of clustered wildings and drops them off to control the trees.

***Tools needed:*** Helicopter pilot and control crew must abide by CAA regulations and use appropriate safety gear.

***Safety considerations:*** All precautions about the use of helicopters must be followed, and this technique should only be used by skilled operators. Weather conditions must be monitored on the day to ensure flying conditions are suitable.

Section 7:

# Maintenance / Follow-up Control

Seeds of pines can last in the soil for five or more years, so even if you remove all trees during the initial control, new trees can still germinate and grow at the site. Therefore, you must be prepared to go back to a site after the initial control to remove any new trees.

*Regeneration after initial control. Photo: Adam Ross*

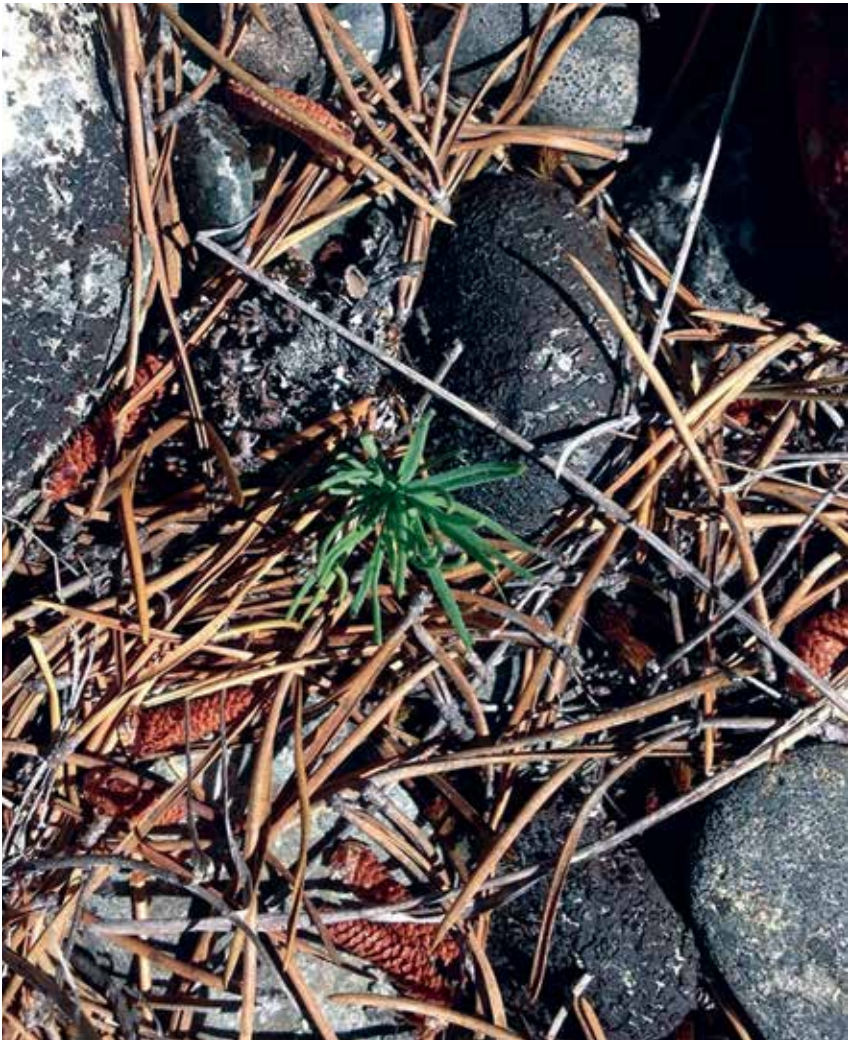
***Some rules of thumb around maintenance control are:***

- Maintenance must be done often (usually every three years). Control must be before trees reach coning age, but preferably wait until as many seedlings as possible are visible.

- Continue to do maintenance until there are no new trees at the site – this may take 2-4 cycles of maintenance control.

## *Seed bank/longevity of seeds in soil*

We think that conifer seeds are viable in the soil for up to 5-6 years. This means that even after you remove wildings from an area, if there are conifer seeds in the soil, wildings could still sprout and grow until the seed bank is exhausted.



Section 8:

# Control Costs

It is difficult to cost out wilding control operations because there are many factors which influence both the choice of control method and the cost, including tree size and density of the infestation, the terrain of the site and access, and the conifer species. The below table shows approximate costs of control per hectare for some of the main control techniques, although please note that costs can vary widely depending on the site.

| Control Method | Density | Cost per hectare |
|---|---|---|
| Felling with a chainsaw | Sparse<br>Moderate | $50<br>$500 - 1,500 |
| Cut stump | Sparse<br>Moderate | $100 - 250<br>$500 - 750 |
| Drill and Fill | Sparse<br>Moderate<br>Dense | $50<br>$500 - 1500<br>$1500 - 3,000 |
| Scrub bar/grubbing | Moderate/Dense | $750 |
| Mechanical Control<br>- bulldozer or mulching | Moderate/Dense | Can be cost neutral |
| ABBA | Sparse | $30 - 100 |
| AFSA | Dense | $2,000 - 2,500 |

Control costs should consider both the cost of initial control and the maintenance. Often, the first round of follow-up maintenance can cost almost as much as the initial control, but costs will subsequently decrease as the seedbank depletes and fewer trees grow at the site.

