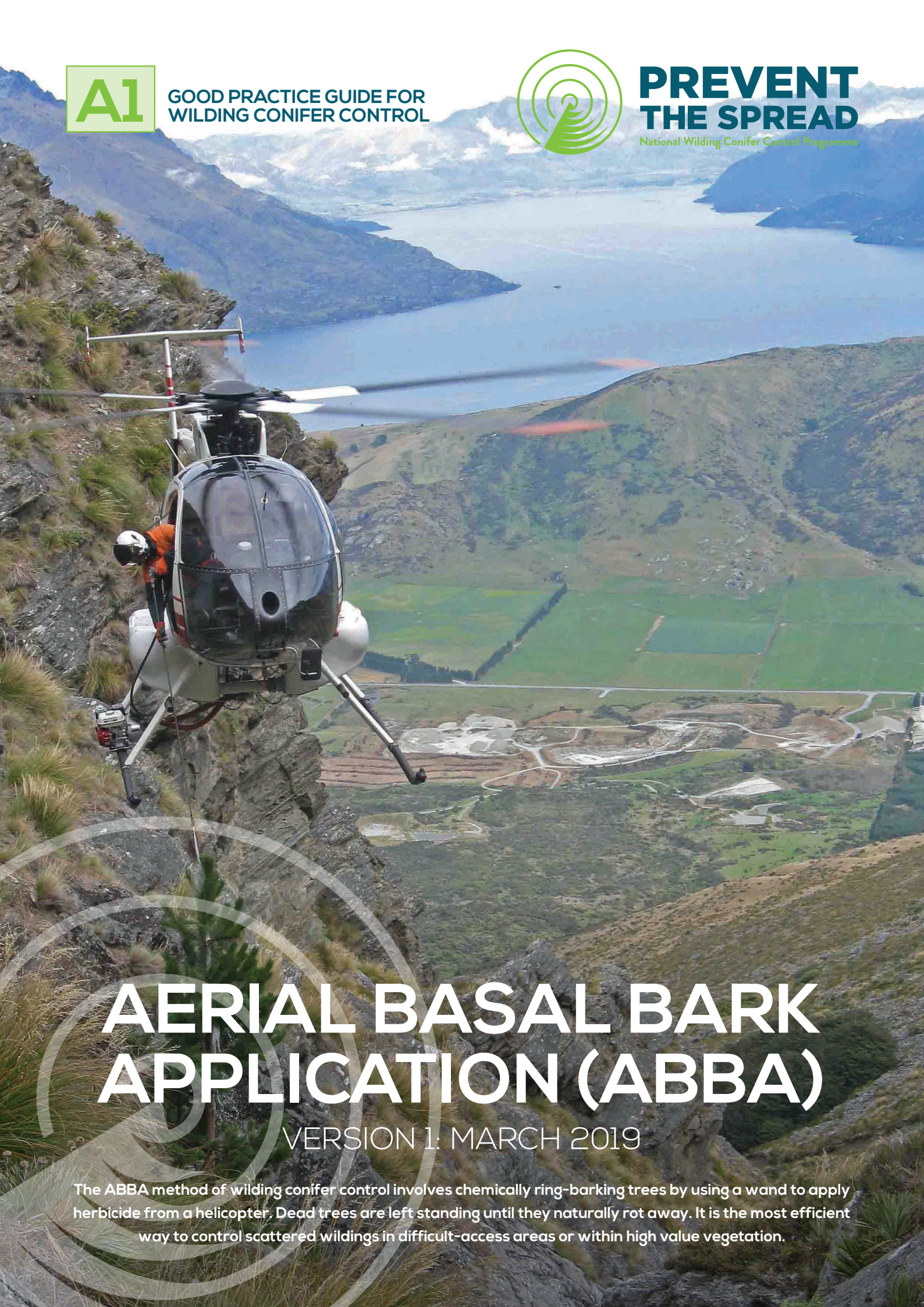
A1 GOOD PRACTICE GUIDE FOR WILDING CONIFER CONTROL

PREVENT THE SPREAD
National Wilding Conifer Control Programme



AERIAL BASAL BARK APPLICATION (ABBA)

VERSION 1: MARCH 2019

The ABBA method of wilding conifer control involves chemically ring-barking trees by using a wand to apply herbicide from a helicopter. Dead trees are left standing until they naturally rot away. It is the most efficient way to control scattered wildings in difficult-access areas or within high value vegetation.

