ALEP

21

Aboriginal Landcare Education Program

ASSIST WITH PRESCRIBED BURNING

bhpbilliton
resourcing the future

Greening Australia

CONTENTS

PUBLICATION NOTES

BHP Billiton Iron Ore is proud to support Greening Australia to provide valuable conservation and land management training to communities throughout the Pilbara through the Indigenous Training Program.

This Learning Guide series has been developed as part of our partnership of the program.

Gavin Price, Head of Environment, BHP Billiton Iron Ore

Greening Australia is proud to produce and provide the comprehensive suite of new ALEP Learning Guides. The guides are compatible with the new horticulture and conservation industries training package and suited to developing skills in Indigenous communities within remote areas of the country where employment opportunities are limited. We would like to thank BHPBIO for their generous support in the development of the guides.

Brendan Foran, National CEO Greening Australia

The second series of ALEP Guides is aligned with a number of units of competence from the *Training Package AHC10 – Agriculture, Horticulture and Conservation and Land Management* (Release 8.0). The units selected are frequently used within Certificates I to III in Horticulture and Conservation and Land Management. As such they cover, where possible, the elements, performance criteria and required skills and knowledge of each unit.

The principal goal of these resources is to support the learning process; the learning activities may complement a trainer's assessment plan. The intent is that they will be used in an interactive manner with learners rather than as self-paced study guides. The structure and sequence have been designed to follow the logical steps of the practical tasks wherever possible. Concepts are introduced and then consolidated with discussion and/or practical activities.

The writers consider that these guides can provide a sound technical foundation but also strongly encourage trainers to complement the guides with additional, authentic resources from relevant industry texts and websites. The guides can be used in part or in their entirety but should always be linked to practical activities to strengthen the teaching and learning.

Genuine consideration was given to the level of language used in the guides. The goal has been to find a balance between simplifying the language to an accessible level and ensuring that the vocational concepts are addressed. The writers contend that with appropriate support these texts can provide an opportunity for students to strengthen their language, literacy and numeracy skills, which may be required for pathway progression.

A number of Aboriginal people have been involved in developing this ALEP Guide, which is considered suitable for use within a program based on Aboriginal pedagogies.

INTRODUCTION

Welcome to *Assist with prescribed burning*. This learning guide covers information about helping with managed burns for agricultural or natural resource management purposes. To successfully help out with a managed burn job you need to know how to get ready for the burn, assist with the burn and clean up after the burn. When doing these activities, the two most important things are:

- A focus on safety
- Good communication

This learning guide can only present the broad ideas about prescribed burning. This knowledge needs to be used in practice as you carry out your duties in the field.

ALEP
Aboriginal Landcare Education Program

EQUIPMENT REQUIRED

To complete this training you will need the following:

- Access to relevant workplace policies and procedures
- Appropriate Personal Protective Equipment (PPE)
- Access to relevant machinery and equipment

LEARNING ACTIVITIES

There are five kinds of activities to complete. These activities may go toward your final assessment.

SECTION	ACTIVITY	SATISFACTORY (Y/N)	DATE
RESEARCH ACTIVITIES			
3.3	Fire-retardant chemicals		
DISCUSSION ACTIVITIES			
1.2	Legislation		
1.3	WHS		
2.5	Fire behaviour		
4.3	Monitoring fire		
WORKBOOK ACTIVITIES			
1.3	WHS		
3.3	PPE and equipment		
PRACTICAL ACTIVITIES			
2.5	Fire Danger Index (FDI)		
3.3	Communication – two-way radios		
3.3	Check equipment and vehicles		
4.4	Using suppression equipment		
PROJECT			
End	All aspects of prescribed burning		

1 BEFORE YOU START

1.1 WHY BURN?

Prescribed burning is a both a traditional Aboriginal and western scientific land management strategy. It is often used along with other strategies to reduce the fuel load in an area. The fuel load is the amount of dry grass, leaf litter and wood that can feed and increase the intensity of a fire.

The best time to burn depends on the seasons in your region. In the south of Australia the ideal time to burn is autumn. In the north of Australia the early dry season is best. This allows for a slower, cooler fire and a mosaic or patchy result. This is desirable because it has a lower environmental impact.

A successful burn will create firebreaks that complement the topography of the area. If a fire does break out during the hot and dry time of year, a patchy effect will prevent the devastation of vast tracts of land in one event. This is the best way to preserve biodiversity in an area.

Reducing the fuel load will reduce the risk of wildfire during the hot, dry time of year. This reduces the risk of harm to:

- Buildings and other infrastructure such as power and phone lines
- Animal habitat
- Biodiversity – this is especially important for regions with vulnerable or endangered species and communities
- Stock and crops, including tree plantations
- Cultural sites

You and your work team will aim to reduce the chance of wildfire. You will use prescribed burning methods that do not significantly impact the biodiversity of the land you are protecting.

1.2 LEGISLATION

The main laws related to burning are concerned with protecting people, property and the environment.

WORKPLACE HEALTH & SAFETY (WHS)

WHS legislation tells you that, as an employee, you have a 'duty of care'. This means you must look after your own safety and that of others. When working with fire you must:

- Wear the appropriate PPE
- Do the necessary training
- Tell your supervisor about anything that could make the workplace unsafe for you or anyone else
- Report any injury related to your work

The *Resources* section lists the main WHS legislation for each state.

ENVIRONMENTAL PROTECTION

The *Environmental Protection and Biodiversity Conservation Act 1999* is national legislation protecting the environment in Australia. A permit will be needed for burning if it is likely to damage the habitat of protected species or ecological communities.

Your state or territory government will also have environmental protection legislation. This is usually managed by your department of parks and wildlife or environmental protection authority. It is often these agencies that will help organise prescribed burning jobs with you in your region.

