

FIRE AS A LAND MANAGEMENT TOOL:

Land clearing burns

Introduction

Fire is a valuable land management tool, but its use does come with some risk. Knowledge of how to use fire safely will reduce the risk to life, property and the environment and help you achieve the result you want.

While Fire and Emergency New Zealand provides advice and guidance to help ensure controlled burns are completed safely, the person who lights a fire is responsible for ensuring the fire remains safe and is completely extinguished.

Purpose of this guide

In New Zealand fire is commonly used to clear unwanted scrub or vegetation. This is often done to prepare for different land uses or for disease control in the agricultural and horticultural industries.

Land clearing burns are inherently dangerous given the complex nature of the fire environment.

The purpose of the guide is to help landowners:

- safely use fire for land clearing
- plan and execute safe land clearing burns that achieve the desired result.

Every land clearing burn is different with more complex burns requiring fire behaviour knowledge to develop the burn plan. This guide is targeted at a range of land clearing burns, with some details not relevant for smaller fires where safety and values at risk do not justify additional precautions. For more complex controlled burns consider engaging specialist contractor services to manage and perform your burn.

If you have any comments or feedback on this guide, please email riskreduction.integration@fireandemergency.nz.

Guide – Land clearing burns

Contents

Key stages	3
1. Check	4
a. Fire season status and permitting requirements.....	4
b. Territorial authority and regional council requirements	4
c. Advice from Fire and Emergency New Zealand	5
d. Insurance	5
2. Plan	6
a. Safety.....	6
b. Burn plan	8
c. Weather	8
d. Time of year.....	9
e. Time of day.....	9
f. Resources	10
g. Personnel.....	11
h. Communications	12
i. Light-up pattern	12
j. Additional regulatory requirements	13
k. Managing the protection of adjacent values	13
3. Prepare	14
a. Prepare the fuel.....	14
b. Prepare the firebreaks	15
c. Arrange the personnel	16
d. Arrange the light-up and suppression resources	16
4. Do	17
a. Check current fire season status	17
b. Obtain the latest weather forecast	17
c. Notify of intent to burn	18
d. Confirm safety considerations	19
e. Brief personnel on the fire plan including safety elements	19
f. Commence burning.....	21
g. Supervise the fire at all times that it is actively burning.....	22
5. Post-burn	24

Guide – Land clearing burns

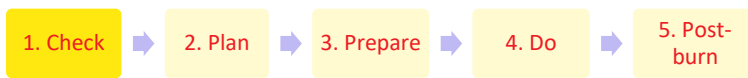
Key stages

There are five key stages to follow to work through when using fire as a land management tool.

Safety of personnel is the highest priority at vegetation fires, and must be considered at every stage of the process.



Guide – Land clearing burns



1. Check

When planning to use fire as a land management tool, the first stage is to check and comply with the legal and administrative requirements of the area where you want to have the burn.

a. Fire season status and permitting requirements

Before you light a fire in open air, you need to find out:

- what the current fire season status is for your area, and
- whether you need a fire permit.

Check the fire season status and permitting requirements in your region using the checkitsalright.nz website.

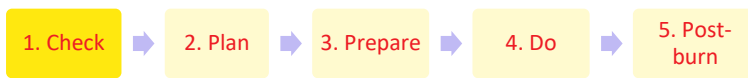
Even with a valid fire permit you are still responsible for the safety of the fire.

b. Territorial authority and regional council requirements

Check with your local territorial authority and regional council about any other restrictions or rules for burning in open air. These could include:

- resource consents for discharge to air and emissions or clearing of vegetation
- smoke management plans
- traffic management plans
- any other relevant bylaws.

Guide – Land clearing burns



c. Advice from Fire and Emergency New Zealand

Contact Fire and Emergency so we know what you are intending and we can provide advice. Even if your burn is in an open fire season, there are still risks when lighting a fire and we are here to help.

Fire and Emergency can provide free advice to help you achieve the result you want safely. Receiving advice does not take away your responsibility for the fire, but use of our expertise can minimise your risk and the adverse consequences of your burn.

Larger burns may take several months to prepare, so it's important to get in touch with us early.