Section 9:

# Prevention

If possible, we should prevent wilding infestations before they even start. This section has information about how to prevent future spread and how to select a low spread risk site if you are thinking about planting conifers. In general, it's a good idea to contact your regional council before planting conifers to make sure you understand local regulations, restrictions, and requirements.

*Pinus Contorta that have spread from the Breezer Crown Legacy plantings with the country beyond intensively grazed by Simon Fowler on The Bounds Station. Photo: Murray Chapman*

## *Surrounding land management to prevent wildings from establishing and growing*

### *Grazing and fertiliser:*

Grazing by sheep at a stocking unit of 0.5/ha can control young seedlings before they become too woody; however if there is high seed rain from an adjacent planted area or wilding trees, stock will only reduce the seedling establishment, not prevent it. Additionally, wilding species have various degrees of palatability, with *Pinus nigra* being the least palatable to sheep. Cattle have not been found to effectively control wildings by grazing.

Fertiliser application can also reduce the establishment of wildings. Fertiliser increases the growth of grasses (often introduced), thereby out-competing wildings for light, water and nutrients. However, fertiliser application can lead to increased browsing on native plants and exotic species out-competing native vegetation.

*Take-off site. Photo: Adam Ross*

## *Dispersal and spread of seeds*

### *Take off sites:*

It was previously thought that take-off sites were the tops of hills – from where it is most likely seeds could be transported long distances by wind. Researchers have now tested this theory using 3D modelling of hills and wind turbulence and found that this theory was not quite correct. Major take-off sites are the windward slopes of hills. Therefore, we should avoid siting plantations on windward slopes facing into prevailing winds.

### *Principles of wind dispersal:*

- Wildings are wind-dispersed and often seeds are carried on the prevailing Northwest winds.

- If possible, it's important to get rid of seed sources, particularly those on take-off sites.

Section 10:

# Post-control options

After wildings are removed from a site, it's common for exotic grasses to establish and thrive. If you want to avoid this, it's important to think about the vision for a site after the wildings are removed before you start your control activity, as your choice of control method can assist you with reaching your land-use goal.

Generally, there are four options for post-control land use:

1. Native restoration
2. Pasture
3. Non-spreading exotic trees
4. Tussock grasslands

You will need to determine which land use type best suits the land and land tenure and also consider the available seed sources of surrounding vegetation (native or introduced). It is also possible to initially transition the land to one land use type (i.e., pasture) before converting it to another. All required resource consents should be obtained where needed.

## *Native Restoration*

Native restoration can either be active or passive. In passive restoration, there needs to be a well-established native seed source near the wilding infestation, and you don't need to underplant native vegetation. If the infestation is sparse or moderate density and is invading into regenerating bush, then drill and fill trees and the native vegetation should grow well and prevent re-invasion of wildings.

*Native regeneration after wilding removal*

Active restoration requires direct planting of native vegetation and it can be expensive. To maximise survival rates, it is important to eco-source the seeds for your restoration project from nearby native vegetation and you'll need to allow for sufficient time for native plants to be sourced and grow to a suitable size for planting. Your local council or DOC office will have planting guides about what grows well in your area.

Wildings leave a legacy in the soil, facilitating the re-invasion of wildings as well as other weeds at a site. Therefore, weed and pest control will be needed to protect the establishing vegetation.

Some regional councils have funding for native restoration, so check their website for funding opportunities.

## *Pasture*

Over-sowing pasture grasses can be a very effective land-use option to prevent re-invasion of wildings. Mechanical control, logging, and mulching are effective control techniques that can allow for wilding tree sites to transition well into pasture land use.

Be sure to apply for and get approval for the required resource consents. This land use type may not be suitable for all land tenures.

## *Plant non-spreading trees*

In some instances, you may want to plant an area in plantation forestry or plant amenity or shelter trees after you control wildings. Make sure you plant a non-spreading tree species and follow normal good plantation establishment practices. Wilding regeneration can be expected amongst planted trees and needs to be controlled. You can get advice from your regional council about non-spreading trees to plant in your area.

## *Maintain tussock grasslands*

### *(only suitable for areas where there were tussocks before wilding infestation)*

If there is no nearby conifer seed source, it is possible to revert land back to tussock grasslands if that was the land cover before wilding infestation. However, tussock grasslands can often be invaded by many types of exotic grasses and woody vegetation, so vigilant maintenance and protection may be required.

Section 11:

# Monitoring/Quality control

Proper control principles must be followed to achieve effective control.

These principles are:

- Monitor the control work to ensure you will achieve your goals for the site. Monitoring will not only indicate whether another cycle of maintenance control is needed, but also alert you of any remaining seed source (on and off-site) which may have been missed.

- Early action at a site is best – control is cheapest when the trees are small and not dense.

- The ultimate objective for any control site is to prevent any wildings from coning – otherwise the trees will only continue to seed and spread.

- Remember that if you cannot remove a nearby seed source, you will need to do ongoing maintenance control at a site. Please refer to your regional council and their Regional Pest Management Plan to understand your (and your neighbour's) obligations.

- All green needles must be removed if controlling wildings by hand-pulling or hand-saw.

*Photo above shows wilding spread in the Craigeburn area in 2012. Photo below shows landscape in 2018 after wilding control: Nick Ledgard*

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