LOCAL GOVERNMENT LEGISLATION

Your local government may also have laws about fire management. They are often responsible for making sure that residential areas are protected. Local governments generally set restricted burn periods for their region.

R1

See WHS Legislation *Resource R1*, page 26

NOTE

You will find more detailed information about this in the ALEP Guide Participate in environmentally sustainable work practices.

DISCUSSION ACTIVITY

Talk with your trainer and supervisor about the legislation covering your region.

State legislation

.....

Local government legislation

.....

1.3 WORKPLACE HEALTH & SAFETY

There are a number of hazards when working on a prescribed burn, and the risks are often high.

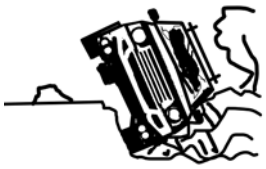
A HAZARD is something that could cause an injury or damage.

An INJURY is what could happen to someone.

RISK is the likelihood of an injury happening and the possible seriousness of injury.

A CONTROL is something you do or wear to reduce the:

- Likelihood of injury
- Seriousness of injury

HAZARDS WITH PRESCRIBED BURNING	
FIRE Can cause: Burns, death 	**SLIPS, TRIPS AND FALLS** Can cause: Sprains, bruising or broken bones 
SMOKE Can cause: Breathing difficulties Suffocation, causing death Injury caused by poor visibility 	**ROAD TRAVEL** Can cause: Injury in a vehicle accident 
RADIANT HEAT Can cause: Heat stress, heat exhaustion, heat stroke, dehydration, fatigue, stress and death 	**WORKING LONG HOURS IN THE SUN** Can cause: Fatigue, stress, heat exhaustion, dehydration 

RISK

Prescribed burning is a very high risk job. Risk is assessed by answering both of these questions:

- How likely is it that injury or damage will happen?
- How serious is injury or damage likely to be?

If you think about these questions you will probably agree that injury or damage is likely. Also, if injury or damage happens it can be very serious, even causing death.

There are two critical things you must do to reduce the risk of injury or damage.

- Communicate clearly
- Follow workplace procedures

COMMUNICATION

Communication is about speaking, listening, reading and writing.

It is critical that you understand the fire plan, your role and who you report to. These will be explained at the **briefing**. It is important to ask questions if you don't understand. We'll look more at this in *Section 3.4*.

You also need to keep communicating during the burn. Let people know where you are and what you're doing. Also let them know if you notice anything that might affect the burn, for example, if there is a change in the wind direction.

WORKPLACE PROCEDURES

It is very important to follow safety procedures at all times. Your workplace procedures are written to make sure you follow the law.

Many workplaces have a Standard Operating Procedure (SOP) or Safe Work Method Statement (SWMS) for each job that is regularly done. This kind of document will tell you:

- How to plan the job
- The training needed to do the job
- The equipment and PPE needed
- How to do the job
- How to clean up after the job

WORKBOOK ACTIVITY

Find your workplace procedure for prescribed burning. If you are working with a partner organisation, you may need to follow their procedures. Read through as a group.

OR

If your workplace does not have a procedure, you need to find one you can change to suit your workplace. Try contacting one of the departments in your state that manages:

- Fire and emergency services
- Parks and wildlife
- Bush fire service or brigade

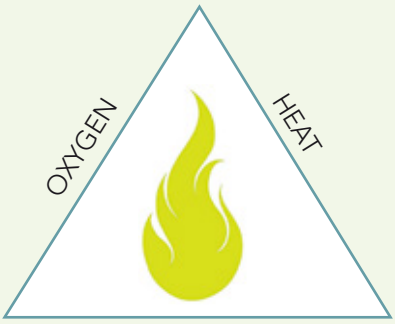
DISCUSSION ACTIVITY

With your work team, discuss the controls you will apply to reduce the risk of injury from each of the hazards above.

2 ABOUT FIRES

Prescribed burning is about planned burning. Things can quickly change though, and you might need to fight the fire. If you learn a little about fire behaviour it will help you recognise when there is a problem and how to manage it. Fire behaviour is what the fire does and how it might respond to a particular influence.

2.1 IN A NUTSHELL



If one side of the triangle is removed, the fire will go out.

Fire needs three things to keep it burning:

- Oxygen
- Heat
- Fuel

To put the fire out, you need to take away one or more of these ingredients.

Oxygen is in the air. You can suffocate the fire by removing the oxygen.

- Smother with foam
- Shovel soil onto the fire
- Beat the fire with branches or wet sacks
- Stop, Drop and Roll: If a person's clothes are on fire, roll them on the ground or in a blanket

Heat is generated by the fire and helps it to keep going. You can cool down the fire by spraying it with water at the base of the flames.

Fuel is anything that can burn. You can remove fuel from the path of the fire to stop it. These are common methods:

- Rake a path
- Use earthmoving machinery
- Back-burn

Managing fire is actually more complicated than this because it is also affected by **three fire factors**.

1. Fuel characteristics
2. Weather conditions
3. Topography

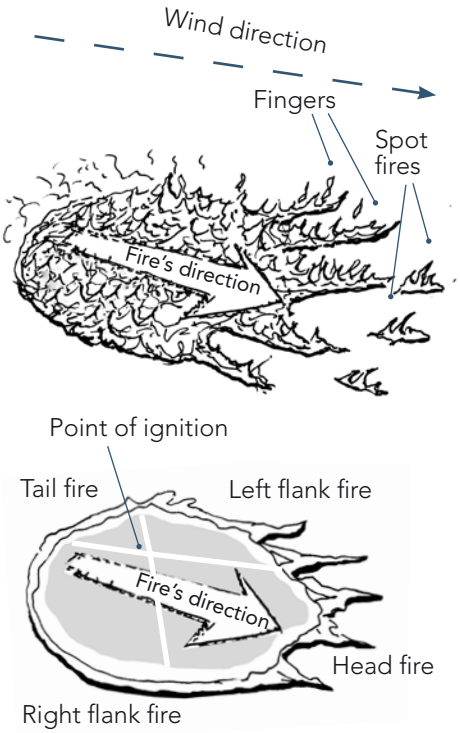
If you analyse these three fire factors you might be able to predict how the fire will behave. This will help to decide if it is safe to burn. It can also help your supervisor decide on the best firefighting technique if the burn gets out of control.