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ABOUT THIS DOCUMENT

Overall disclaimer:	The information in this publication represents the collective view of the National Wilding Conifer Control Programme (the 'National Programme'). We have made every effort to ensure the information is accurate. However, the National Programme does not accept any responsibility or liability for error of fact, omission, interpretation or opinion, nor for the consequences of any decisions based on this information. Good practice use by any reader is done so at their own risk, and the National Programme rejects all liability for any risk or loss as a result of applying this good practice information.
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VERSION CONTROL

DATE	DETAILS	DOCUMENT ID AND VERSION NO.	AMENDED BY
February 2014	For the National Wilding Conifer Control Programme, this ABBA document replaces the 2014 DOC basal bark guideline Woody Weed Control Using Bark Application Methods, published by DOC's Science and Capability Group. 33p	Reference for the 2014 document: DOCDM-1364016. doc Draft	MPI and via 2017 workshop, culminating in this ABBA document.
March 2019	Edited for readability and in response to EPA feedback comments	Version 1	MPI
1 July 2020	Herbicide mix updated to reflect programme ban on mineral fuel	Version 2	MPI

Front cover: ABBA method in action, Central Otago (Photograph: Mark Mawhinney)

1. BACKGROUND

This document provides good practice guidelines for anyone using the aerial basal bark application (ABBA) method. It describes the minimum standards for the safe and correct application of herbicide for wilding conifer control. This good practice advice complements, but does not replace, any legal rules and regulations relating to the method (see Appendix 1A: Legal requirements).

We have prepared this document with the 'good management practice' information presently available. We will annually review and update this document, so please make sure you use the most up-to-date version.

Follow these guidelines to achieve the best results and to protect operators. If you have any suggestions for improvements to the good practice methods, contact the National Programme at wilding.conifer@mpi.govt.nz.

1.1 CHOOSING THE RIGHT METHOD OF CONTROL

There are a range of ground-based and aerial methods used for wilding conifer control in National Wilding Conifer Control Programme operations.

Ground-based methods include:

- 'Drill & Fill (herbicide injection of trees)[1];
- Ground Basal Bark Application (GBBA) of herbicide to tree trunks, similar to ABBA; and
- physical removal by hand or handheld equipment (e.g. chainsaw, scrub bar) or by large machinery extraction (e.g. excavator, dozer or mulching in some situations).

Aerial methods include:

- Aerial Basal Bark Application (ABBA) (directional control of herbicide with a lance or a wand generally to the base of trees); and
- Aerial Foliar Spray Application (AFSA[2]), which includes:
  - boom spraying (all-over foliage coverage of dense stands of wildings); and
  - spot spraying (foliar coverage of individual trees where stands are not dense and ABBA is not possible).

Aerial methods can be particularly cost-effective where trees are remote, and they come into their own where ground access is difficult or unsafe.

Choosing the best control method for a situation requires many factors to be weighed up, including tree sizes, their density and form, surrounding vegetation, ease of access, weather, and various aspects of human and environmental safety. While there is no clear 'rule of thumb' approach to this, Table 1 provides some generally accepted guidance to choosing the appropriate method.

1 Good practice guidance for Drill & Fill operations is contained in a companion document: *Good Practice for Wilding Conifer Control – Drill & Fill.*

2 Good practice guidance for AFSA operations is contained in a companion document: *Good Practice for Wilding Conifer Control – Aerial Foliar Spray Application (AFSA).*

Table 1: Guidance on which wilding conifer control method to use

	DENSE INFESTATION ⟷	SCATTERED TREES
DIFFICULT SITE ACCESS ↕	AFSA	ABBA (best for single-stem trees under 0.6m diameter at breast height) GBBA (best for single-stem trees under 0.6m diameter at breast height) Drill & Fill (trees above 0.1m diameter at breast height)
EASY SITE ACCESS	Large machinery (digger, mulcher)	Hand-held tools (chainsaw, loppers)

1.2 CHOOSING ABBA CONTROL METHOD

The ABBA method is particularly useful for widely scattered trees, inaccessible or unsafe areas (such as steep slopes), and in sensitive areas where specific targeting of wilding conifers is required amongst desirable vegetation.

