



A Landowners Guide to Land Clearing by Prescribed Burning



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Disclaimer: Whilst every precaution has been taken in the preparation of this booklet, the National Rural Fire Authority accepts no liability for omissions or failure to follow or modify any of the information contained herein.

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Introduction

Why write about prescribed burning?

Fire has long been accepted as an aid in clearing land, and it is still an efficient and economical way of doing so, provided it is contained within the area to be burnt and does not present any danger to life, neighbouring property or the environment.

Who is this booklet for?

This booklet aims to help farmers and other rural landowners to make effective and safe burns.

What information does it cover?

We outline the legal requirements, discuss planning, describe land preparation, burning techniques and safety issues.

This booklet is produced by the National Rural Fire Authority (NRFA). The NRFA is set up under the Fire Service Act and is authorised to coordinate and support the work of approximately 100 Rural Fire Authorities that have local responsibility for fire control in rural areas.



Our Mission Statement is:

***Partners in responsible
fire management.***

You can find out more about us at:

www.nrfa.org.nz

Rural Fire Authorities (RFA)

RFAs are autonomous organisations that accept the responsibility for the prevention, restriction, detection and suppression of vegetation fires that occur within their designated area.

Types of RFA

The 4 types of RFA are:

- State areas, the majority of which are DoC land - and are administered by the Department of Conservation
- Rural Fire Districts made up of the NZ Defence Force
- Rural Fire Districts - made up of Rural Fire District Committees
- Territorial Areas (e.g. Local Authority) - responsible for the balance of the land not covered by the first 3 types of RFA and Urban Fire Districts

Talk to your RFO

RFAs each appoint rural fire officers (RFOs) including a Principal Rural Fire Officer (PRFO) for their area and prescribe restrictions on the use of fire.

NZ Fire Service

The NZ Fire Service is the urban fire authority responsible for all fires within the gazetted urban Fire Districts - including land used mainly for commercial, industrial and residential purposes. They don't usually cover rural land.

Rural Fire Authorities (RFA)

RFAs and the NZFS

The NZ Fire Service focus on fires in urban areas, while RFAs focus mainly on the control of vegetation fires in rural areas.

RFAs also carry out fire prevention measures by monitoring the fire danger, declaring fire seasons and issuing fire permits.

Which authority is responsible for a specific land area?

To find out which Rural Authority is responsible for a specific area, contact:

- The territorial authority, (eg. your local body authority)
- Your local Rural Fire Committee
- The Department of Conservation
- The National Rural Fire Authority; (website www.nrfa.org.nz)
- The NZ Fire Service

The NRFA web page lists the RFAs nationally and their contact details.

Specific RFA websites may also tell you details of their Principal Rural Fire Officer (PRFO) and fire season as well as their fire permit requirements.

For State areas (eg DoC) that are not in a rural fire district a permit is required throughout the year to light a fire within 1.0 km of their boundary.

Why check about fire permits?

Fire behaviour is very difficult to predict. Even the smoke from a simple rubbish burn near a road can block visibility, take motorists by surprise, and result in serious accidents.

The fire permit process provides you, as the landowner, with the support of rural fire expertise in fire management. It's logical and practical to take advantage of this expertise.

This does not take away your responsibility for the fire, but making use of this expertise does minimise your risk exposure.

Ignorance isn't a defence against prosecution. You may be liable for fire fighting costs incurred or for damage caused by a fire lit by you. **It's important to have adequate public liability insurance, as well as fire suppression insurance.**

A permit does not absolve you of responsibility.

Escaped fires have cost individuals between \$1000 and \$250,000 in fire fighting costs - carry appropriate insurance including Forest and Rural Fires Act fire suppression cover.

Always dial 111 and ask for the Fire Service.

Telecom transfers the 111 call to the Fire Service Control Room Operator who takes details of the fire and location and dispatches the firefighters. Usually the nearest Fire Service Brigade responds and if appropriate, the relevant RFA also responds.

***If a fire gets out of control who do I contact for help?
Always dial 111 and ask for the Fire Service***

Doing a prescribed burn? PLAN AHEAD!

The steps you need to follow depend on when, where and how much you want to burn.

First step...

Your first step is to discuss your plans with the Rural Fire Officer responsible.

1. Find out which Rural Fire Authority has jurisdiction over the area concerned.
2. Talk to the Rural Fire Officer.

Larger burns may take several months to prepare, so talk to your RFO early (eg in the autumn for a large burn the following spring or early summer).



1. Check the fire season status (Open, Restricted or Prohibited - see inside front cover).
2. If the fire season is Restricted, talk to your RFO about a fire permit.
3. Ask your local authority about any other resource requirements, eg Resource consent for smoke emissions, clearance of vegetation etc.

For small rubbish fires...

For larger land clearing burns

1. For larger burns you may need to prepare a **burn plan** to be checked and approved by your RFA prior to permit issue. Although your RFO can advise on this, you will need to complete the burn plan yourself.
2. If required, prepare vegetation for burning.
3. Advise all neighbouring landowners of any land-clearing burns being undertaken.

For complex land clearing burns

- Plan well in advance
- Contact your PRFO or RFO early
- Give yourself time for pre-burn preparation
- You and /or your RFO may need to do an inspection of the area to be burnt, plan well ahead so you give yourself time for this

Burn plans

A burn plan takes into account factors like the topography, fuel types and climate conditions of the area to be cleared. It identifies the safest and most efficient way to carry out a prescribed burn.

It describes the most appropriate ignition patterns, subdivisions and the firebreaks required.