Before you analyse the three fire factors, there are some more things to learn about. Understanding these things will help you to recognise the importance of the three fire factors.

2.2 PARTS OF A FIRE

Learning about the parts of a fire will help you understand the behaviour of a wildfire.

The **point of ignition** is the place where the fire started. In the diagram on the right it is where the white lines cross each other. The fire moves outwards from the point of ignition.



The **head fire** is the hottest and has the largest flames. It moves in the direction of the wind. Embers from the head of the fire can be blown forward by the wind. This can start spot fires ahead of the main fire front.

Sometimes the height of the flames at the head fire is estimated. This can help describe the fire's intensity.

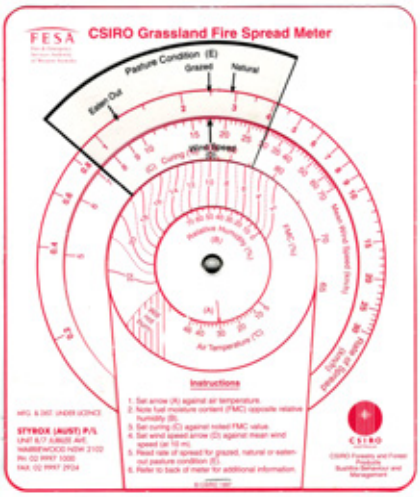
The **tail fire** moves in the opposite direction to the wind behind the head fire. It is less intense than the head fire, so it is easier to control. It burns toward the wind from the point of ignition.

The **flank fires** are between the head and the tail fires. The flank fires may vary in length depending on the wind. They burn outwards from the original point of ignition. Flank fires can become the head fire if the wind changes direction.

2.3 RATE OF SPREAD (ROS)

The ROS measures how fast the fire front is travelling. This generally refers to the head fire. The rate of spread is like the speed of the fire. The speed depends on the three fire factors. ROS is usually measured in metres per hour (m/hr) in woodland, or kilometres per hour (km/hr) in grassland.

The ROS can be estimated with a tool, for example, the CSIRO Grassland Fire Spread Meter.



2.4 TYPES OF FIRE

There are three types of fires.

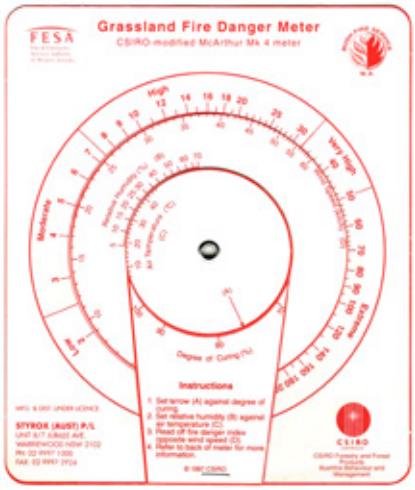
A **ground fire** burns the organic material in the soil. It happens in areas that have peat bogs, mallee roots and seaweed clumps under the ground. This kind of fire smoulders without any flames. The concern with this kind of fire is that it can ignite a surface fire if conditions are favourable.

A **surface fire** burns vegetation just above the ground. The fuels will be grasses, low shrubs, bark and leaf litter.

A **crown fire** burns the crowns of trees ahead of, and above, an intense surface fire. This kind of fire happens in heavily treed areas in windy conditions. These fires can travel very quickly and cause spot fires ahead of the main surface fire.

2.5 THREE FIRE FACTORS

The three fire factors are the main things that will affect a fire once it has started. These are fuel characteristics, weather conditions and typography. It is essential to consider these before you begin a prescribed burn. These factors are used with other information to calculate the Fire Danger Index (FDI). This will help you work out if it is safe to burn or not.



FDI can be calculated with a meter like this.

1. FUEL CHARACTERISTICS

Fuel for a fire is dry vegetation such as grass, leaf litter, trees and logs.

The size of the fuel will affect how fast it burns. Fine grass burns faster than logs.

The quantity of fuel will affect the intensity and duration of the fire. Quantity means how much vegetation there is to burn. This may be called the fuel load and is measured in tonnes/hectare.

The arrangement of the fuel is the way the fuel is positioned in relation to other pieces of fuel. If the fuel is packed tightly then it won't let as much oxygen in, so will burn more slowly. If pieces are positioned away from each other, the fire may cool as it travels. This will decrease the intensity of the fire. If fuel is separated by soil patches, the fire might actually burn out.

The condition of the fuel refers to how dry or wet it is. When fuel is still alive (green), it is much wetter than if it is dead. It might also be wet after heavy rains.

The condition of the fuel will help you to work out the ROS.

If fuel has high moisture content it is wet. Wet fuel burns slower and takes longer to ignite.

If it has low moisture content it is dry. Dry fuel burns faster and is quicker to ignite.

If you are working in a woodland area it is helpful to know the fuel moisture content (FMC). This tells you how wet the fuel is. Soggy leaf litter or green leaves will have an FMC of 100%. The FMC is calculated using the following procedure.

- Gather a quantity of fuel
- Weigh the fuel
- Dry the fuel in an oven
- Weigh it again
- Calculate the difference in weight to give the weight of the moisture
- Express the moisture as a percentage of the dry weight

If you are working in a grassland area you will need to work out the degree of curing. When grass is completely dead and dry we say it is 100% cured.

Guides such as these shown below can help you estimate how much cured grass is in the region you are planning to burn. You will find links to these in the *References* section.