Advantages of ABBA

- ABBA is useful for trees that are hard to access. Helicopters are highly manoeuvrable and well suited for use in remote or mountainous areas.
- ABBA is useful when trees are found within areas of high vegetation value. Can target specific trees without harming surrounding vegetation.

Disadvantages of ABBA

- ABBA is more effective on smaller trees than on larger trees.
- ABBA cannot be carried out in windy or low-visibility conditions.
- Greater potential for off-target spray drift harm.

The right time of year for ABBA

ABBA can be undertaken over most of the year, but the best time is from late summer through to late autumn. Late autumn is often the easiest time from an operational perspective, with more settled weather patterns in most regions.

2. ABBA PRE-CONTROL WORK

Before the operation begins, the operational controller must have in place an operation plan and a health and safety management plan. These plans need to be on site during the control operation for reference, and reviewed with key personnel prior to the start of operations.

2.1 SITE SPECIFIC OPERATIONAL PLAN

At the start of each financial year an agreed site specific operational plan must be in place for each Management unit. This operational plan must identify which areas are to be controlled by which method along with the associated costs for the year. By collating all the operational plans the national programme can effectively coordinate resources to priority sites.

2.2 HEALTH AND SAFETY MANAGEMENT PLAN

All persons participating in National Wilding Conifer Control Programme have a duty of care to ensure the health and safety of themselves and those working around them. To ensure this duty of care, a Health and Safety Management Plan (HSMP) must be established for all wilding conifer control programme work. This plan will be reviewed and adapted as new risks are presented. The HSMP plan may also be audited by the National Programme or WorkSafe New Zealand inspectors to ensure it is implemented.

The Health and Safety Management Plan is to be established by each contractor carrying out the work and reviewed by the contract manager prior to starting work: The Health and Safety Management Plans must clearly contain (but not be limited to):

- what its work-related health and safety risks are – particularly those that have the potential to cause workers and others serious injury or illness;
- The Health and Safety roles and responsibilities;
- the likelihood of those risks occurring;
- the degree of harm that could result from those risks;
- the options to eliminate, or minimise the risks (where they can't be eliminated);
- The HSMP needs to follow the Approved Code of Practice (ACOP) for Health and Safety in Forest Operations and include other health and safety matters relevant to using herbicides.

2.3 COMPLYING WITH RELEVANT ACTS AND REGULATIONS

All operational personnel, including contractors, must abide by all relevant Acts and Regulations. It is every person's responsibility to have a good working understanding of the legal matters relevant to the area of work they are undertaking.

See Appendix 3: Legal requirements, for key legal requirements relevant to this method.

2.4 PRE-START BRIEFING

Before the operation begins hold a pre-start briefing with key operators. This should be in a timely enough manner to allow for potentially affected parties to be notified of any changes.

Pre-start briefing to include, but not be limited to:

- Ensure consent is obtained from the landowner or nominated occupier.
- All applicable contractual matters are completed.
- All cost sharing is agreed upon and confirmed so that everyone knows how the operation is funded and any conditions that need to be met. Any separate agreements and understandings regarding control of other plant pests encountered must be finalised before the operation begins.
- Brief the helicopter pilot and crew and any other contractor/team members, all adjacent neighbours, and the landowner(s) or occupier(s) on whose land the operation is being carried out. The briefing must explain where the operational area is. Show the area visually using a map and describe the outermost boundary of the operation. A map is to be supplied for each party.
- Seek information from occupiers and neighbours on all potential hazards that might be encountered (e.g. main grid power lines or hot wires that go from ridge to ridge on farmland). These hazards need to be entered as appropriate into the site safety hazard register, which needs to be available for inspection by everyone involved for the duration of the work.
- Ensure the flight path is not over open water; check any regional rules surrounding this.
- Check weather conditions at time of programmed operation. Note: Current products are generally 'rain-fast' after an hour – that is, after an hour there is no effect of rain on the efficacy of the herbicide. However, a period of at least 24 hours without rain after application is ideal. Affected parties are to be notified in the event of a weather postponement.