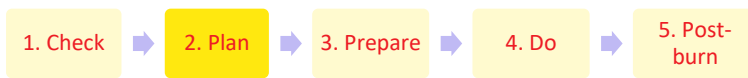
Contact details for your local Fire and Emergency office are available on the fireandemergency.nz website.

d. Insurance

Check with your insurance company exactly what your insurance covers:

- **Insurance of property for loss and replacement from fire:** For your house, household effects, other buildings, vehicles, plant and machinery, forests and crops.
- **Public liability insurance:** To cover the cost of damage and loss to a third party from any fire that escapes from your property and damages other party's property.

Guide – Land clearing burns



2. Plan

Planning is the most important stage when using fire as a land management tool. A good plan will help you to achieve your burn objectives, prevent the escape of your fire, and keep everyone and the environment safe.

a. Safety

Safety of personnel is paramount when using fire as a land management tool. It is crucial that everyone involved has the right skills and understands how the burn will be conducted.

Land clearing burns are the most dangerous type of fires used for land management. To reduce the risks and increase safety, you must have an understanding of:

- How fires burn
- The factors that influence the behaviour of fires
- Hazards and survival
- Protecting yourself and others.

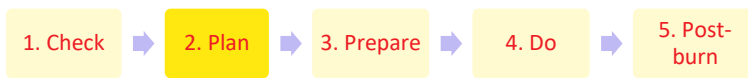
The study guide [Working Safely at Vegetation Fires](#) available on the fireandemergency.nz website covers these areas. This has been produced by Fire and Emergency Training primarily for firefighters, but the concepts listed above apply to anyone working with vegetation fires.

Everyone present is responsible for contributing to their safety and that of others on the site at all times. Having a structure so people know what their role is helps ensure things run smoothly and people know what is expected of them. See [Confirming safety considerations](#) later in this document.

Personal protective clothing is a must. Wear wool or cotton clothing. Do not wear synthetic materials as these can melt and cause severe injuries. Create layers of clothing without tucking in, e.g. trouser legs over boots to prevent embers catching in clothing. Consider equipping personnel with specialised personal protective clothing available from suppliers of safety apparel.

As the person responsible for the burn, you are ultimately responsible for the safety of everyone present. Anyone not involved with the burn must not be allowed within the planned burn area, as well as the surrounding area. Restrict access at locations accessible by the public.

Guide – Land clearing burns



LACES

LACES is an internationally recognised safety system used by firefighters at vegetation fires to protect themselves from being trapped by fires and other fire hazards.

Lookouts

Lookouts should be in a position from which they can see the fire line, the fire itself, and the crews that are working the line. They should be able to recognise and anticipate dangerous situations, and must report changes immediately. The size and complexity of the fire may require more than one lookout. They need to be experienced, and able to recognise dangerous situations.

Awareness and anchor points

Lookouts should watch for changes in the fire's location and behaviour. They should know the plan, so that they can relate it to what they see the crews and the fire is doing. Lookouts should also track the weather by taking readings at regular intervals and watching the sky for tell-tale signs of changes. Everyone must be able to understand what the lookouts are trying to report, however situational awareness is the responsibility of everyone on the fire.

An anchor point is a point to start construction of a fire line that minimises the likelihood of being outflanked by a fire. An example of an anchor point could be a river, road, location without fuels, or using a second crew to produce a line in the opposite direction.

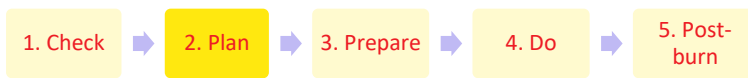
Communications

The person in charge of the fire, crew leaders, and lookouts should have a quick, reliable, and tested way to communicate with others. This may be by direct radio contact, mobile phones, or through a lookout or other relay point. If you plan on using the radio system or mobile phones, have an alternative way to communicate in case the radios or mobile phones fail for any reason. Establish regular reporting times. The communications link down to the individual may be by word of mouth. It can be very noisy at the fire, so as the noise gets louder, the distance between individuals may have to be shortened to ensure adequate communication.

Escape routes

Have at least two planned routes of escape. If your primary route is cut off, know what you are going to do. Every person must know the plan, and what is expected of them. Everyone must also know what will trigger a move to the safety zone. Escape routes should be measured in time to get to safety, not distance to account for variations in terrain and ground cover.