EXAMPLE

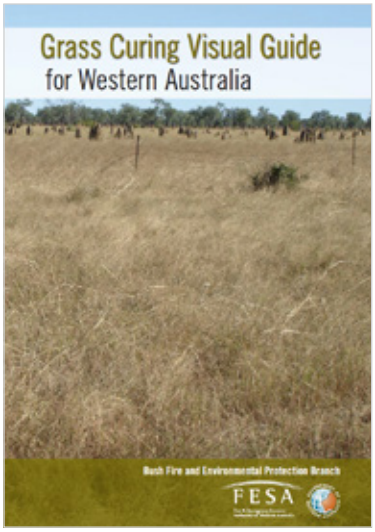
Wet weight 1500 g

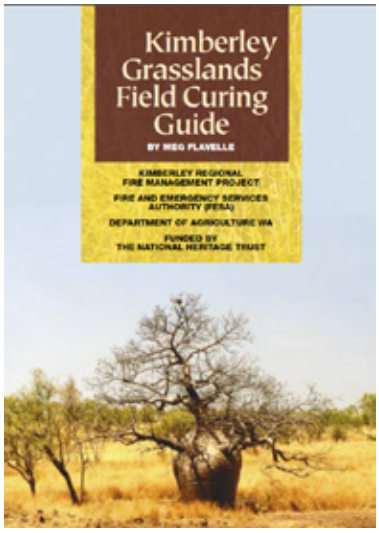
– Dry weight 1200 g

Moisture weight 300 g

$$FMC = \frac{300}{1200} \times \frac{100}{1}$$

FMC=25%





2. WEATHER CONDITIONS

Weather conditions affect fire intensity and ROS. You need to pay attention to these conditions before and during the burning job.

When **the temperature** is high, fuel is easier to ignite because it is preheated and probably drier.

High **humidity** means there is more moisture in the air. Low humidity means the air is dry. Humidity will affect the condition of the fuel. So fire is more likely to take off on a less humid day when the air is drier.

Wind is moving air and air has oxygen. There are four ways wind helps fire.

- It adds to the intensity of a fire, as it gives it oxygen
- It blows hot air in front of the head fire, drying and heating fuel
- It pushes the fire forward, increasing the ROS
- It can blow embers ahead of the head fire and create spot fires

It is important that you pay attention to the wind conditions *at the site of the burn*. This may be different from the weather report.

NOTE

You can measure temperature, humidity and wind speed at the area you are working using a Kestrel weather meter or similar.

3. TOPOGRAPHY

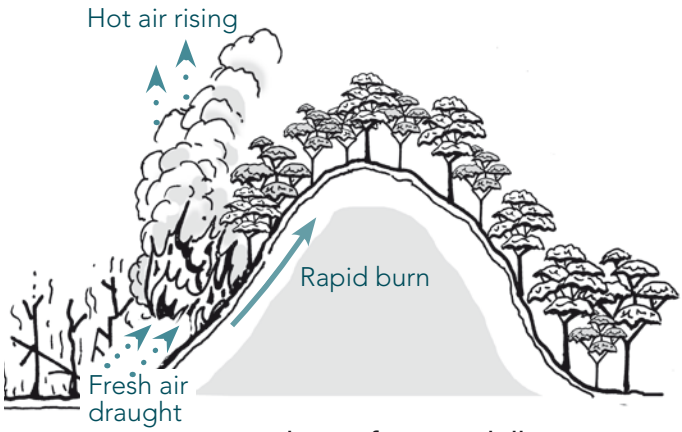
Topography is the layout of the land, including valleys, plains and mountains.

Fires travel steadily across flat ground and are affected mainly by the prevailing wind.

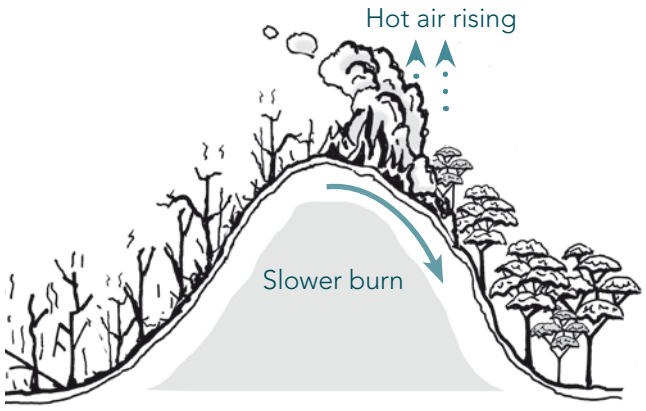
As fire goes up a hill the ROS will be higher; this means the fire is spreading more quickly. This is because heat naturally rises. The hot air preheats fuel on higher ground. The rising heat causes the wind speed to increase, bringing fresh oxygen. This will cause the fire to intensify. If you are in a position on a hill above the fire you need to leave the location immediately. This is a very dangerous place to be.

As the fire moves downhill, it will generally slow down. This is because the rising heat is only affecting the already-burnt fuel.

Gullies or valleys can affect fire differently. If there is moisture in the fuel then the ROS might decrease. If it is dry it can draw the fire, increasing the wind and the ROS.



Fire burns faster uphill



Fire burns slower downhill

DISCUSSION ACTIVITY

Talk with your work group, supervisor and trainer about fires they have been involved with. Think about how the three fire factors made the fire easier or more difficult to work with.

PRACTICAL ACTIVITY

Work with your supervisor or trainer to calculate the FDI for the place you are at right now. The method they use will be right for your workplace and environment.

You may be using a meter such as the one on page 8. There are also websites and an app available that will do the calculation for you if you input the numbers.

3 GET READY

3.1 WORKPLACE PROCEDURES

Much of what you need to do to get ready for the burn will be written in your workplace SOPs or SWMSs. You looked at these in *Section 1*. You also need to help your supervisor complete a Job Safety Analysis (JSA). This looks at the hazards present on the particular day and the controls you will use to minimise the risk of harm from these hazards.