3. ABBA MATERIALS

3.1 HERBICIDE

The recommended ABBA herbicide mix for wilding conifer species is a 20% basal bark mixture, often referred to as a 20% volume to volume (v/v) solution:

- 200 mL of 600 g/L triclopyr butoxyethyl ester (triclopyr BEE) herbicide,
- 800 mL of 100% biodiesel (a methyl ester derived from vegetable oil or modified seed oils).

This herbicide mix gives 120 g of active ingredient per 1 L of herbicide mixture.

Note: the use of mineral based diesel (including JetA1), fuels and oils (including blends of mineral diesel and vegetable oil) as carriers in herbicide mixes is prohibited in the National Programme.

3.2 DELIVERY EQUIPMENT AND SETUP

Helicopter set up

The decision of which helicopter type to be used will be based on safety and specific environmental conditions (e.g. altitude and manoeuvrability requirements) and will ultimately be made by the pilot. To allow for accurate record keeping and post control monitoring, a GPS system must record both the helicopter flight path and points where herbicide is applied to conifers.

All equipment attached to the helicopter must have an approved modification listed in the aircraft flight manual.

- Operators using the wand must be restrained with an approved retractable seat belt and safety harness at all times.
- The pilot is responsible for installing a securing mechanism, such as a bracket or strap, to ensure the wand does not come in contact with the main or tail rotors. The operator must use it as directed.
- Spare, oil-resistant (Viton rubber) O-rings for the handguns and diaphragms for the nozzles should be carried on the helicopter so that if there is a failure they can be replaced without causing unnecessary delay and potentially compromising the operation.

Spray tanks

To ensure that the herbicide remains properly mixed, the spray tank must have an efficient agitation system. A mechanical agitation system is satisfactory. It is best to pre-mix the herbicides before putting the formulation into the spray tank, but if there is a good agitator in the machine, putting products directly into the helicopter tanks also works.

The Civil Aviation Authority (CAA) requires that where tanks have a 'dumping system' fitted (to be able to jettison any unwanted liquids), it must be fully operational. Note: emergency "dumping" may trigger an environmental incident (see appendix 4).

Spray pumps

The type of pump system used is at the discretion of the helicopter pilot. Internal or external (electric) driven pumps are used to deliver the herbicide to the wand, although some operators prefer external tanks with petrol drive pumps. The pressure of the spray pump should be operated– between a preferable 3 (to minimise misting of the herbicide), but no more than 5 bar pressures.

Herbicide wands

The shape and length of the wand is optional and at the discretion of the pilot and/or operator. However, wands are generally between 1.5 m and 4 m long, and straight. Sometimes wands with a 45° bend at the tip are used. However, the 'bent' wand makes it harder to treat trees directly below the helicopter, which is the preferred option (lessons rotor-wash).

The wand should be tethered, so the operator isn't able to raise it into the rotor disk. Similarly, a system needs to be established for wand positioning for landing (e.g. wand pointing to the rear of the helicopter) so that it doesn't hit the ground as the helicopter lands.

The use of an extendable carbon fibre rod that can reach outside the rotor wash zone is an option for treating trees in difficult locations. A carbon fibre wand is also recommended for all ABBA work, for health and safety reasons, as it is much safer than a steel wand, in the unlikely event of it coming in contact with the rotor.

The nozzle size is important, as this needs to produce a solid stream. Nozzles that produce 'fine' or 'very fine' droplets are not recommended because the small droplets are prone to drift (Akesson & Yates, 1984).

4. ABBA METHOD

4.1 FLIGHT PATH

To ensure conifers are not missed, it is important that the pilot works in a consistent and logical search and control pattern that is predetermined during the pre-flight briefing. Typical search grid methods include working along at the same contour heights, moving ridgeline to ridgeline or gully to ridgeline and vice versa, depending on the nature of the topography and density and positions of the target wildings.

The flight path and points of herbicide application are to be GPS recorded to allow for adaptive management and accurate post-control success monitoring.

4.2 CORRECT SPECIES IDENTIFICATION

All wilding trees to be treated must be positively identified before treatment occurs to ensure only wilding conifer species are treated (unless other woody weeds are also agreed to be included).