Guide – Land clearing burns



Safety zones

Safety zones are places of refuge; places you can be assured of your safety. Their size is dictated by the fuel, terrain, weather conditions, and worst-case fire behaviour. Some commonly used safety zones include “the black” or burned area, natural features like green meadows, clearings constructed as part of line construction, clear cut blocks, etc. Safety zones should NOT be downwind from the fire; in chimneys, saddles or narrow gullies; in locations that require steep uphill escape routes; or be located near heavy fuel concentrations. The time to get to the safety zone is also critical.

b. Burn plan

For complex land clearing burns, a burn plan must be completed. The burn plan details what, where and when you are burning as well as the mitigations that are in place to help prevent fire escapes.

A [burn plan template](#) is available from Fire and Emergency.

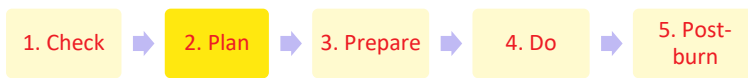
c. Weather

Weather is an important factor to consider when planning your burn. It can change very quickly with the potential to catch you out.

Element	Description
Air temperature	Fuels in a warm environment are pre-heated by the air temperature and the sunlight, drying it out and making ignition easier. Ambient air temperature is measured in °C.
Relative humidity	This is the amount of moisture in the air. When relative humidity is low, fuels dry and ignite easier. Embers remain hot longer and travel further, increasing the risk of spot fires. Wet fuels lose moisture to dry air (i.e. on sunny days). Relative humidity is measured as a percentage.
Wind speed	Wind helps dry out fuels, it directly affects the speed at which a fire spreads and direction the fire will travel. Wind is the element that catches people out the most when they are using fire. Wind speed is recorded in km/hr.
Rainfall	Fuels absorb moisture in continuous rain or high humidity. In short periods of heavy rain, water tends to run off and not be absorbed by fuels. Precipitation is measured in mm.

Technical weather information can be obtained from the fireweather.niwa.co.nz website.

Guide – Land clearing burns



d. Time of year

The best time of year to burn is late summer to early autumn, when the temperatures start to cool and before the autumnal winds start to strengthen and make burning potentially dangerous.

Understand the effects of weather on your local area. What effect will an approaching front have? How does the topography affect wind change? How will this affect the way your fire behaves?

e. Time of day

Weather pattern is important when deciding what time of day to start a burn.

New Zealand wind tends to change direction before 1pm with the majority increasing in force during the morning, reaching a maximum sometime after midday. The change in force is at times quite sudden.

You need to be familiar with your local and regional weather patterns. Fire generally burns quickly during mid-afternoon when relative humidity is low and the temperature is higher. In some environments, winds shift or increase during the day. Examples of this are:

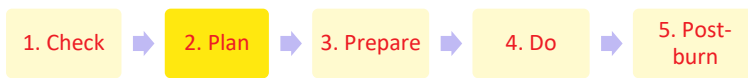
- coastal areas – the onshore coastal breezes arrive most afternoons
- hilly or mountainous areas – cool katabatic winds push down valley systems in the evening.

There are situations where an early burn is acceptable:

- Where Fire and Emergency approves and notes it in the fire conditions on the fire permit
- Where the area to be burned is completely surrounded by non-combustible materials
- Where a safety burn is required to widen a firebreak, but only after a risk assessment has been completed.

Generally, you must only light-up during daylight hours. Exceptions to this rule may apply to forest skid fires lit in locations away from public roads in late autumn or winter.

Guide – Land clearing burns



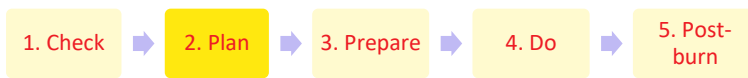
f. Resources

Think about the resources you will require for preparation, lighting-up and fire suppression. The amount required depends on the size and complexity of the fire.