3.2 PPE & SAFETY EQUIPMENT

Your PPE will all be clean and stored in a dry area at your workplace, preferably in a plastic tub.

Fire-retardant overalls, turnout coats and trousers, or long-sleeved cotton shirt and trousers		Drinking water	
Safety boots		Face cloth	
Goggles		First aid kit with items to treat burns	
Gloves		Kestrel weather meter	
Hard hat or tight-fitting cap or hat		Two-way radios	
Respiratory protection		Watch	
Notepads and pens		Other PPE for chainsawing	

3.3 PREPARE VEHICLES & EQUIPMENT

VEHICLES

Vehicles are used to carry people and equipment to and around the site. They may be fitted with two-way radios, as this is often the best method of communication. Make sure all vehicles have plenty of drinking water on board. It will be necessary to take recovery gear in case the vehicle becomes bogged.

All vehicles used during the burn need to have a pre-start check.

PRE-START CHECK	
Fuel and oil levels okay	☑
Coolant level okay	☑
Air filter clean	☑
Tyres, including spares, at correct pressure	☑
Battery is secure and terminals tight	☑
No obvious faults or damage	☑

FIRE IGNITION EQUIPMENT

You will use matches or a drip torch to start a fire.

PREPARE A DRIP TORCH

1. Check O-rings
2. Tighten and adjust fittings as necessary
3. If torch leaks, apply an out-of-service tag: do not use

If the drip torch is okay, you can fill it with kerosene and diesel mix or as advised by your supervisor.

When fuelling up a drip torch, remember these things:

- *Move away from flames or heat before filling*
- *Clean up spilt fuel immediately*
- *Never light a torch near spilt fuel or fuel containers*

COMMUNICATIONS EQUIPMENT

If you are using two-way radios, make sure you know your workplace procedures for using them.

Some tips for using communications equipment:

- All messages should be clear and short
- No inappropriate language and swearing
- Use standard radio words and phrases
- Report any problems to your supervisor

See the *Resources* section for some standard radio words and phrases.

R2

See basic two-way radio words *Resource R2*, page 26

PRACTICAL ACTIVITY Practise using the two-way radios in your workplace. Make sure you understand and follow your workplace procedures.

FIREFIGHTING EQUIPMENT

All your firefighting equipment should be ready to go at all times in case of an emergency. You will do maintenance as you clean up after a job. You will also check it all on a regular basis. We'll cover this in more detail in *Section 5*. You may use all or some of this equipment, depending on the risk rating for the burning job you are doing.

Do not use equipment without appropriate training.

Knapsacks are used to carry water on your back. Only ever use clean water to fill a knapsack. This will avoid blockages and keep it working properly. Get help to put it on, as it can be heavy.

Hand tools may be used to clear a firebreak or shovel dirt onto a fire. Generally, you will take shovels, rake hoes and axes.

Slip-on units have a single hose reel and are put on a trayback vehicle or trailer. They carry around 400 litres of water. The tank needs to be filled with clean water; a pre-start check needs to be done on the pump; and fittings need to be tightened and adjusted if required.

4x4 truck fitted with various water sprayers and possibly a 3000 litre tank may be needed. To get ready, you need to do all regular vehicle checks. You also need to do pre-start checks on pumps, hoses and nozzles.

Water trucks or trailers are used to carry water to the site. The water is used to refill knapsacks and slip-on units. They are refilled from a dam, river or billabong.

A chainsaw might be used after the fire has passed to fell smouldering trees that could fall across a firebreak and ignite unburnt areas. Before use, you need to do a pre-start check as described in the manufacturer's instructions. Don't forget your PPE for chainsawing.

Chemicals can be used to mix with water to help cool and smother fire. These are known as fire-retardant chemicals. Class A retardants can be used on organic material such as wood and grass. The chemicals absorb heat and provide a barrier to oxygen. The chemical concentrate will be stored in a shed with your other equipment. These will need to be loaded onto the vehicles as you prepare for the burn.

RESEARCH ACTIVITY

Use the internet to find out more information about using Class A retardants. Why is it better to use these rather than just water?

WORKBOOK ACTIVITY

With your work team, discuss the PPE, equipment and vehicles for your next prescribed burning job.

PRACTICAL ACTIVITY

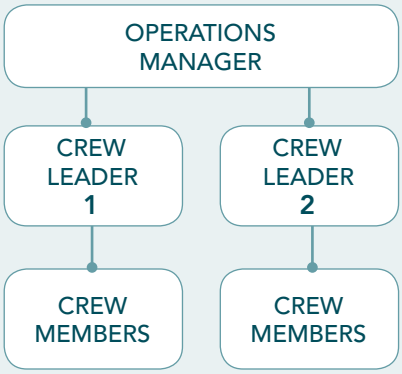
Do a routine check on all the equipment, vehicles and PPE.

Work out what to do if:

- Equipment is missing or broken
- Anything needs servicing

Talk to your supervisor about what needs to be done. Work with your team to get everything ready.

At the end of this activity, everything should be ready to go for the prescribed burn. You will be doing this in the next section.



NOTE

We have used the terms 'operations manager' and 'crew leader'. Different terms might be used in your workplace. Make sure you know who is who.

3.4 BRIEFING

The briefing is a meeting where everyone involved in the burn comes together. The operations manager explains the fire plan to everyone. It is absolutely critical that you understand the plan. If at any time you don't understand, you must ask them to explain it again.

It is a good idea to take notes during the briefing. The following sections cover the things that will be discussed.

CHAIN OF COMMAND

Understanding the chain of command is important when there is more than one small crew involved in the burn. There is always one person who is responsible for the burn overall: the operations manager. Sometimes there are smaller crews with a crew leader. If you are working in a crew, you need to raise issues with your crew leader. Your crew leader will communicate with the operations manager. It is really important to communicate through the chain of command. Otherwise everyone can end up confused and this can put people in danger.