4.3 HELICOPTER OPERATION

The ideal flying/hovering height to treat a conifer using ABBA is to have the wand within 1 m of the top of the tree. This will minimise spray drift and facilitate the accurate and precise placement of the herbicide onto the correct areas of the trunk (and upper branches if appropriate). However, wilding conifers occurring within deep fissures or other inaccessible areas may require treatment from a greater height, to ensure aircraft safety.

The pilot must fly a tight circular motion so that the wand operator can effectively direct the herbicide down and into the main stem area. Larger trees that are judged to be suitable to treat with the ABBA method usually cannot be treated adequately from directly above and require circular treatment, from one side then moving around to the 'topside' to complete the basal treatment. Similar circular movements may also apply to smaller trees.

The positioning of the wand operator relative to the pilot is optional. An operator positioned in the rear of the machine on the same side as the pilot allows the pilot to see the tree that is being sprayed, which means less communication between the pilot and crew member is required. If the operator works from the front passenger seat alongside the pilot, the pilot may not be able to see the target tree, so more communication is required. Planned techniques may need to be modified depending on what is seen during flights.

4.4 REDUCING ROTORWASH

Trees should be treated directly below the helicopter whenever possible. This approach removes the temptation to overextend the wand into the rotor wash zone. The pilot should turn off the pump immediately if they see rotor wash of the herbicide occurring as a result of the application.

The minimum amount of air disturbance and rotor wash occurs when the helicopter is moving in a forward direction, but application can only occur when in a hover. Therefore, where possible, trees should be treated after allowing the air disturbance to subside. Aiming the wand directly down or arcing a little towards the back of the helicopter are the optimum positions to treat a tree and will result in minimal rotor wash bounce of herbicide off the ground.

4.5 HERBICIDE APPLICATION

Operating the wand requires diligence at all times as good coverage around the entire basal stem area (known as 'chemical ring-barking') is essential for effective control. Operators should use discretion when applying herbicide, taking into account the size and complex nature of the tree to be treated and whether another method may be more effective. During initial control operations it is better to spray more herbicide into a tree than not enough and risk having to revisit an area where trees have only been partially controlled.

Single or multi-stemmed trees, generally under 0.6m diameter, should be treated by applying the herbicide into the tree and onto the bark of the trunk as low down as possible. The herbicide should encircle the trunk from ground level upwards for a minimum of three times the diameter of the trunk in sufficient quantity that it covers the trunk to the ground. The herbicide should be applied until it runs down the stem.

Larger trees with many upper branches and thick rough bark require more herbicide to be applied. The principle to be followed is to treat each large branch in the crown as a single tree and to apply enough herbicide so that it encircles the branch and runs down each branch onto the intersecting trunk and, from there, to the ground.

5. ABBA POST CONTROL

5.1 POST-CONTROL MONITORING

Post-control monitoring is currently reliant on visual inspections. Accordingly, this type of monitoring is best carried out once treated trees are showing visible effects of the treatment. In most cases it is recommended that post-control surveys are undertaken between 4 and 5 weeks following control (only in summer when the effects of the herbicide will be seen). It is good practice to run a final monitoring operation after 2 years (for small trees) or 3 years (for big trees), when the real effectiveness of the operation can be evaluated.

Ensuring that the target trees have been controlled adequately can be a drawn out process as it could take years for big trees to die. The results of this post-operational monitoring can be cross-checked against the GPS flight paths submitted from the control operation. Operators' spray diaries can also be requested to verify exact dates and times when work was done. It is essential that all recording of information is valid and kept up-to-date.

Note, post-control monitoring techniques are currently being investigated with the intention of developing good practice guidance for use across the programme.

5.2 PROGRAM QUALITY CONTROL

Quality control checks should be conducted to ensure operations are being carried out in accordance with agreed plans and good practice. These are also helpful in post control success monitoring and to enable adaptive management.