You will need the following resources, depending on the size of the burn:

- communications equipment for all personnel – radios are preferred over mobile phones
- lighting-up equipment – e.g. lighter, gas torch, drip torch, aerial burners
- hand tools for firefighting – e.g. shovels, Pulaski tools, chainsaws, portable extinguishers
- ground firefighting – e.g. fire engines, water carriers, hoses
- aerial firefighting – e.g. helicopters, fixed wing, portable dams. Helicopters are to supply their own buckets and foam injection kits.
- water supplies – location and distance away from the burn, accessibility, volume
- sprinklers – an effective tool to protect areas, widen firebreaks and to dampen down hot areas
- first aid kit, and where wasps may be present, adrenalin kit as wasps can become aggressive at fires
- other resources – e.g. bulldozers, excavators, tractors, engines, tankers, patrol vehicles, personnel transport
- food and drinking water.

Guide – Land clearing burns



g. Personnel

Your personnel need the skills, competency and personal protective equipment to carry out the burn, based on its complexity. For complex controlled burns consider engaging specialised contractor services to manage and perform your burn.

Determine the number of personnel required, considering the size of the burn, in particular:

- the length of the burn perimeter
- the light-up pattern and length of any lines to be lit
- be guided by advice from Fire and Emergency.

The appropriate qualified first aiders should be on site along with specialist anaphylactic trained person(s) with adrenalin kits where wasps may be present.

All personnel need to be in constant contact with at least one other person during the burn. Whenever they are working near the fire, they need to be within line-of-sight of a buddy.

The rule for the buddy system is that you work as a pair – entering, working and leaving the burn off area together.

The purpose of the buddy system is that you look out for one another, maintain contact all the time and if that contact is lost, the buddy must take immediate action to re-establish contact or call for help.

For large burns, personnel are generally split into patrol and lighting party groups.

Patrols

A patrol's job is to monitor the perimeter of the fire to ensure it does not escape, respond to any break-away fires, and notify managers of break-away fires.

You will need enough patrols to:

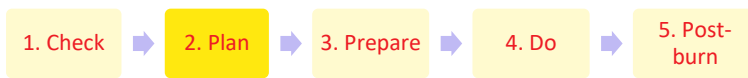
- keep a close watch along the length of the boundary
- allow each member to have ready visual and vocal contact with those on either side – this is vital should a call come for assistance to cope with break-away fire
- have escape routes and safety zones and make them known to all personnel.

Lighting party

When organising the number of people for the lighting party, consider the:

- length of the light-up line
- ease or difficulty with which the people can move along it, i.e. terrain.

Guide – Land clearing burns



h. Communications

Communications are critical in every planned burn. It is vital that all personnel involved have visual and vocal contact with at least one, preferably two, other members. One person must be in charge for the entire burn.

It's essential to communicate any changes to the fire to all personnel on site to ensure safety of the resources and surrounding public and to be able to respond to break-outs or spot fires outside the burn perimeter.

i. Light-up pattern

Land-clearing

There are a number of light-up patterns that can be used for land-clearing burns. The selection of the right pattern to use depends on the specific environment for your burn, including the terrain, vegetation and the weather conditions of the day of the burn. This requires specialised knowledge of fire behaviour and experience in burn planning.

If applicable, create an isolated area as a small test fire to light first so as to determine the fire behaviour and use to decide whether to light the larger portion.

For complex controlled burns, seek professional help or contact Fire and Emergency.

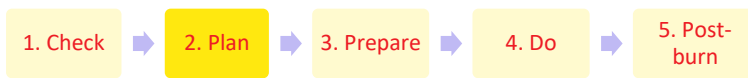
Windrows

Windrowing is the heaping of combustible fuel into rows, with spaces of non-combustible material in between.

When using windrows:

- Light each windrow along its length. Only light the first third of a windrow to start with and see how the burn progresses.
- When windrows are on a slope, light from the top (upslope) and work downhill.
- Where windrows are on flat ground start at the downwind end.
- Once started, windrows are difficult to extinguish. Retain control by:
 - burning into the wind or downslope
 - burning only a few windrows at a time
 - having a digger or other equipment on hand to create a break in a windrow if it's required to stop it burning.

Guide – Land clearing burns



j. Additional regulatory requirements

There may be a number of regulatory requirements that you need to conform with. Go to the checkitsalright.nz website to see what Fire and Emergency's rules are for your area. Check with your district and regional councils directly to see if there are any regulatory requirements that apply to your situation.