WHERE

You will look at a map of the area and see exactly where the burning will happen. You will also identify where the water points are. You need to be aware of places that must be protected during the burn, such as:

- Buildings
- Utilities:
  - power and telephone lines
  - water supply structures
  - communications towers
- Areas of rare or sensitive flora and fauna
- Important cultural sites
- Activities that are happening within the site, e.g. drilling, tourism, mustering
- Crops and tree plantations

WHEN

You will be told the timeline for the day. This will give the times for:

- Fires to be lit at each location
- Weather condition checks
- Scheduled radio checks

WHO

Everyone will be told their role. You will usually work in pairs or in a small crew. Stick with your partner or crew in case you get bogged or separated from other crews by the fire. It is essential that you understand what you need to do. Talk with your crew leader if you don't understand.

CONTINGENCY PLAN

A contingency plan covers anything that might need to change from the original plan. This is particularly important if something goes wrong.

This can include what to do if you need:

- Backup help
- First aid treatment – make sure you know who is trained
- To evacuate

If anything needs to change, the first step is communication. You must speak with your crew leader. If you're not with them, you can use two-way radios.

4 SUPPORT THE BURN

In this section you will learn about working with your team to complete the prescribed burn as effectively and safely as possible.

4.1 ARRIVE AT THE SITE

PARK THE VEHICLE

It is important that your vehicle is accessible in case of an emergency. Make sure you park away from the burn area in a cleared space. You can save time if you face the vehicle toward the escape route. Leave the keys in the ignition. Put the windows up and shut the doors but don't lock them.

CHECKING

When you first arrive at the burn site, there are a few things to check. First, think through the three fire factors. Are these the same as expected and described in the briefing?

1. The fuel characteristics
2. The weather conditions
3. The topography

If not, talk with your crew leader before doing anything else. Follow their instructions.

If all is to proceed as planned, then double check the following:

- The communications equipment works
- You understand your role
- You understand what is happening at what time
- You know the escape route
- You have all your PPE

Talk to your crew leader straight away if you have any questions or problems. No question is a silly question.

When everyone is ready, the operations manager will give the authority to light the fire.

4.2 MOVING AROUND THE SITE

Once the burning has started, you need to be very careful not to get into a position that could put you or anyone else at risk.

If you are on foot then make sure you:

- Stay with your crew
- Can get to the escape route at all times
- Keep one foot in the black (a burned area won't burn again)

If you are driving a vehicle:

- Engage the hubs and 4WD
- Drive slowly and carefully
- Always have your headlights on and a flashing beacon or hazard lights
- Make sure you can turn around at all times
- Do not block roads, tracks or the escape route
- Keep ¼ tank of water at all times for emergencies
- Carry a two-way radio

4.3 COMMUNICATING & MONITORING

You will have found out about the monitoring and communications procedures during the briefing and while reading your workplace procedures. You must follow these.

You may be required to give an update on weather conditions or a situation report (sitrep) at certain times. For example, radio in every 30 minutes. You can explain what has been completed and what is left to do and request help if you need it. You might also give an update on your equipment and water reserves. Always let your crew leader know if you need to leave the fire ground to refill water.

You and your crew are responsible for watching the weather and the fire in your sector. Anything that is not expected or planned must be reported to your crew leader immediately. This includes any changes to:

- Wind speed
- Wind direction
- Temperature
- Humidity
- Fuel quantity and/or condition
- Topography
- Rate of spread

Read the scenario on the next page to see the importance of communication and monitoring.

DISCUSSION ACTIVITY

Look at the photo and discuss the answers to these questions.

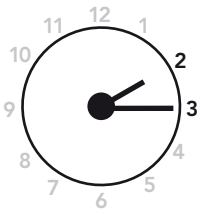
Which way is the wind blowing?

Is it a strong wind?

Describe the fuel characteristics.

SCENARIO

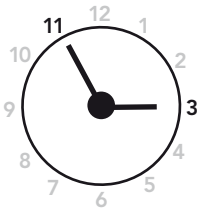
A crew was responsible for lighting up their area at 2:30 pm.



At 2:15 they noticed the wind had picked up a little and was coming from a different direction. They called their crew leader on the two-way and let her know.

The crew leader radioed the operations manager. The operations manager made the decision to go on standby for 30 minutes to see what the wind would do. He asked the crew leader to radio back with an update before their new scheduled light up time at 3:00.

The crew leader radioed back to the crew members and explained the new instructions.



At 2:55 the crew checked the weather again and the wind was still the same. They radioed their crew leader and gave her an update.

The crew leader radioed the operations manager and explained. The operations manager directed the crew leader to postpone burning that area. He also asked her to move with her crew to another area to help another team manage their burn. In this area the wind had taken the fire further east than expected and was threatening power lines.

The crew leader let the crew know the new plan, and they all went to the new location.

4.4 RESPOND TO EMERGENCIES

If the burn is well planned and there are no changes to the weather, then there should be no emergencies. If, however, something does change, the risks can increase very quickly. This means the chance of an incident increases and the possible seriousness of that incident increases.

This is why you organised firefighting and first aid equipment.

Remember:

- Don't panic
- Keep together with your crew
- Continue communication through the chain of command
- Follow the contingency plan to call for backup, receive first aid treatment or evacuate if necessary

Firefighting appliances are sometimes called 'suppression equipment'. It is best to learn how to use this through practical training.

You need to make sure you are safe and you are economical with the water. This means you don't want to waste it.

You might need to start fighting the fire if it changes behaviour. You will need to be trained in fire suppression to be able to do this safely.

PRACTICAL ACTIVITY

Learn about using the firefighting appliances in your workplace. This includes knapsacks and tanks with a motorised pump and hose. Your trainer or supervisor will help you.