Inspections may cover a wide variety of aspects, such as:

- checking daily briefing forms;
- evidence of daily equipment checks and annual checks;
- air operational observations (from a ground position);
- observation of ground operation procedures (refuelling, chemical handling, helicopter landing/take off procedures);
- an inspection of the ABBA wand to ensure it is functioning correctly;
- inspection of tanks on helicopters to ensure they are mounted safely and are in good working condition (carried out by a qualified Licensed Aircraft Maintenance Engineer);
- tree inspections (if applicable) to confirm that herbicide has been applied correctly;
- inspection of waypoints, track logs (flight lines), spray diaries and flow rate data to confirm which areas have been treated – track logs may show an area that has not been controlled; and
- where appropriate, actual volume of herbicide used compared with both the size and number of trees treated.[3]

3 The usefulness of this information may be variable. A rule of thumb often used is to apply as much herbicide as is necessary to kill a tree, to prevent any survivors needing to be treated, as the cost of aerial re-treatment well exceeds the cost of extra herbicide used.

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New Zealand Wilding Conifer Management Group

Information for landholders: http://www.wildingconifers.org.nz/about-us/land-holders/

Identifying wilding conifers: http://www.wildingconifers.org.nz/about-us/land-holders/identifying-wilding-conifers/

APPENDIX 1: TERMS AND DEFINITIONS

TERM	DEFINITION
Calibration	The process of determining, checking or rectifying the graduation of any instrument that gives quantitative measurements. In this case, checking that the equipment, when operated to the specifications, delivers the required amount of spray mixture per unit area over the bout (or effective swath) width.
Carrier	The substance that carries the herbicide formulation and any adjuvants. The formulation will specify the carrier – often water, sometimes an oil.
GROWSAFE	The brand name used by the industry training organisation known as New Zealand Agrichemical Education Trust (NZAET). The role of NZAET is to ensure independent trainers train to national industry standards. NZAET appraises, accredits and reviews specialist trainers to ensure quality. It also publishes the GROWSAFE manual, a training aid for teaching NZS 8409:2004 *Management of Agrichemicals* (Standards New Zealand, 2004).
New Zealand Standard for Management of Agrichemicals (NZS 8409:2004)	The New Zealand Code of Practice approved by the Environmental Protection Authority (EPA) under the Hazardous Substances and New Organisms Act 1996. It sets out how to manage agrichemicals to comply with the relevant hazardous substance regulations. Knowledge of this industry Code of Practice is an essential part of GROWSAFE certification and Qualified Person certification.
NZTM projection	New Zealand Transverse Mercator (NZTM2000) is the projection used for New Zealand's Topo50 1:50,000 and other small-scale mapping. Spatial data users should use NZTM2000 where a projection is required within mainland New Zealand. You can convert co-ordinates between NZTM and WGS84 using the Land Information New Zealand (LINZ) online co-ordinate converter.[4]
Operational Controller	Where the operation is being carried out under the National Wilding Conifer Control Programme, there will be an Operational Controller – who acts on behalf of the Programme to ensure the operation is conducted appropriately and aligned to the Programme's good practice guidelines, or in the absence of such, the relevant industry codes of practice. The role includes ensuring all equipment is applicable to the task, staff or contractors are suitably trained and competent to undertake the work, relevant health and safety considerations and practices are employed and accurate data is collected and reported. The Operational Controller is deemed to have the duties of a PCBU under the Health and Safety at Work Act 2015.
Qualified person	The qualification requirements for handling a class 9 substance are defined in the Hazardous Substances (Hazardous Property Controls) Notice 2017 (EPA, 2017, Part 4 subpart C). This replaces the former Approved Handler Test Certificate process.

4 http://apps.linz.govt.nz/coordinate-conversion/

TERM	DEFINITION
Regional Air Plans	Each regional council/territorial authority has a regional plan to protect air, land and water quality. Rules in these plans contain conditions regarding the discharge of agrichemicals. While there is some national commonality between rules around the use of agrichemicals for wilding conifer management, project managers and operational controllers should be aware at all times of the specific rules and conditions in place for the regions they are working in.
Shapefile	A shapefile is a common geospatial file type compatible with ESRI and other Geographical Information System (GIS) software. It spatially describes data in the shape of points, lines or polygons (areas).
Spray drift	Spray drift is the unintentional diffusion of a pesticide outside the application area, with a possible risk to human health, the environment, or property. Some limited spray drift may occur with ABBA, but this would mostly be insignificant because the amount of herbicide used is low.
Operator	A person who is involved with the control work.
Pilot	A person who operates the flying controls of an aircraft.