Prepare the plans and apply for any consents or other authorisations that are required, for example:

- Resource consent for discharge to air
- Traffic management plan approval if your fire is likely to create a smoke hazard for public road users, including setting out warning signs on the day of the burn.
- Apply for the fire permit, if required.

k. Managing the protection of adjacent values

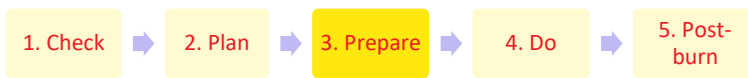
Think about where you want to have the fire. If your burn is going to be on or near a boundary that is close to high-value commercial plantations, crops, areas of public conservation land or other farm infrastructure, you should advise your neighbours.

Also be aware of other national infrastructure utilities that are present:

- Mobile phone towers
- Power lines – smoke across power lines can cause arcing which greatly increases the risk of escaped fires
- Roads and other public access ways across your land or that may be close to your burn or affected by smoke drift.

You should consider using specialist structure fire protection contractors and equipment if the burn is to be near high-value assets such as buildings.

Guide – Land clearing burns



3. Prepare

Once the plans are in place, there are several preparation steps to perform before you can light-up.

a. Prepare the fuel

Give your vegetation plenty of time to dry out. The majority of sap is water. Windrowing or spraying vegetation with chemical spray and leaving it for up to six months will allow it to dry out and give you a much better burn.

If possible, prepare the burn site in the spring and burn in the autumn. This gives the vegetation plenty of time to dry over the summer months and will produce a good clean burn, reducing the likelihood of fire escaping. Once vegetation is dry it takes longer to regain the moisture making autumn a good time to burn.

Ensure there is no debris piled on the outside of the firebreak.

Within the burn-off area, ensure there are no large piles of slash on the edge of the fire as this will create high intensity fire near the perimeter of the burn area, which could pose a risk to nearby properties or fuel sources.

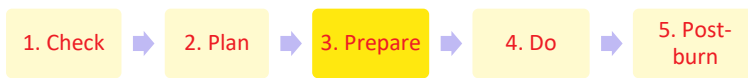
Place large material in the centre of the burn area to ensure the boundary of the fire isn't compromised.

If using piles or windrows for burning, stack or heap the fuel.

Piles

- If you are using a contractor for tree trimming or stacking your piles, discuss with them prior to trimming the best location of the tree trimmings to be piled.
- Stack your piles according in accordance with good burning practices. It is easier to manage a number of smaller piles than one large pile.
- Ensure trimmings are at least 30-50m away and on the downwind side of any shelter belt, trees, fences, buildings or other combustible material.
- Ensure smoke will not create a nuisance to neighbouring properties and public roads.
- Ensure there a cleared space around each pile to act as a firebreak.
- Avoid piling heaps for burning under or close to power lines as smoke can cause arcing and power outages.

Guide – Land clearing burns



Windrows

- Windrows should be at least 50m away from any other combustible material. Windrows tend to have a large quantity of medium to heavy fuels, so the distance is required to reduce the effects of radiant heat on surrounding combustible fuels, and to ensure embers aren't transferred outside the burn area. The separation distance means the fire can't transfer from one windrow to another, allowing you to retain control of it.
- Make sure your windrows are free of soil as this will assist in the drying of the vegetation and the burning of the rows. Windrows with lots of soil will cause the fire to smoulder, creating a low intensity burn with lots of smoke and a lot of left-over material. The soil also assists in holding the heat, which can make it difficult to manage the fire and can result in flare ups later.

b. Prepare the firebreaks

A firebreak's main function is to break the continuity of the fuel to provide a barrier against the spread of fire. For large land clearing burns, they also provide:

- a place to light-up from
- access for crew and equipment to deal with spot fires across the break
- a safety zone and escape route for the crews.

Firebreaks are normally unable to contain a fast running fire, but they serve as a break to continuous fuel and act as a tactical barrier to fight the fire from and to carry out patrols. There are several different types of firebreaks, use the appropriate type for the burn location.

Mechanical firebreak

Use earth-moving machinery to clear a perimeter line of vegetation growth down to mineral earth.

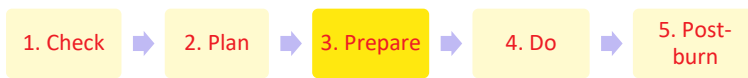
In hilly country, form firebreaks along spurs and ridges, where they are most effective and easily constructed.

Note: You may need a resource consent from your district council to undertake earthworks for large fire breaks or on erosion-prone land.

Burnt firebreak

Burnt firebreaks are usually carried out in conjunction with a man-made firebreak, natural barrier such as a road or track, watercourse or hand-cut firebreak. In general, the fire is lit in a single strip and then allowed to 'back slowly' into the wind to create a wide strip of burnt fuel to act as a firebreak. This is usually performed by helicopter, rather than people walking through unburnt fuel.

Guide – Land clearing burns



How wide should my firebreak be?

The fire environment factors of topography, weather and fuel must be considered when determining the width of your firebreaks. Your local Rural Fire Officer can provide advice on how wide they should be.

The use of the SCION Fire Behaviour Toolkit will also assist you to calculate the width for firebreaks.

A firebreak must not have any fuel present in it. Firebreaks may consist of a dozed mineral earth track, green grassy paddock, river, road or other similar non-combustible features.

Consider the provision of safety zones for personnel to retreat to if circumstances become dangerous while burning and also create turn around areas for patrol vehicles and tankers, etc. to turn safely.

Ensure that the outside of the firebreak is clear of debris, otherwise this creates nests of material for embers to catch in and spread the fire outside of the burn area.

c. Arrange the personnel

Ensure you have the personnel required available for the day of the burn. One person must be in charge for the entire burn with a chain of command or responsibility leading up to that person.

Make sure that everyone has access to the correct clothing:

- Natural fibre clothing, such as cotton or wool. Synthetic materials can melt and cause severe injuries.
- Fire resistant overalls are preferred to ensure that legs, arms and head are covered.
- Sturdy laced up leather boots, ideally with a steel cap.
- Heavy leather gloves to protect hands when working close to the fire.
- Safety helmet for all personnel at land clearing burns where hazards exist such as heavy machinery, helicopters, forestry areas and falling rocks.

For large burns, crews are generally split into patrol and lighting party groups.

Grouping and placement

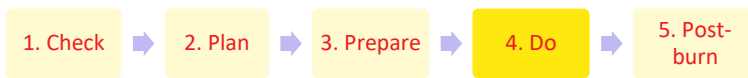
The lighting party and the patrols need to function as a cohesive unit.

- No individual can be allowed to work without being in contact of at least one other person
- The lighting party must be under strict control during all stages of the burn
- Each burner operator should have a support person with them.

d. Arrange the light-up and suppression resources

Ensure you have the resources that you identified during planning on hand including communications and lighting-up equipment, firefighting tools, clean water supply, first aid kits, and any other resources..

Guide – Land clearing burns



4. Do

On the day of the burn, there are several tasks that must be performed, other than just lighting-up. If your burn required a fire permit, follow the standard and any special conditions of that permit.

a. Check current fire season status

Check the checkitsalright.nz website to check:

- the current fire season status
- the rules around the fire season status
- there are no temporary prohibitions in place
- there is no prohibited fire season.

The notification of a temporary prohibition or a prohibited fire season prevents the lighting of fires in the affected area and suspends all existing fire permits. It is possible to obtain permits for fires during a temporary prohibition or affected fire season, but applications must be assessed against special criteria.

b. Obtain the latest weather forecast

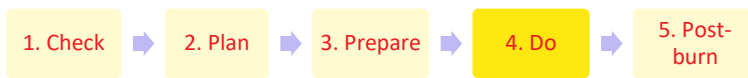
It is important to obtain the latest weather forecast for the area in the morning. You need a current and long range forecast, obtained no more than 12 hours before light-up.

Do not light-up if:

- there are strong winds or when strong winds are predicted. Generally, fires should not be lit with a wind greater than 25km/h (small branches are moved). Your permit may specify a maximum wind speed.
- smoke drift from the fire could cause nuisance to nearby towns, residences or compromise traffic safety on roads.
- the wind is blowing towards adjacent forestry blocks, public conservation land, buildings, or other sensitive environments.

Continue monitoring the weather forecast during the day and change your plans to suit the weather.

Guide – Land clearing burns



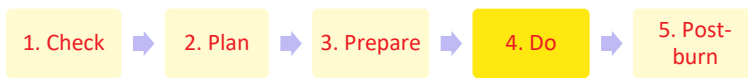
c. Notify of intent to burn

Notify the people you have identified and contacted during the planning phase as needing to be aware of the burn, including:

- All occupiers of land adjoining the land containing the area to be burnt
- Fire and Emergency communication centre so that they are aware of the burn taking place if members of the public call to notify of fire or smoke
- Helicopter operator on standby for fighting any escaped fire, where appropriate.

Follow the details of the traffic management plan, if one has been created.

Guide – Land clearing burns



d. Confirm safety considerations

Safety considerations should have already been determined during the planning and preparation phases. Confirm that these are still valid and are in place.

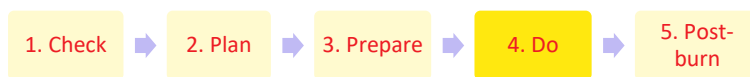
Establish LACES. See [Safety](#) earlier in this document.

e. Brief personnel on the fire plan including safety elements

A good briefing to all personnel helps avoid accidents. The briefing should cover:

- relevant details of the burn plan, including the light-up pattern
- what is required from the crew
- the key safety messages below.

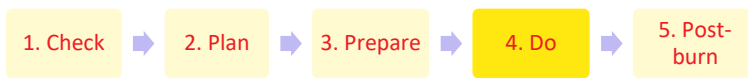
Guide – Land clearing burns



Key safety messages

- The rule for the **buddy system** is that you work as a pair – entering, working and leaving the fireground together. The purpose of the buddy system is that you look out for one another, maintain contact all the time and if that contact is lost, the buddy must take immediate action to re-establish contact, provide assistance or call for help.
- Be aware of the location of your **safety zone** and ensure they have two options for an escape route to the safety zone. Where possible all personnel should walk or drive the safety zones and escape routes to familiarise themselves.
- It's essential to **communicate any changes to the fire to all personnel** on site to ensure safety of the resources and surrounding public and to be able to respond to break-outs or spot fires from outside the burn perimeter. Check that your communications equipment is working correctly.
- **Before entering the fireground** ensure you are wearing all your personal safety equipment and that you have adequate drinking water. **Do NOT let anyone participate without appropriate personal safety equipment.**
- **Don't tuck clothing in**, create layers so hot material you come into contact with doesn't catch in your clothing. For example, don't tuck the bottom of trousers into socks, let the trouser leg fall over the outside of your boot. When working close to the fire, use heavy leather gloves to protect your hands from radiant heat and hot material.
- Make sure you get a **full briefing**.
- Remember to **ask questions** if things are not clear to you.
- **Fire intensity** increases abruptly when two fires burn together and the increase is greater when fires converge along a line rather than at a point.
- It takes a **disciplined ignition crew** to recognise that some ignition patterns require considerable patience and that it's wiser not to force the fire, but allow it to develop and achieve the fire behaviour sought for the burn.
- **Keep a close eye** on the fire and alert your crew leader to any changes or fire behaviour that was not predicted.
- **Successful management of a heading fire** requires that no individual strip of fire can develop to a high intensity before it reaches either a firebreak or another burned out strip.
- **Be aware** that a large number of small fires burning simultaneously can produce the same kind of explosive convective energy as a single large fire because too much heat energy is released too rapidly.
- When working around fire never underestimate **the effects of radiant heat**. The damaging effect of heat on your body builds up with the more time spent working in the heat.
- Know your **dangerous situation watchouts** (see below) and LACES.

Guide – Land clearing burns



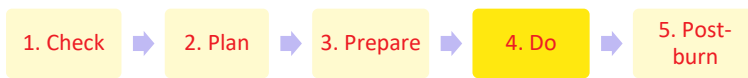
Possible dangerous situations to watch out for

1. Fire size is unknown
2. Unfamiliar territory
3. No escape route
4. Don't know the local weather
5. No communications
6. Instructions are not clear
7. Getting hotter
8. Wind changes speed or direction
9. Building fireline downhill with fire below
10. Uphill or downwind of a fire
11. On a steep slope
12. In rugged terrain
13. Can't see the fire
14. In unburnt vegetation
15. Walking through hot ashes
16. Working alone
17. Getting tired
18. Near powerlines
19. Working with machinery
20. Working with aircraft
21. Working around trees or spars
22. Working near fast-moving water.

f. Commence burning

- Only burn during daylight hours (exceptions may apply to forest skid fires).
- Follow the burn plan light-up pattern.
- Burn downwind of anything flammable outside of the perimeter.
- Do not allow anyone to light-up:
 - while moving uphill or up valley or gully bottoms
 - alone or out of touch with other members of the crew
 - without the right personal safety equipment.

Guide – Land clearing burns

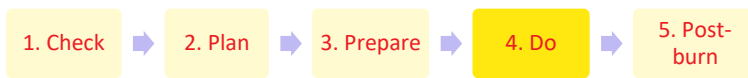


g. Supervise the fire at all times that it is actively burning

- Make the escape routes and safety zones known to all personnel
- Post lookouts where there is possible danger
- Be prepared to respond to changing weather conditions or fire behaviour and if necessary and it is safe to do so, shut down the burn if a natural or mechanical break exists. Otherwise continue to follow the burn plan
- Patrol and observe the adjoining land outside of the perimeter for spot fires
- Rapidly suppress any spot fires outside of the perimeter, if it is safe to do so
- In the event of a sudden flare up or flame across a break, lie flat on the ground rather than running
- Maintain patrols until the fire is out

Call 111 immediately if at any point you are concerned about a risk to people, property, or the environment.

Guide – Land clearing burns



Greatest danger

The greatest danger exists along the perimeter firebreak where it has been freshly lit, bordering on flammable fuel outside the burn.

Patrols must be in greatest number behind the lighting party, stationed on the cleared firebreak area, and as the line of fire lengthens they spread out along the length of the boundary.

If the burn happens to be on the lee edge of the area being burnt, there is even more reason for patrols to be close together because smoke blowing over them will restrict their visibility.

If flames come across a firebreak

In the event of flames across a firebreak, the patrols must understand that the safest place if they cannot use the predetermined escape routes is on the ground, away from unburnt fuel. They should throw themselves flat, protect their face with a shovel, and **do not** remain upright. This way, not only will they avoid injury from burning but once the flurry of flame has passed, will be in a position to see and attack any fires that it may have caused on the other side of the firebreak.

As the fire burns back from the boundary edge and it becomes safer, the patrols move forward and close up, reducing the spacing between themselves along those parts of the boundary where the most danger of fire crossing exists.

Do not watch the burn

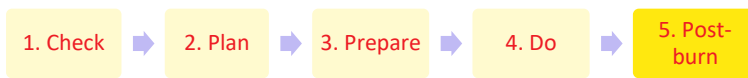
It's important that patrols position themselves with their backs to the area being burnt. It is in our nature to stare at a fire, but this must be resisted otherwise there is the chance of getting into a trance-like state and failing to spot changing conditions or spot fires. However, always maintain good situational awareness of where the fire is.

Keep a strict watch on the fuel **outside** the burn area, to ensure spot fires do not get a good hold before they are detected.

If they are noticed immediately they can be dealt with before they get out of hand.

If the fire escapes, aggressively attack if it is safe to do so.

Guide – Land clearing burns



5. Post-burn

After the burn is complete, check the burn in the days and weeks following burning to ensure it's completely out and cannot escape.

When strong winds occur it can fan the fire back into life and transfer embers, creating unwanted fires. Piles of burnt vegetation can hold heat for months after burning.

Check piles or windrows in the days and weeks following burning to ensure it is cold in the centre. Turn piles or windrows to ensure complete burning of the material.

Do not restock any piles with fresh fuel for a later burn as there is the risk of the fire reigniting.

Further information

More information including tools and resources on how to safely use fire as a land management tool is available from:

- the Fire and Emergency website at fireandemergency.nz
- your local Rural Fire Officer
- the Fire and Emergency call centre 0800 FIRE INFO (0800 347 346).