- Follow all workplace procedures and your trainer's instructions
- Experiment with the nozzles to find how to best save water
- Practise aiming the jet to where the base of the flames would be
- Fill tank from a water source
- Resolve problem if the pump fails to prime
- Adjust revs on motor to get the right pressure

4.5 MOP-UP

Mop-up is done when the burning is finished to make the area safe. The crews extinguish (put out) and remove any burning material along the edge of the fire.

Make sure:

- Smouldering logs or trees can't roll or fall into an unburnt area
- All burning fuel is spread out or buried to stop sparks travelling
- Search for burning roots, stumps, etc. near the edge of the fire
- Check for heat sources around the perimeter of the fire

The operations manager will not declare the fire ground safe until the mop-up is finished and a regular patrol is set up. This means a person will walk or drive around the control line and check for hidden fires in roots or underground. This may be done for several days or even weeks after the fire.

NOTE

A patrol checks to make sure the fire does not restart.

5 FINISH UP

When the burn is finished, you will return to your base and complete the final tasks associated with a prescribed burn.

5.1 CLEAN & MAINTAIN EQUIPMENT

After the burn, the last part of the job is to clean up. Much of the equipment you used is for firefighting, and it needs to be ready to go in case of an emergency.

PPE & SAFETY EQUIPMENT

These items need to be washed and dried.

- Overalls
- Goggles
- Respiratory protection
- Hearing protection

They should then be stored in plastic tubs where they will be kept clean and dry.

All other items used must be stored according to your workplace procedures. This will include:

- Headwear
- Gloves
- Safety boots
- Turnout coats
- First aid kit
- Kestrel weather meter
- Two-way radios

FIRE IGNITION EQUIPMENT

DRIP TORCHES

1. Check O-rings
2. Tighten and adjust fittings as necessary
3. Refuel

VEHICLES

Trucks and other vehicles need to be made ready for use again.

The tasks that need to be done are:

- Clean
- Check and replace if needed: filters, fuel, oil, water, coolant
- Check tyres: pressure and damage
- Report any damage or other maintenance required

SUPPRESSION EQUIPMENT

HOSES AND HOSE REELS

- Check moving parts and grease if necessary
- Check hoses and fittings for damage
- Check O-rings and replace if necessary

PUMPS

- Flush clean with fresh water

KNAPSACKS

- Empty and dry
- Lubricate spray wand and O-rings
- Store so nozzles won't be damaged

HAND TOOLS

RAKE HOES, AXES AND SHOVELS

- Sand and oil or replace handles as necessary
- Store in vehicles or in a dry area in a safe manner where they can be accessed easily and do not present trip hazards

5.2 BURN DEBRIEF

The debriefing happens when everything is finished. It includes everyone involved in the burn.

It is an opportunity to:

- Discuss how the burn went
- Report any incidents
- Report any equipment breakdowns or repairs needed
- Make suggestions for improvements in future

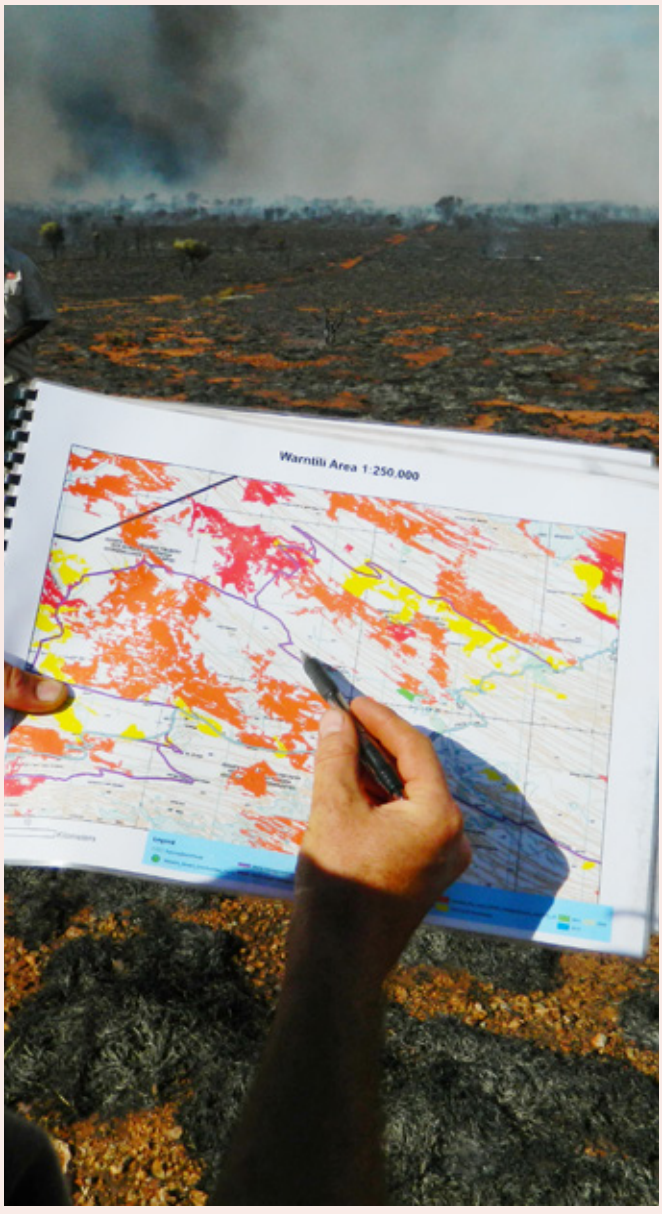
It is important to contribute any useful information to the debrief.

PROJECT

Participate in a prescribed burn job with your work team, including your supervisor and trainer.