APPENDIX 2: NATIONAL WILDING CONIFER PROGRAMME, ROLES AND RESPONSIBILITIES

ROLES	FUNCTIONS
Fund manager As at 2018 include: • Horizons Regional Council • Marlborough District Council • Environment Canterbury • Otago Regional Council • Environment Southland	Fund managers are the regional partnering organisations engaged by funding agreements with the Crown to deliver programmes (under the National Programme), within their regional jurisdictions and in line with agreed management unit (MU) management plans. In managing the key relationships in each region, they ensure all wilding conifer control occurs through MU managers/contractors. They also ensure that high-level health and safety obligations between the parties are addressed. Fund managers have oversight and reporting (in conjunction with MU reporting) responsibility for funding from all funding partners within the region, and they convene the Regional Steering Group to provide cross-agency approval of MU operational plans and implementation. Delegated senior managers within each fund-managing organisation oversee management responsibilities, acting on behalf of the fund manager.
MU manager	An MU manager acts on behalf of the National Programme to ensure that each operation within an MU is planned and conducted appropriately and aligned with the relevant MU operational plan. MU managers are also known as contract managers or project managers through their organisations. They undertake key planning and forecasting for the MU and have oversight of any key risks that may affect logistics or operational activities. Other key tasks include: • engaging and overseeing contractors to deliver control and other operations; • carrying out stakeholder engagement; • communicating with affected landowners; • ensuring data is received from operational teams and entered into the Wilding Conifer Information System (WCIS); and • providing monthly reports to the National Programme. MU managers must be suitably capable and resourced so they can carry out these functions. They are often employees of the fund-managing agencies, but not always. DOC may undertake this role, or a regional council or a Trust. MU managers may manage more than one MU. An MU manager can also be an operational controller (see below).

ROLES	FUNCTIONS
Operational controller	The operational controller is the key person with day-to-day responsibilities for the on-the-ground running of each contract or operation. They ensure the operation follows the MU operational plan and good practice guidance for the method(s) used and that the equipment and materials used are all present and fit for purpose. They are responsible for ensuring health and safety plans are in place and carrying out briefings of all personnel on site. Importantly, they are the field-based 'person conducting a business or undertaking' (PCBU) for each operation and have a co-ordination role for health and safety communications between other PCBUs. Other tasks include: • undertaking pre-operational checks and one-to-one landowner consultation; • confirming that contractors and sub-contractors are trained and fully briefed; and • making sure that accurate data is collected and reported to the MU manager. An operational controller can also be an MU manager (depending on resources available in each region). Designated operational controllers are responsible for recording data in the WCIS, in conjunction with the MU manager.
Contractor	Contractors are independent to the fund managers. Contractors operate commercial enterprises that are awarded contracts for specific work in specific MUs. They undertake all contractual delivery work, under guidance of the MU manager/operational controller. They may be aerial or ground control operators, or both. A contractor may also be an operational controller in certain situations. Note: the New Zealand Defence Force undertakes separate work (for safety purposes) in part of an MU and reports accordingly, and is seen as a contractor even though it is a Crown agency. Where organisations (e.g. DOC) have staff directly delivering on the ground work, they are in effect also a contractor.
Pilot	A person who operates the flying controls of an aircraft.

APPENDIX 3: LEGAL REQUIREMENTS

The key legal requirements for operators using the ABBA method to be aware of are summarised here.