Factors to consider

- Consider **wind direction** and adjacent land to be protected - wind is probably the most important single factor affecting a prescribed burn
- Consider where **firebreaks** are necessary - to contain the fire within set boundaries and provide escape routes (It's accepted that firebreaks will not, unless very wide, stop a running fire)
- Consider the **lighting up pattern** - this needs to be shown clearly on the burn plan using the A-B-C system
- Consider the best **light up time**
- Consider **personnel requirements** - firstly their **personal safety**, then other factors like burn size, fuel type and adjoining assets at risk

**Discuss these essential points with your PRFO
on an inspection.**

Wind direction

Winds and their influence on planning

Make the decision regarding wind direction early because it influences:

- The provision and placing of firebreaks and consequently determines the lighting-up pattern
- The placing of firebreaks

Include wind direction and strength in the burn plan.

e.g. Any wind NE through to SE, up to strength 3-4 on the Beaufort Scale.

State wind directions which would preclude burning, often N or NW.

Other fire weather factors (e.g. Fire Weather Index) are available through your RFA.













Factors to consider

- Strong winds, low humidity and dry fuels spell danger, especially if they precede a frontal change
- It's essential to obtain a long range weather forecast prior to a burn
- It's important to obtain a weather forecast for the 24 hours before and after light up

The web provides access to a network of meteorological data. You can access this information through the NRFA website www.nrfa.org.nz or at www.metservice.co.nz

The Beaufort Scale:

An internationally accepted method for describing wind strength.

Wind strength	Wind strength (as with slope) has a significant influence on the direction in which the fire will travel, the rate of fire spread (ROS), and fire intensity.													
Beaufort	Average Speed kms/hr	10	20	30	40	50	60	70	80	90	100	110	120	Observable
0 = calm	<1													Calm, smoke rises vertically
1 = light air	1-5													Direction of wind indicated by smoke drift, but not by wind vanes
2 = slight breeze	6-11													Wind felt on face; leaves rustle; ordinary vane moved by wind
3 = gentle breeze	12-19													Leaves and small twigs in constant motion; wind extends light flag
4 = moderate breeze	20-28													Raises dust and loose paper; small branches moved
5 = fresh breeze	29-38													Small trees in leaf begin to sway; wavelets form on inland waters
6 = strong breeze	39-49													Large branches in motion; whistling heard in telegraph wire; umbrellas used with difficulty
7 = near gale	50-61													Whole trees in motion; inconvenience felt when walking against the wind
8 = gale	62-74													Breaks twigs off trees; generally impedes progress
9 = strong gale	75-88													Slight structural damage (TV aerials and tiles removed)
10 = storm	89-102													Trees uprooted; considerable structural damage occurs
11 = violent storm	103-117													Widespread damage
12 = hurricane	118+													
Beaufort	kms/hr	10	20	30	40	50	60	70	80	90	100	110	120	

Firebreaks are excellent escape routes

Firebreaks - their influence on planning

Many fires escape from land clearing burns because of inadequate firebreaks.

The fire breaks' main function is to break the continuity of the fuel, and provide:

- A convenient place to light up from; and
- Access for people and equipment to deal with spot fires across the break

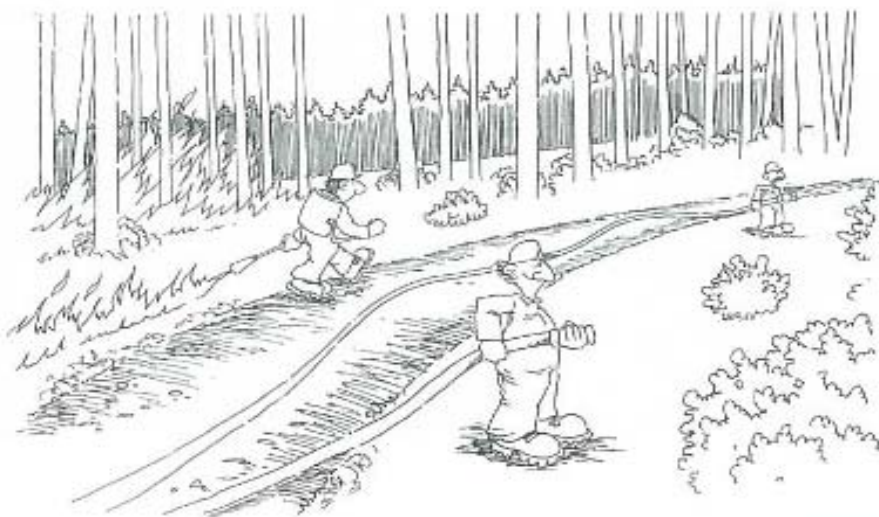
Factors to consider

When preparing your burn plan, and planning the position and width of firebreaks, consider:

- Topography
- Prevailing fire weather and conditions
- Adjoining vegetation and assets at risk
- Fuels to be burnt and the light-up pattern

When do we form firebreaks?

Firebreaks may be formed any time after the burning pattern has been established.



Forming fire breaks

How do we form a firebreak?

- Where mechanical firebreaking is not an option, consider - burning in firebreaks, hand cutting or use of chemicals
- Cut firebreaks to mineral earth - generally a minimum of 5m of mineral earth or non-combustible material pushing debris to the outer edge (away from the fire)
- Clear hand - cut breaks of all flammable material
- Form a minimum width of one blade (5 metres) - ranging up to 20m in some situations
- In hilly country, form firebreaks along spurs and ridges, where they are most effective and easily constructed

Burning back a safety strip



Fire breaks and Subdivisions

Subdivision of larger area

Where **resources are limited** larger areas may need to be subdivided into smaller, more manageable units. The lines cut to subdivide the area are essentially additional firebreaks.

In **hilly or broken country** natural features such as complete gullies or small valleys may be isolated by ridge top breaks into individual units for easy control.

These ridge top breaks should ideally, be located slightly below the ridge on the opposite side to the burning area. But often, for reasons of economy, they are placed on the ridge top.

Access Tracks

At the same time as the firebreaking and subdivision are done, any necessary access tracks along the gully or valley floors should be cut.

These are often needed to facilitate lighting, which must be done from the top of the gully or valley down, never in the reverse direction.

It's important that both sides of a gully or valley are burnt simultaneously, for if one side only is done it will inevitably lead to sparks being carried across and starting spot fires on the opposite one.

You may need a resource consent from your District Council to undertake earthworks for large burns.

Consider time of year

Time of year - influence on planning

This depends on the state of the fuel to be burnt and the incidence of good burning weather.

It's important to balance fire danger conditions with suitable conditions to complete a satisfactory burn.

Best time of YEAR to burn

In damper areas

Burning may be confined to the driest months January, February and March.

Prepared Fuel or Dry Climates

Where the fuel has been felled or crushed to increase its flammability and where there has been prevalent warm dry weather, burning may be best done in March or April, when less hazardous conditions usually prevail.

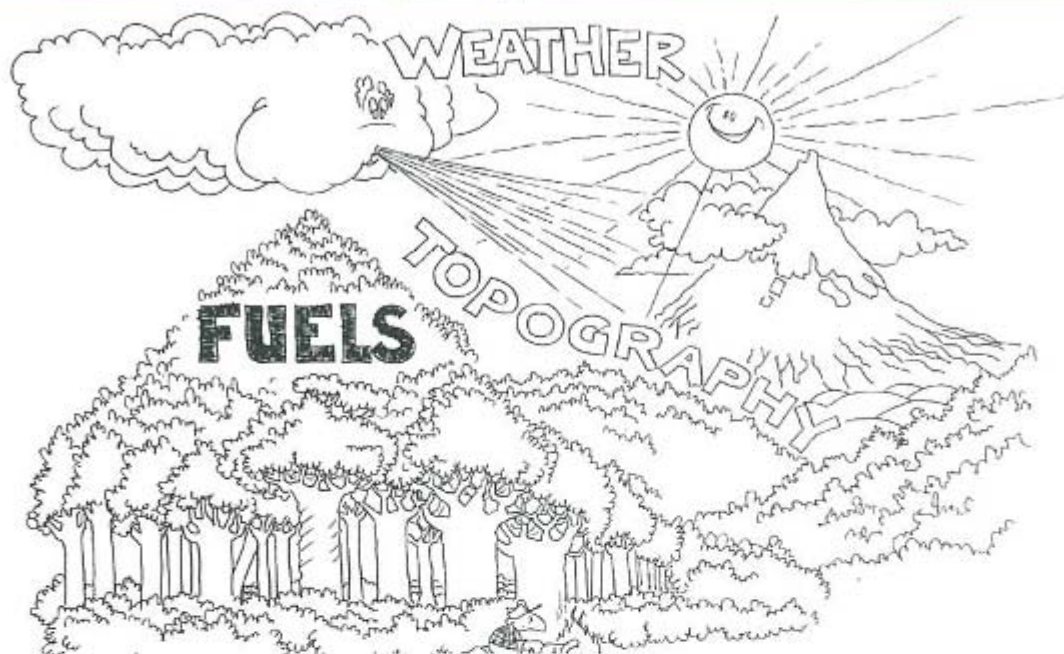
It's often necessary to take advantage of suitable weather as it occurs - striking a balance between obtaining a clean burn and keeping the hazard of burning within manageable bounds.

Factors to consider

Weed Control

If the burn can be deferred until after the annual weeds have appeared they can largely be eliminated and the area left comparatively clear over the winter months.

Consider time of day



Factors to consider

New Zealand weather records show that over 50% of the winds recorded at 9am change direction before 1pm with the majority increasing in force during the morning, reaching a maximum some time after midday. The change in force is at times quite sudden.

Time of day - influence on planning

This weather pattern is important in deciding what time of day to start a burn.

For example:

Bill wakes to good conditions and starts his burn at 9am, with sufficient resources for the current conditions. At 10 or 11 am, his early start fire is beginning to burn well. About 11 am, a break-away fire occurs. The wind changes about 11 am, reaching its peak in force about 3 pm.

Bill and his crew under-estimated the day's potential hazards and the crew is in trouble with perhaps 3 or 4 hours of worsening conditions ahead.

Consider time of day

Time of day - influence on planning

By choosing to start after 1300 hours, you can avoid the risks of this situation. This is why it is important to delay your burn until you see how the day is going to turn out.

You then have the opportunity to decide whether or not to carry out the job depending on the degree of hazard that has developed. And should you start your burn and run into trouble, you can look forward to easier conditions towards evening.

There are situations where an early burn is acceptable:

- Where the RFA approves and notes it in the fire conditions
- Where the area to be burned is completely surrounded by non-combustible materials
- Where a safety burn is required to widen a fire break - when “dew” may be present

Crew Organisation

Lack of attention to organisation can substantially reduce the effectiveness of the burn and waste the money, effort and time spent. If there is any possibility of damage to neighbouring property, your costs can increase dramatically.

Skilled Crew

Unless the proposed burn is in a safe area, a number of people will be needed to complete the operation safely.

Most RFAs will recommend a minimum of 3 people - but there should always be 2. It is NOT a safe practice to carry out a burn alone.

If your property lies adjacent to forestry companies, help may well be available from the forest owners.

As a private landowner, help may be sought from neighbours.

Crew Safety

Good **briefing** on the pattern the burn is to take and what is required from the crew helps avoid accidents.

Protection from accidents can be provided by attention to correct dress: working boots, head cover, preferably brimless and close fitting, and long woollen trousers with a long sleeved woollen shirt, but preferably FIRE RESISTANT OVERALLS.

Under no circumstances wear synthetic clothing.

Crew Organisation

Crew numbers

Determine these numbers accurately, consider the size of the burn being undertaken, in particular:

- The length of the boundary adjacent to flammable fuel outside the burn area
- The pattern of lighting up and length of line to be lit
- Be guided by the RFA requirements

The crews will generally be divided into two distinct groups: patrols and lighting party.

Patrols

Have 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

Time spent on thinking through your organisation is time well spent.

Crew Organisation

Lighting Party

Any breaks in the continuity of the lighting-up can at certain stages of the burn increase the hazard considerably.

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

- The length of light-up line
- The ease or difficulty with which the people can move along it

Grouping and placing of people

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

- No one individual can be allowed to work out of contact with the rest
- The lighting-up party must be under strict control during all stages of the burn
- Each burner operator should have a support person with him

Crew Safety

The safety and welfare of the crew is paramount.

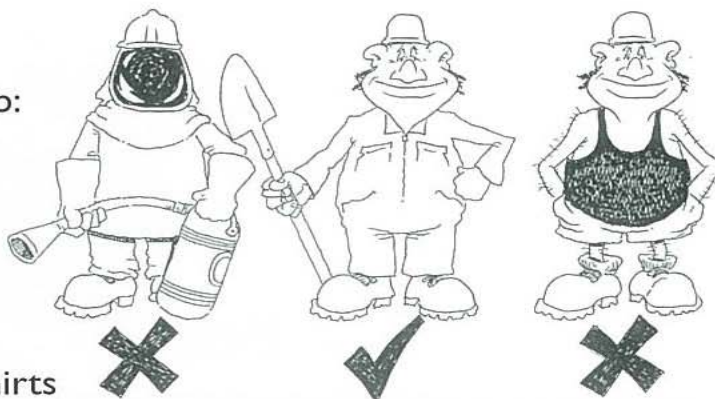
Dress

Ensure all personnel are properly dressed for the job:

- Working boots
- Fire resistant overalls
- Hard hat

If these are not available:

- Woollen long trousers
- Woollen long-sleeved shirts
- Hat, preferably close fitting + brimless



Following these guidelines will help ensure their safety.

Crew Safety

Wool vs. Cotton

Woollen clothing will absorb the effect of sparks without burning and will protect the skin from heat.

Cotton clothing will not give the same protection, nor will it stand the rough usage clothing is often subject to at burns.

Burning may be carried on into the evening, in which case warm clothing is necessary.

Briefing

Before starting the burn, brief the entire crew on:

- How the burn is to be carried out
- The lighting pattern
- Individual responsibilities and duties
- Probable hazard areas
- The expected fire behaviour
- The sequence of events
- Handout pink NRFA safety briefing card - with LACES, watchouts and 10 standard orders - available from your RFA
- Communications method - cellphone, mobile radio etc



**No type of synthetic clothing should be worn.
Anyone wearing any synthetic clothing must not
be allowed on the fire site!**

Crew Safety

Communications

As far as possible, organise the crew so that each member has visual and vocal contact with at least one, preferably two, other members of the burning party.

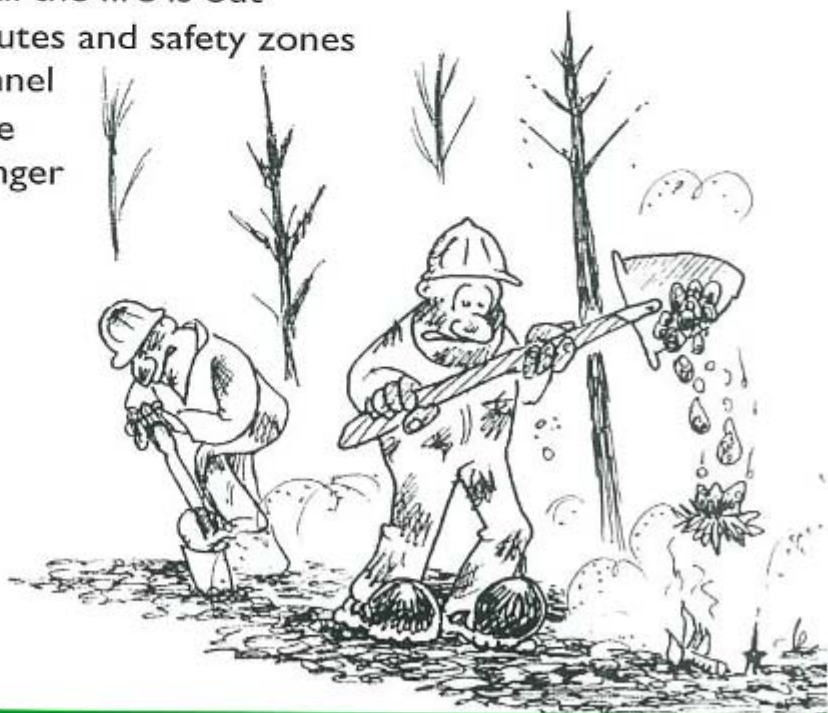
Lighting-up

Adhere to burn plan light up pattern.

Do not permit anyone to light up while moving uphill or up valley or gully bottoms; or to light up alone, out of touch with other members of the crew.

Patrols

- Locate patrols on cleared firebreaks
- Warn them to lie flat on the ground, rather than run, in the event of a sudden flare up or flame across a break
- Maintain patrols until the fire is out
- Make the escape routes and safety zones known to all personnel
- Post lookouts where there is possible danger



Maintain patrols until the fire is out

Essentials for a Safe Burn

Safety, effectiveness, size, and duration are all closely allied.

A safe burn demands...

For a safe burn you need:

- Sound methods
- Good burning conditions
- The correct time of day
- Skilled personnel
- Favourable weather forecast

Effective clean burning demands...

For a clean effective burn you need:

Dry fuel (the vegetation, scrub, debris, etc. to be burnt)

The generation of the maximum amount of heat in the main body of the burn, e.g. Small piles and many of them won't be long lasting or deep seated.

The most time consuming and expensive part of a prescribed burn is the slow back burning from the lee edge.

It's vital to go slow in burning out from the dangerous edges before the body of the burn can be allowed to go with the wind.

Safe. Effective. Clean.

Essentials for a Safe Burn

Where is the greatest danger

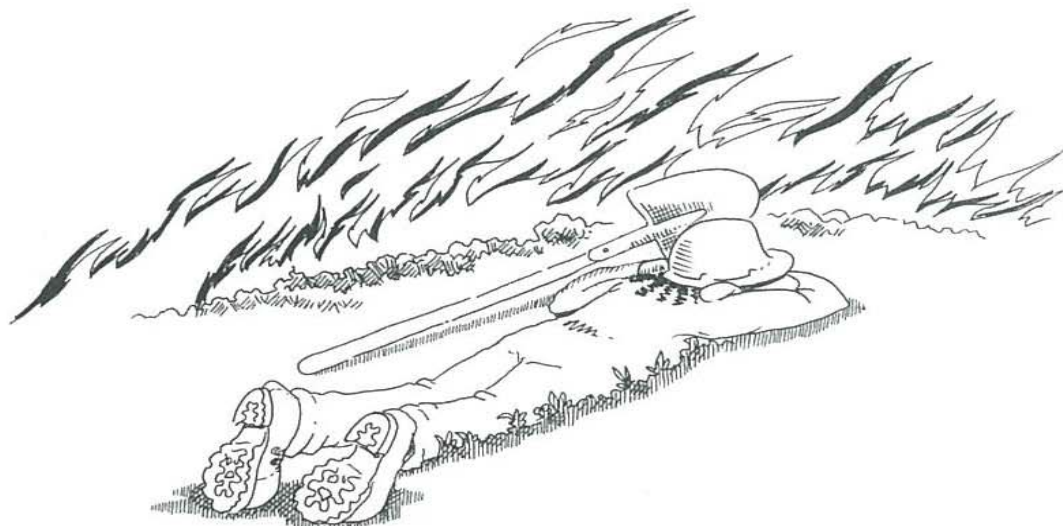
The greatest danger exists along the perimeter firebreak (bordering on flammable fuel outside the burn) where it has been freshly lit.

Patrols must be in greatest number behind the lighting-up 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.

What do I do if flames come at me?

In the event of flames across a break, the patrols must understand that the safest place is on the ground. They should throw themselves flat, protect face with shovel, DO NOT remain upright. In 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.



Essentials for a Safe Burn

When is it safe?

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.

Why can't I watch the burn?

It's important that patrols position themselves with their backs to the area being burnt. The natural inclination or temptation to watch the burn must be resisted.

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.

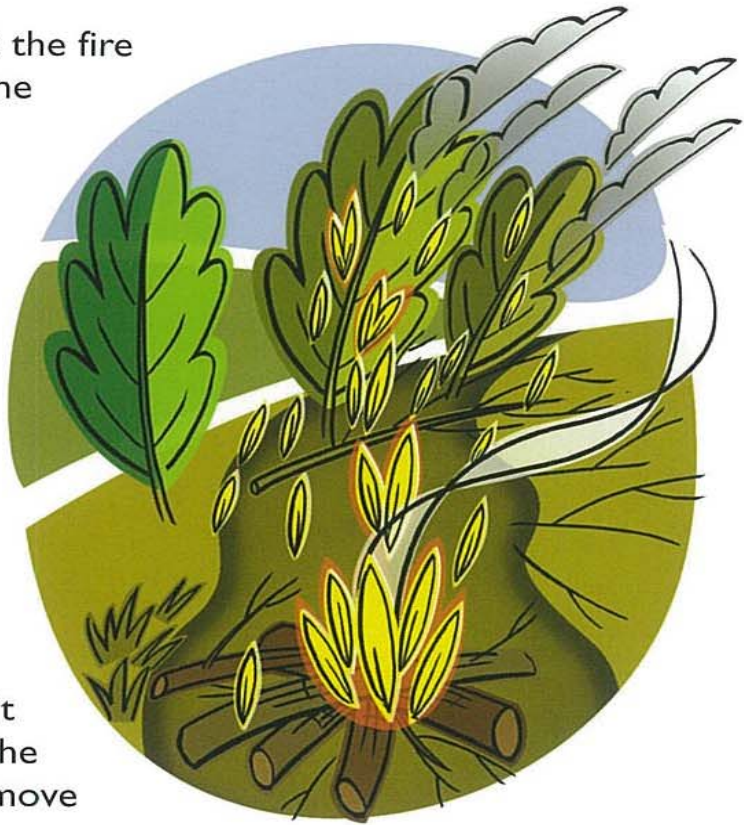
How often do I need to inspect?

Inspect until it is completely extinguished - because flame is invisible does not mean the fire is out.

Inspect until the fire is completely extinguished.

If the fire escapes...

- The initial attack against the fire will often be made by one person
- Consider setting up a portable pump and hose line at particularly sensitive locations
- Concentrate effort on keeping the fire in check until reinforcements arrive.
- Attack the fast-moving sections (leave slower moving parts for later attention) with shovels
- If water is available, use it to take the heat out of the fire so that shovels can move in at close quarters
- If water is available in abundance, use it to save much arduous shovel work



**Always dial 111 and
ask for the Fire Service**

Burn Methods

There are various methods of burning out areas, each designed to suit particular circumstances.

Chose your method to suit the fuel, terrain, and shape and size of the area to be burnt.

A soundly based plan is required otherwise the burn will likely be a failure.

Ring burning



Ring burning involves lighting the outside edge of the burn area in a prescribed sequence so that the fire burns towards the centre of the area creating a convection column and a high intensity burn.

This common practice is suitable for dense vegetation areas where the line of fire around the perimeter will be drawn into the centre from the fire on the opposite side of the prescribed area.

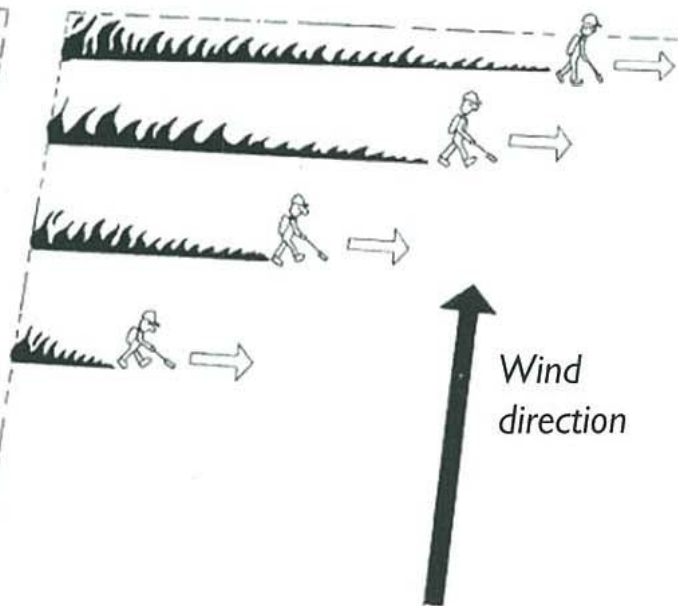
To ignite using the ring burning pattern, follow the steps below:

Step	Action
1	Light from the appropriate firebreak using a backing fire, to secure the firebreak and increase its effective width.
2	Once this buffer strip has been burned out sufficiently, the ignition crew proceeds as quickly as possible down the flanking firebreaks, lighting-up the flanks as they make their way to meet up in the middle of the lower slope or windward firebreak.
3	Where burn is on a slope, light from the top (upslope) and work down.

Setting fire to a narrow strip of fuel adjacent to a fire-line and then burning successively adjacent strips in parallel lines.

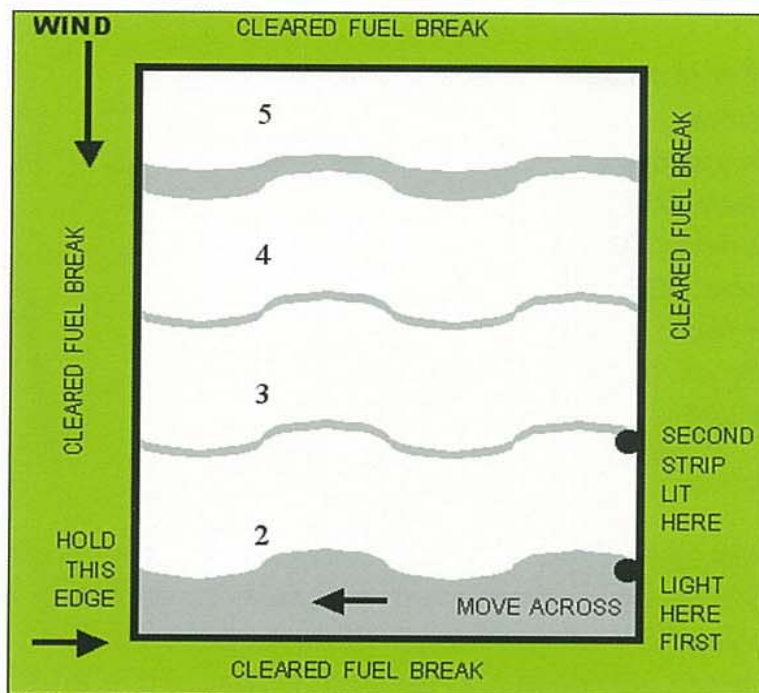
Strip burning is useful when seeking a fast moving top fuel reduction burn prior to such land management activities as fertilizing and over-sowing for pasture.

Strip burning provides a high intensity burn and is ideally suited for aerial operations.



- If using this method to light fuels by hand, the fuels must be very light
- It is absolutely critical that personnel maintain watch on one another, and that they are staggered rearward of the lead person who has the strip closest the fire break, and the lighters are staged successively deeper in to the burn, so that no one person's light up threatens that person in front of them
- **Strip burning on foot can be hazardous**
- **You need sound judgment, experience and close supervision to carry this method out safely**

Strip burning, continued



To ignite using the strip burning pattern, follow these steps :

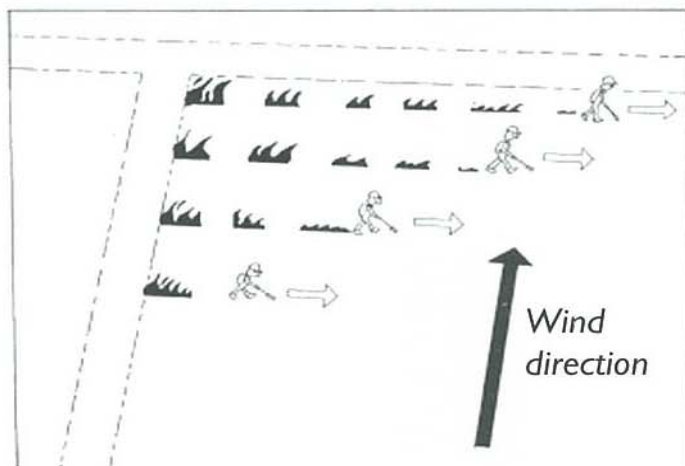
Step	Action
1	Burn from the appropriate firebreak using a <i>backing fire</i> , to secure the firebreak and increase its effective width.
2	Once this strip of fire has burned back some distance, light further strips progressively upwind or down slope.
3	Continue the process until the whole block has been lit.
4	Where burn is on a slope, light from the top (upslope) and work down.

In this way the area is burned out, strip-by-strip with heading fires.

- *Heading fires* travel with the wind or upslope
- Unlike backing fires they can develop a high rate of spread and intensity
- Successful management of a heading fire requires that no individual strip of fire can develop to a high intensity before it reaches another burned out strip

Spot burning

The setting of a number of individual fires throughout an area so spaced that they will spread independently over most of the rest of the area before finally meeting at the junction zone.



This is the standard technique for *Low Intensity Burns* where control of fire spread and intensity is paramount to achieving a certain objective. It's an effective method of reducing fire intensity compared to strip burning (which can sometimes create a fire that is too intense).

In spot burning, light a series of well-spaced, half-metre long spots rather than a solid strip of fire along the strip. A solid strip of fire always spreads faster and builds up intensity quicker than does a series of spot fires spaced along the same strip.

Spot burning, continued

To ignite using the spot burning pattern, follow the steps below:

Step	Action
1	Burn from the appropriate firebreak using a <i>backing fire</i> , to secure the firebreak and increase its effective width.
2	Then light a series of spot fires at a specified distance upwind or downhill of the backing fire.
3	Continue the process until the whole block has been lit.
4	Where burn is on a slope, light from the top (upslope) and work down.

The distance between spot fires along each strip and the distance between strips will influence when the *heading fire's* potential intensity will be reached.

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.

If the spot fires are lit too close together along the strip, then strip fires and junction zones develop earlier resulting in a faster, more intense fire with extreme fire behaviour, including spotting and fire whirls.

Windrow burning

A long line of piled slash or debris resulting from forest or scrub clearing.



The windrow burn pattern is used to burn piled debris. It is somewhat fixed because of the character and placement of fuel.

Once started, windrow burns are difficult to extinguish. Safe burning can be achieved if:

- The burn area is kept as small as practical
- Piles are not close to each other or standing vegetation or fuels

To ignite a windrow burn, follow the steps below:

Step	Action
1	Each windrow is lit along its length.
2	Where windrows are on a slope, light from the top (upslope) and work down.
3	Where windrows are on flat ground start at the downwind end.

Crop Residue burning

To ignite a crop residue burn:

- It's important to consult your RFA as some of them have a Code of Practice in place
- Follow the RFA's conditions!
- Use either a ring burning or strip burning pattern
- Where crop residue is on a slope, light from the top (up slope highest point) and work down
- Obtain a weather forecast
- Consider the direction of smoke
- Don't light up if the smoke is likely to drift across the road and become a hazard to traffic
- Don't light up in strong winds or when strong winds are predicted

Equipment

First Aid

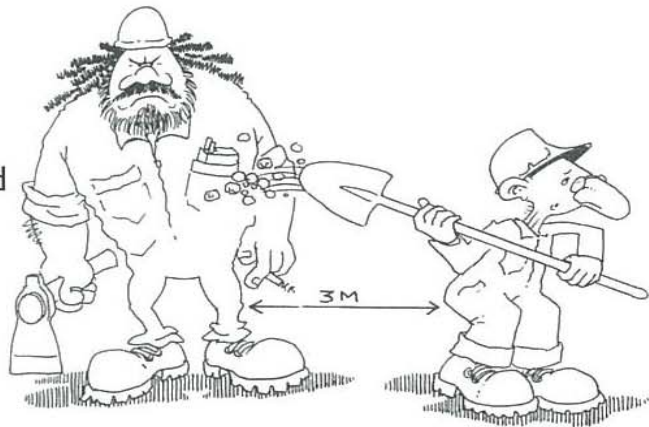
Have a good first aid kit on hand for an emergency.

What tools are essential?

This list should include:

- Shovels
- Knapsack pumps
- Slip on spray units
- Burners

You may also have tractors and other useful farm equipment available.



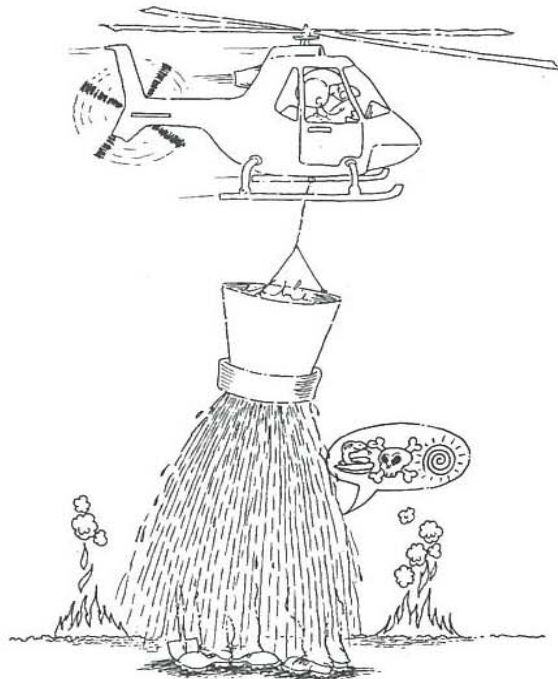
What if it's a large burn?

If a large burn of high hazard is being undertaken, you'll also need tractors and mobile water tankers with hose and pumping units.

Where a water source is available, a means of pumping it onto the fire line or using it to replenish tankers should be considered.

In particularly tight corners, portable pumps can be set up prior to commencing ignition.

It may be prudent, even a requirement, to have aerial resources on standby at the fire site.



Ignition Tools

Use anything from pumice torches to pressurised flame thrower type burners as long as they are capable of reasonably efficient lighting.

They need sufficient duration of burning to do the length of line that is to be fired.

The operator must keep the burner head close to the ground when lighting up to ensure the necessary continuous line of fire.

Hand-held drip torches are usually fuelled with a mix of diesel and kerosene.

Advantages

More diesel provides
more sustained burning

More kerosene provides
better ignition

Disadvantages

More diesel makes the torch
difficult to light

More kerosene is more volatile



Lighting the Drip Torch

A kerosene: diesel mix of 1:3 is commonly used and provides a good mix.



Lighting the drip torch

Step	Action
1	Tighten all connections before using the torch and DO NOT use the torch if there is evidence of any leaks or escapes of fuel from any point other than the wand..
2	Select a safe, clear area and open the fuel valve (where fitted).
3	Tip the torch just enough to wet the wick and wet the small pile of grass with the fuel.
4	Place the torch upright.
5	Light the small pile with a match and dip the wick of the torch into this small fire to light the wick.
6	Place the torch upright and the wick should continue to burn, until the fuel mix is exhausted.

Using the Drip Torch



Using the drip torch

Step	Action
1	Hold the torch slightly away from the body, tip the torch to deposit the burning fuel and then walk away. If ground fuels are damp or green, progress may be relatively slow.
2	If a spot is difficult to reach, swing the torch forward and terminate with a snapping motion of the wrist.
3	To extinguish the torch, place the torch upright, close the valve and blow out the wick or allow it to burn out or smother wick.

Drip Torches – Cautions

Commercial drip torches have a fuel trap on the spout to prevent flashback and a check valve in the cover to prevent flame from reaching fuel tank as a double protection against flashback. They have a breather valve, an oil-proof gasket and sealed outlets to prevent the slopping of fuel.

- Never fill around someone who is smoking
- Refuel well away from fire or embers
- Visually ensure that there are no flames on or near the torch when opening or refilling the torch
- Avoid fuel spills on body or clothing
- Re-ignite away from re-fuelling area (at least 3m)
- Keep the torch upright when not in use for burning
- Keep escape routes in mind
- Carry a lit torch in the middle of the firebreak
- Walk carefully
- Know where others are and maintain a safe working distance
- Allow all parts to cool sufficiently prior to handling, refueling or disassembling
- Inspect the torch regularly and replace any damaged parts
- Wipe off the torch and store well away from heat when finished

Safety and Efficiency

Have **spare** burners available when a burn is being carried out.

Breakdown or delay in the lighting-up during certain states of burn can be a serious handicap and may increase risks to safety. It's important that you can affect quick replacement if there is failure in any of those being used.

Avoid using burners that leak fuel

Shovels are a simple and readily available tool and can be used for beating out unwanted spot fires, throwing soil on to a fire to smother it, digging in smouldering pieces of wood, and shielding the face from heat.

A **helicopter** with an approved fire lighter can, in the right conditions, be an advantage in burning off. The size of the area to be burnt and the cost should be considered. A known firm with an experienced pilot should be hired and operators must have the right approvals. **Fixed wing aircraft** can be used effectively as water bombers.

Weedeaters/scrubcutters are also useful tools

Fire retardant can be used to make firebreaks.

Water sprinklers can act as firebreaks in some circumstances where it is environmentally unacceptable to use machinery.

First Aid for Burns

Cool the burned area with frequent applications of wet cloths or sheets.

A knapsack pump can be used to wet the material.

Remember, the burn continues to penetrate deeper into the skin even after the heat source has been removed, so cooling for at least 10 minutes is of prime consideration.

Avoid handling affected areas more than necessary. See that hands are as clean as possible.

Do not apply lotions of any kind.

Do not remove burned clothing and do not break blisters

Cover the area (including burned clothing) with a prepared sterile dressing or whatever clean bandaging material is available.

Bandage firmly, except when blisters are present (in which case, bandage lightly). Where face is burnt, cut bandage material in shape of mask, with a hole for breathing.

Immobilise the affected area by suitable means.

Seek medical aid if necessary.

20 DANGEROUS SITUATIONS TO WATCH OUT FOR!

1. Fire size is unknown
2. Unfamiliar territory
3. No escape route
4. Don't know local weather
5. No communications
6. Instructions are not clear
7. Getting hotter
8. Wind changes speed and 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

Lookout(s)

Anchor Point(s)

Communication(s)

Escape Route(s)

Safety Zone(s)

10 Standard Vegetation Fire Orders Fire Behaviour:

1. Keep informed of fire weather conditions and forecasts.
2. Know what your fire is doing at all times.
3. Base all actions on current and expected behaviour of the fire.

Safety:

4. Have escape routes and safety zones and make them known.
5. Post lookouts where there is possible danger.
6. Be alert. Keep calm. Think clearly. Act decisively.

Operational Control:

7. Maintain prompt communication with your crew/s, your supervisor, and adjoining crew/s.
8. Give clear instructions and ensure they are understood.
9. Maintain control of your crew/s at all times.

Goal:

10. Fight fire aggressively, having provided for safety first.



**Always dial 111
and ask for the
Fire Service**

First Aid for Burns, continued

Treat for Shock

- Reassure the casualty
- Lay them down (position depends on injuries)
- Loosen clothing about neck, chest and waist
- Wrap in a blanket, rug, coat, or whatever cover is available
- Give sips of water, tea etc. but not alcohol, if they complain of thirst.
- If the casualty is badly burnt he or she must be removed for medical aid as quickly as possible.
- Remember that unless it will take more than 4 hours to reach such aid they should not be given anything by mouth, in case an anaesthetic will be needed.
- Should such a delay be inevitable, water, with salt added to it, (at a rate of half a teaspoon to two tumblers), is the best drink.

Treat for Shock.