You will need to:

- Help get the equipment and vehicles ready
- Wear your PPE as required
- Participate in the briefing
- Communicate with your crew and crew leader
- Help with all aspects of the burn: ignition, emergencies, mop-up
- Help clean and maintain equipment and vehicles
- Participate in the debrief



RESOURCES

R1 WHS LEGISLATION

JURISDICTION	LEGISLATION
Commonwealth	*Work Health and Safety Act 2011*
ACT	*Work Health and Safety Act 2011*
New South Wales	*Work Health and Safety Act 2011*
Northern Territory	*Work Health and Safety (National Uniform Legislation) Act*
Queensland	*Work Health and Safety Act 2011*
South Australia	*Work Health and Safety Act 2012*
Tasmania	*Work Health and Safety Act 2012*
Victoria	*Occupational Health and Safety Act 2004*
Western Australia	*Occupational Safety and Health Act 1984*

R2 BASIC TWO-WAY RADIO WORDS & PHRASES

WORD OR PHRASE	MEANING
Affirmative	Yes
Break, Break	The following message is a priority
Come in **Go ahead**	Speak now I'm ready to listen
Disregard	Ignore what I just said
EMERGENCY EMERGENCY	Serious danger
I spell	I'm going to spell the next word using the phonetic alphabet. (You might want to look up the phonetic alphabet to spell out words over the two-way radio, e.g. Alpha, Bravo, Charlie.)
I say again	I am repeating the same message
Negative	No
Out	I have finished talking to you and I do not expect a reply
Over	I have finished talking to you and I expect a reply
Reading you	I can hear you
Reading you loud and clear	I can hear you loud and clear
Roger	I understand your message
Say again	Repeat all of your last message
Standby or Wait out	Wait for a short period and I will get back to you
Wait	Wait for a short period and I will get back to you
Wrong	I made a mistake in my message and I will start again

GLOSSARY

Extinguish	When you extinguish a fire, you put it out.
Ignition	Ignition is when you light something. This can be done by putting a spark to fuel.
Perimeter	The perimeter is the outside edge of an area.
Prevailing	The prevailing wind is the main wind. This term is used to talk about wind direction.
Suppression	To suppress something means to stop it. Suppression is the act of stopping something.
Add your own words and meanings here	

REFERENCES

Bush Fires Board of WA. (1997). *Firefighters course module 1: Safety and survival*. Bentley, WA: Author.

Bush Fires Board of WA. (1997). *Firefighters course module 2: Wildfire behaviour*. Bentley, WA: Author.

CFA (n.d.). *Grassland curing guide* [pdf document]. Burwood East, VIC: Author.
Retrieved from http://www.cfa.vic.gov.au/about/guides/

CSIRO. (2011). *Fuel moisture and bushfires* [Webpage].
Retrieved from http://www.csiro.au/Outcomes/Safeguarding-Australia/FuelMoistureAndBushfires.aspx

CSIRO and FESA. (1997). *CSIRO grassland fire spread meter.* Highett, Victoria: CSIRO.

CSIRO, FESA and Bush Fire Service WA. (1997). *Grassland fire danger meter.* Highett, Victoria: CSIRO.

Department of Industry. (2014). *Workplace English language and literacy: Conservation and land management*. West Perth, WA: WestOne Services.

Dyer, R., Jacklyn, P., Partridge, I., Russell-Smith, J. and Williams, D. (Eds). (2001). *Savanna burning: Understanding and using fire in northern Australia*. Darwin, NT: Tropical Savannas CRC.

Fire and Emergency Services Authority of WA and Department of Conservation and Land Management of WA (2000). *Module 2.28 wildfire behaviour 2: Preventing and reducing the effects of fire*. Perth, WA: Authors.

Fire and Emergency Services Authority of WA (2008). *Grass curing visual guide for Western Australia*. Perth, WA: Author.

Flavelle, M. (2002). Kimberley grasslands field curing guide. Broome, WA: Kimberley Regional Fire Management Project.
Retrieved from http://savanna.org.au/search/downloads/KimberleyGrasslandsFieldCuringGuide.pdf

Kawalilak, R. and Higgs, N. (Eds). (1998). *Safety in bushfire control*. Como, WA: Department of Conservation and Land Management.

Wildfire Management Branch, Ministry of Forests, Lands and Natural Resource Operations, Province of British Columbia. (nd). *Fighting fire & fire behaviour FAQ* [Webpage].
Retrieved from http://bcwildfire.ca/FAQ/behaviour.htm

Published and distributed by
Greening Australia
1 Underwood Avenue
Shenton Park
Western Australia 6008
T: 08 9287 8300
E: per.general@greeningaustralia.org.au
W: www.greeningaustralia.org.au

ISBN: 978-0-9942059-6-4

Project Manager: Mike Clark

Authors and instructional designers: Catherine Ralston and Volker Mischker

Aboriginal advisors: Wayne Barbour

Technical advisors: Volker Mischker, Gavin Wornes and Wayne Barbour

Artwork photography: TASWA Training Consultants and Greening Australia unless otherwise stated

Editing: Madelaine Dickie

Proof: Ruth Davies (centrEditing)

Graphic design: Square Peg Design

ALEP

Aboriginal Landcare Education Program

ASSIST WITH PRESCRIBED BURNING

This learning guide covers information about helping with managed burns for agricultural or natural resource management purposes.

To successfully help out with a managed burn job, you need to know how to get ready for the burn, assist with the burn and clean up after the burn.

Topics include:

- WORKPLACE HEALTH & SAFETY
- LEGISLATION
- FIRE BEHAVIOUR
- PREPARE VEHICLES & EQUIPMENT
- SUPPORT PRESCRIBED BURNING
- CLEAN AND MAINTAIN VEHICLES & EQUIPMENT

ISBN 978-0-9942059-6-4 (2015)

For further information contact Greening Australia on

T: 08 9287 8300 E: per.general@greeningaustralia.org.au W: www.greeningaustralia.org.au

bhpbilliton resourcing the future

Greening Australia