- **Health and Safety at Work Act 2015** – administered by WorkSafe New Zealand, covering matters outlined in section 3.1 of this document.
  - The Health and Safety at Work Act also covers hazardous substances regulations (from December 2017)[5] around the use of agrichemicals in the workplace.
  - An MU operation-specific health and safety plan must be developed and kept on site at all times.
  - WorkSafe New Zealand has approved codes of practice (ACOPs) for various activities, such as the ACOP for Safety and Health in Forestry Operations, which is relevant for wilding conifer control.[6]
- **Hazardous Substances and New Organisms Act 1996 (HSNO Act)** – administered by the Environmental Protection Authority (EPA). The EPA approves all herbicides for use in New Zealand and places conditions such as upper limits on the active ingredient that can be applied. The upper level of active ingredient that can be applied may be higher than is shown on company label claims. The herbicides used for wilding conifers do not exceed the EPA stated upper limits and the EPA does not specify nor approve manufacturer label rates. Regulations under the HSNO Act are largely replaced by the Health and Safety at Work (Hazardous Substances) Regulations 2017, and HSNO controls have been replaced with EPA notices, such as the Hazardous Substances (Hazardous Property Controls) Notice 2017 (EPA, 2017).
- **New Zealand Standard for Management of Agrichemicals (NZS8409:2004)** – a New Zealand Code of Practice approved by the EPA that provides practical and specific guidelines on the safe, responsible and effective use of agrichemicals.[7] The standard is available to agrichemical users through the GROWSAFE training programme. Off-label use of herbicides is permitted. See section C3.2 of the current New Zealand Standard NZS 8409:2004 (Standards New Zealand, 2004).
- **Civil Aviation Authority rules and regulations** – address the shared responsibility for safety and security of all aircraft users and participants involved with aircraft, with numerous standards to meet and maintain.
- **Biosecurity Act 1993** – among many matters, sets out which organisms are declared pests in each region, and allows for authorised persons to be appointed, with a resulting wide range of powers (including entry to places to undertake pest inspections and control, and numerous other powers). Wilding conifers are declared pests in many regions of New Zealand.
- **Resource Management Act 1993** – addresses many environmental management matters (e.g. discharging agrichemicals to air or land) and responsibilities, including the provision of regional water plans and regional air plans developed by regional councils. However, which activities are permitted or non-permitted (requiring resource consent) vary from region to region.

5 Health and Safety at Work (Hazardous Substances) Regulations 2017: http://legislation.govt.nz/regulation/public/2017/0131/28.0/DLM7309401.html

6 https://worksafe.govt.nz/topic-and-industry/forestry/safety-and-health-in-forest-operations/

7 At the time of writing, this standard was under review, as changes to legislation have made parts of it outdated. A streamlined standard needs to be retained to protect people, the environment and food safety. It will simplify the complex legal requirements for the benefit of all stakeholders.

APPENDIX 4: ENVIRONMENTAL INCIDENT RESPONSE AND REPORTING PROCEDURE

Should an environmental incident occur in relation to the National Wilding Conifer Control program operations, the following response and reporting procedure is to be enacted.

An Environmental Incident within the National Wilding Conifer Control Program is considered to have occurred where one or more of the following is observed:

- A single event where over 1 Litre of chemical concentrate or mixed equivalent has been accidently discharged (i.e. distributed outside of control polygon or onto non-target species) into the environment.
- A loss of a threatened species or harm (dieback) to a threatened ecosystem that can be related to control operations is identified.

All environmental incidents observed during control operations are to be notified and assessed within a 48 hour period of being noticed. An environmental incident report is to be complied for each separate incident and these are to be reported in the monthly reporting.

However, where action could be immediately and safely be taken to prevent immediate danger or further harm to people and/or the environment you should ensure that action is being taken to avoid or minimise immediate danger or further harm in conjunction with reporting the situation.

ENVIROMENTAL INCIDENT REPORT CARD

1. Incident Reported by:

2. When did the incident occur? **Day:** **Time:**

3. Where did the incident occur?

4. Type of incident:

- Chemical spill to land,
- Chemical contamination of water,
- Near miss,
- Other? E.g. Cumulative effects i.e. chronic chemical build-up in areas where refuelling often takes place.

5. Cause of incident:

6. The value of any receiving environment:

- Very High (threatened species or ecosystem),
- High (native or productive land),
- Medium (intermixed native or productive species /exotic),
- Low (unproductive exotic).

7. The magnitude (severity) of the incident:

- Severe (large area, or large legacy effect)
- Moderate (partial loss of a population or ecosystem).
- Low (small area or very short temporary effect).

8. Using answers to 6 and 7 above, what is the (actual or potential) environmental impact of the incident (circle):

ENVIRONMENTAL IMPACT	VALUE OF RECEIVING ENVIRONMENT			
	LOW	MEDIUM	HIGH	VERY HIGH
LOW	Very low	Minor	Moderate	High
MODERATE	Minor	Moderate	High	Very High
SEVERE	Moderate	High	Very High	Very High

9. Actions taken to remedy the impact of environmental incident:

Contain:

Clean up:

Restore:

Prevent:

10. Any further actions needing to be taken: