



You are about to look at the major impacts of bushfires.

As you work through the information, summarise your ideas in a table like this. Some examples have been done to help you.

Impact on ...	Immediate impacts of a fire	Longer-term impacts of an inappropriate fire regime
People		
Property		
Native animals	<i>Some perish, many are able to escape, some become prey through lack of cover, others are able to take advantage of the lack of cover and find prey more easily.</i>	
Vegetation		
Insects		
Farm		
Business		
Economy		
Water		<i>If water in a catchment is polluted by erosion of the soil this could create a crisis in the area's drinking water supply.</i>
Air		
Other? (List any)		

**Impacts of bushfire on the natural environment**

The impacts of bushfires on the environment can differ according to the nature of that environment.

Here are two case studies of fire in two common but different vegetation types — a eucalypt forest, and tropical savanna. The description is of the impacts of an individual fire, but the more important element is not the effects of a single fire, but of a fire regime in the area — that is, the sequence of fires over a period of time.

*Case Study 1:  
Eucalypt forest*

*Characteristics*

A eucalypt forest is characterised by a large eucalypt overstorey, with a multi-layered structure of smaller trees, then bushes and grass.

*Trees*

These require a high intensity fire for germination. Such a fire also changes the amount of light, transpiration and wind, so that the nature of the vegetation cover can be changed.

If fires are too frequent, some species, such as the mountain ash, will disappear to be replaced by others that are more fire-tolerant.

The entire overstorey could be changed in this way.

[http://audit.deh.gov.au/ANRA/vegetation/docs/biodiversity/bio\\_assess\\_acacias.cfm](http://audit.deh.gov.au/ANRA/vegetation/docs/biodiversity/bio_assess_acacias.cfm)

*Animals*

Many individuals are killed during fires, but rarely so many as to threaten a species. Others are subject to predation after the fire through lack of cover. Mobile animals are best able to survive. Some, such as wombats and echidnas might be able to shelter in burrows or logs. Snakes flee. Possums may seek safety up high.

*Insects*

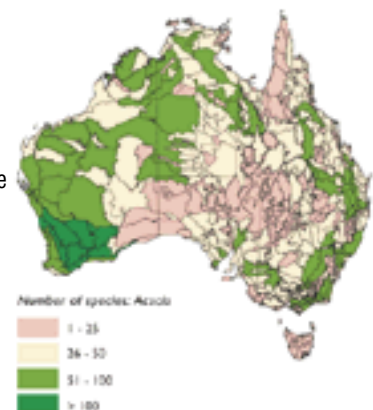
Many are killed by the burning of the bark and litter that are their preferred habitat. Flying insects can flee.

*Soils*

Low intensity fires result in little change, but high intensity ones may alter the chemical structure of the soil. They may cause a change in the soil's permeability (its ability to absorb water) and create erosion.

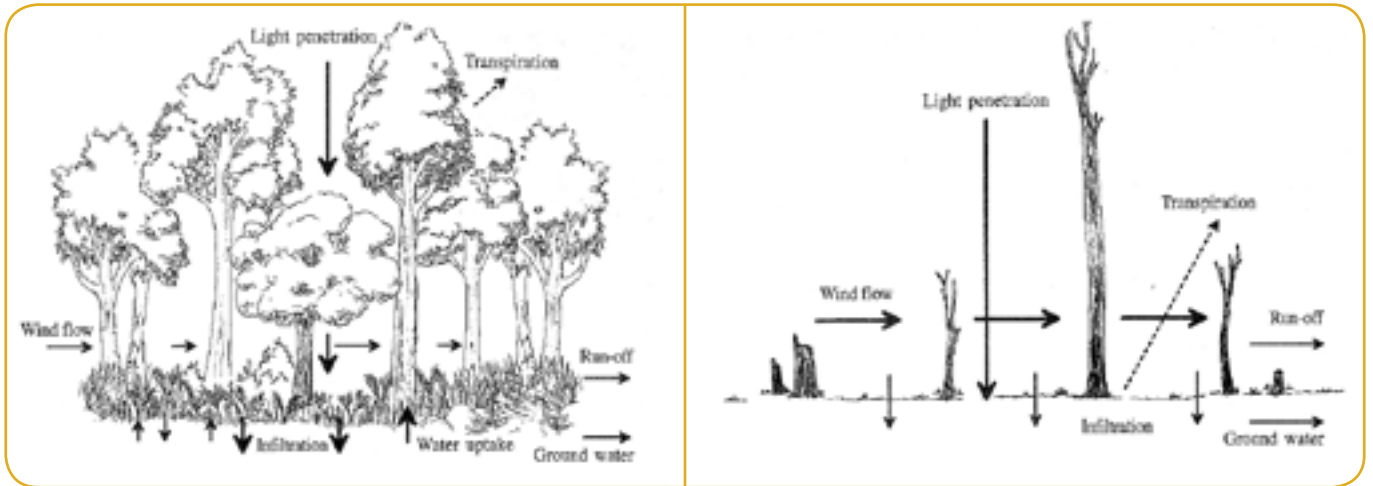
*Water*

Fires can affect streamwater quality through the flushing of soil and nutrients into the streams if there is heavy rain soon after the fire.



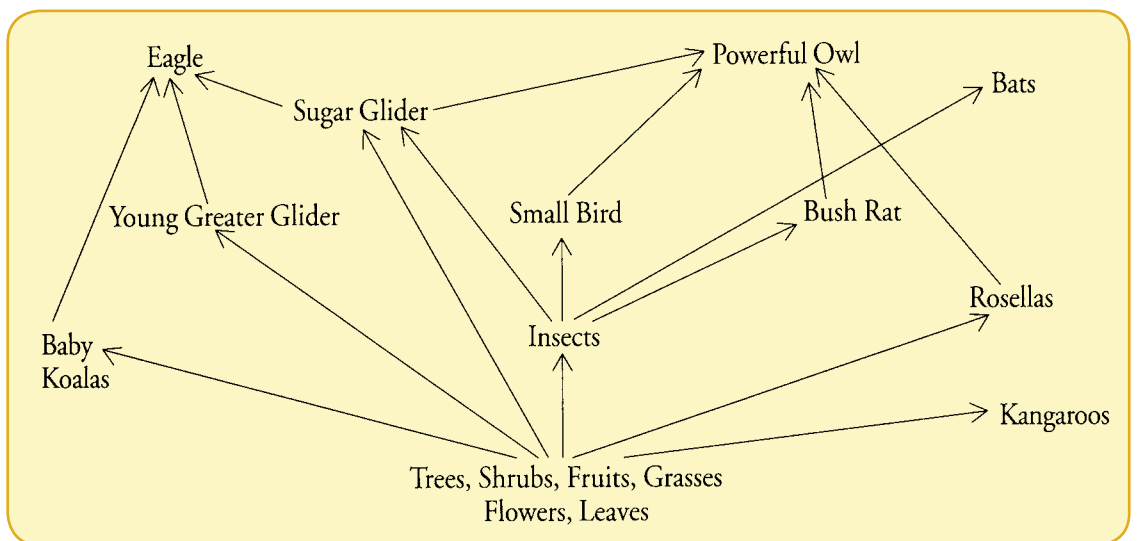
[http://audit.deh.gov.au/ANRA/vegetation/docs/biodiversity/bio\\_assess\\_acacias.cfm](http://audit.deh.gov.au/ANRA/vegetation/docs/biodiversity/bio_assess_acacias.cfm)

- 1 Add information to the table.
- 2 Use this diagram to explain what happens to light penetration, transpiration and soil erosion after a major high intensity fire. ↓



Forests and Fire, Department of Natural Resources and Environment, Melbourne, 1998 page 22

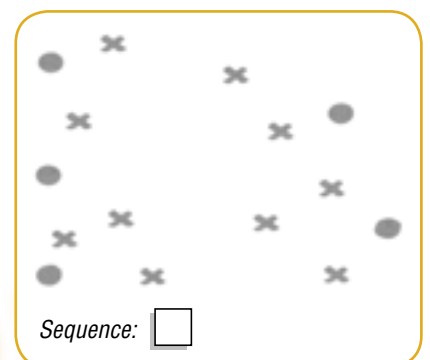
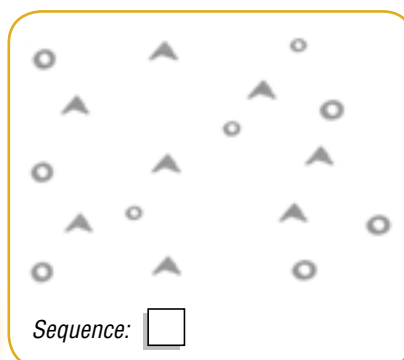
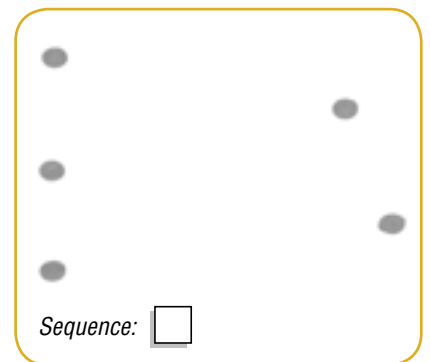
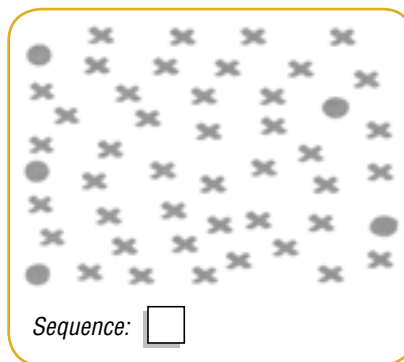
Here is a food web found in an ecosystem. →



Forests and Fire, Department of Natural Resources and Environment, Melbourne, 1998 page 19

- 3 Which animals are most likely to escape?
- 4 A Greater Glider might escape the fire, but not the after-effects. Why?
- 5 After fire, animals that live on the ground and under shrubs are more visible and have fewer places to hide. Which of the animals above might benefit from this?
- 6 Wombats and koalas both live in a forest. Compare their chances of surviving a fire.
- 7 Sequence this diagram 1-4 showing different stages before and after a bushfire. →

- KEY
- Mature mountain ash
  - × Regeneration (including canopy and understorey plants)
  - Burnt tree
  - ▲ Understorey plant



Forests and Fire, Department of Natural Resources and Environment, Melbourne, 1998 page 21

## Case Study 2: Tropical savanna

### Characteristics

Tropical savanna covers 25 per cent of the Australian landmass. It is the vegetation and area that burns most frequently. There are different types of fires, depending on the timing of the fire. Most fires are started by lightning strikes. Early dry season fires tend to be low intensity, as the fuel still contains moisture from the preceding wet season; later dry season fires can be high intensity, as the fuel has dried out. The intensity of the fire also depends on how long it has been since the last fire: frequent fires thin out the fuel available; long gaps between fires leads to a build-up of fuel, and consequently much fiercer fires.

### Air

In a typical year, tropical savanna burning releases about 80 million tonnes of the greenhouse gas carbon dioxide (CO<sub>2</sub>) into the atmosphere. This compares with about 70 million tonnes from Australian vehicles and industry each year. However, the following growing season absorbs about the same amount each year in the savanna.

### Soil

Each fire reduces the nitrogen content of the soil, impoverishing it.

### Water

The effects of savannah burning on streams can be dramatic. It creates erosion, and consequently a degraded water quality. Some water-borne vegetation benefits from this infusion of nutrients in the water.

<http://savanna.ntu.edu.au/centre/>

### Animals

The major effect of fires on animals in the area is indirect — it changes the nature of the habitat and food supplies, and creates the risk of predation due to loss of cover. Some animals become 'winners', with easier prey available, and others become 'losers', as they turn into easy targets.

Small mammals such as bandicoots are very vulnerable to fire, as they cannot escape. Larger species such as dingoes easily outrun it, and can move into unburnt areas. Tree-dwelling species such as possums are especially vulnerable to late season, high intensity fires. There is no one type of fire that benefits all species.

### Birds

Many take advantage of fire. Flocks of black kites gather at fire fronts, eating insects and other small animals flushed out by the flames. After fire, scavenging birds such as hawks and kookaburras feed on dead and injured animals, and on exposed seeds and nuts, and a few weeks later on insects attracted to new growth. Birds such as Partridge Pigeons and finches and honeyeaters, who often nest on the ground or very low in trees, lose habitat.

### Reptiles

Predatory and scavenging reptiles such as snakes and goannas 'clean up' after fires.

### Insects

Fires have little overall effect on them, regardless of the type of fire.



<http://savanna.ntu.edu.au/centre/>

#### 1 Add any information to your table.

The National Museum of Australia includes part of this statement by Bill Neidjie, an Indigenous man of the Kakadu area. →

- 2 What effects does fire have on this environment?
- 3 Why would Indigenous people in the area want to encourage this?
- 4 Does this action seem controlled or random? Explain why. To help you answer this question further, look at page 13, 'Traditional Aboriginal management' and 'Tropical savanna management today'.

**T**his earth ...

I never damage,

I look after.

Fire is nothing,

just clean up.

When you burn,  
new grass coming up.

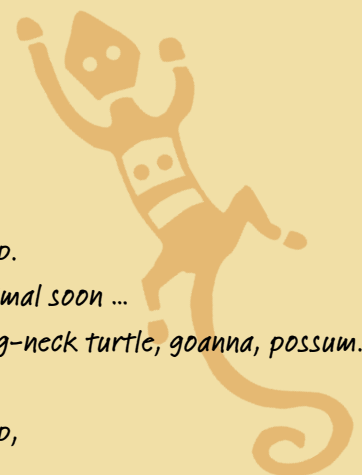
That mean good animal soon ...

Might be goose, long-neck turtle, goanna, possum.

Burn him off ...

new grass coming up,

new life all over.



## Impacts of bushfire on the built environment

Destructive bushfires have a long history in Australia. The Museum display includes a list like this:



↑ National Museum of Australia, Bushfire timeline from 1851 till 2003  
Photograph George Serras

Year	Place	Approximate or estimated deaths and building destruction
1851	Victoria	12 people killed
1898	Victoria	12 people killed, 2,000 buildings destroyed
1926	Victoria	31 people killed
Jan 1939	Victoria, NSW	71 people killed, 1,300 buildings destroyed
Jan 1944	Victoria	51 people killed, 700 buildings destroyed
1957	NSW Blue Mountains	25 homes, shops, schools, churches and a hospital
Jan—Feb 1962	Victoria	9 people killed, 600 homes destroyed
Jan—Feb 1965	NSW, Victoria	11 people killed
Feb 1967	Tasmania	65 people killed, 1,400 buildings destroyed
Nov—Dec 1968	NSW Blue Mountains	14 people killed, 150 buildings destroyed
Jan 1969	Victoria	23 people killed, 240 buildings destroyed
Feb 1977	Victoria, South Australia	5 people killed, 80 buildings destroyed
Feb 1983	Victoria, South Australia	103 people killed, 2,819 buildings destroyed
1994	New South Wales	4 people killed, 206 buildings destroyed
Jan 2003	Canberra	4 people killed, 500 buildings destroyed

Table based on display in National Museum of Australia and Peter Clack, *Firestorm*, Wiley, Brisbane, 2003 pages 15–18

## Murray Nicoll

(RADIO ARCHIVE, Adelaide 'Ash Wednesday' bushfires, 1983)

We are crouching down behind — behind a farmhouse. There are children. (Gasps) The sky is red and then white. It's going crazy. The fire's jumped 100 feet high, 150 feet high, straight over the top of Green Hill Road. There are a dozen people here with me. We can hardly breathe. The air is white with heat. There's smoke and it's red and there are women crying and there are children here and we are in trouble ...

At the moment, I'm watching my house burn down. I'm sitting out on the road in front of my own house where I've lived for 13 or 14 years and it's going down in front of me. And the flames are in the roof and — Oh, God damn it. It's just beyond belief — my own house. And everything around it is black. There are fires burning all around me. All around me.

And the front section of my house is blazing. The roof has fallen in. My water tanks are useless. There is absolutely nothing I can do about it.

[www.abc.net.au/dimensions/dimensions\\_in\\_time/Transcripts/s678221.htm](http://www.abc.net.au/dimensions/dimensions_in_time/Transcripts/s678221.htm)

1 Brainstorm to create a list of the impacts on the built environment that such bushfires could be expected to have. For example, there would be destruction of telephone wires, water tanks, farm animals, etc. Add these to your list.

## Impacts of bushfire on the people's lives

The list opposite shows many human deaths from bushfires. While this is the most serious of impacts, bushfires can have many other impacts on people as well. Read the following evidence, and answer the questions that follow.

I've lived through two fires. I remember the first one, over 30 years ago, left much bitterness in the community when firefighters had to decide which houses to sacrifice, and which to save. Those decisions have divided that community to this day. And communities have not forgotten. There is still memory, fear and loss of precious items.

Canberra resident, interview 2004

A

This wasn't just our disaster. This was a disaster that stretched across two states, and within 100 metres of my place five people died. We just lost a house. They lost their lives. Thousands of families were affected that day. That was a bad day for a lot of people.

Murray Nicoll remembering the 1983 'Ash Wednesday' bushfires in Adelaide, [www.abc.net.au/dimensions/dimensions\\_in\\_time/Transcripts/s678221.htm](http://www.abc.net.au/dimensions/dimensions_in_time/Transcripts/s678221.htm)

B

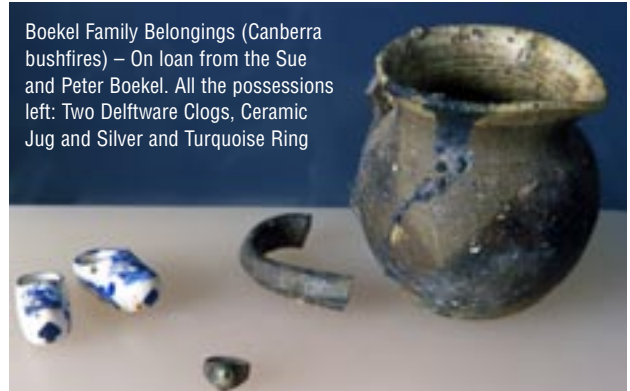
Both A and B above refer to large bushfires in the past. The most recent major fire was in January 2003. While that disaster affected Canberra people, their recollections help us to understand the impact that fire has on all Australians who experience it.

A pair of Delft ceramic clogs sat there smugly, apparently unharmed by their recent return to the kiln-like heat. Pete's Dutch parents had recently returned from Holland and had taken great delight in presenting us with those clogs.

The ceramic jug was a modest piece with a history that escapes me but is clearly a little hero now. All sorts of molten material seem to have adhered to its body while the handle, weakened by its ordeal, lay at rest.

The silver and turquoise dress ring was found amongst the molten remains of my once extensive brooch collection. I was never known not to wear a brooch. The ring was the first I had ever bought as a teenager — how I loved that ring.

Sue Boekel  
National Museum of Australia



Boekel Family Belongings (Canberra bushfires) – On loan from the Sue and Peter Boekel. All the possessions left: Two Delftware Clogs, Ceramic Jug and Silver and Turquoise Ring  
Photograph George Serras

**C**

We ... thought we'd try to get back [home] to see whether anything could be saved. We had hundreds of books, collected over thirty years, many of them expensive and very rare medical volumes that can't be replaced. All our medical equipment and patient records were there too. Chinese paintings, photos, voice recordings we'd made when the children were little, our sons' violin and piano. Everything.

Yang Xue and Xue Song Liu, in Stephen Matthews, *'How did the fire know we lived here?'*, Ginninderra Press, Canberra, 2003, pages 74–75

We have all read of some appalling events, such as stealing from burnt homes, lighting fires and so on, but I want you to know that there are some wonderful young people in Canberra ... All appeared lost [at our home] when, out of the smoke and grit, four young men arrived with buckets and, by constant bucketing water from the swimming pool, the house was saved. Nobody knew who they were — no names or from where they came — but these bucket angels worked so hard and disappeared, no doubt to help someone else.

Joan Hanks in Stephen Matthews, *'How did the fire know we lived here?'*, Ginninderra Press, Canberra, 2003, page 125

**D**

Some neighbours told us stories of how they'd been there all night battling spot fires. We felt guilty for not having stayed. But they all shook their heads at us and said, 'Everybody understands why you went. You've got kids.'

Karan Gabriel in Stephen Matthews, *'How did the fire know we lived here?'*, Ginninderra Press, Canberra, 2003, page 154

**E**

Thanks to all the volunteers, fire-fighters, police and officials who did their best in an impossible situation. Thanks to the ACT government and its officials for the prompt response to people in need. Thanks to the people who manned the recovery centres for long hours in sweltering temperatures. Thanks to all my close friends who have supported my family and me since our loss. Thanks to all the people — those that I barely knew, and the perfect strangers who I knew not at all — who stepped up to give me a hug and a word of encouragement. Thanks to the shopkeepers, the bank officials and the people in government offices who have bent over backwards to help. If I had a tear in my eye at different times, it was not for my situation, but because I was deeply touched by the generosity and kindness of people everywhere ... The one low note is the real estate woman who offered me a house to rent, which I accepted, and then offered it to other people at a higher rental.

Des Fooks in Stephen Matthews, *'How did the fire know we lived here?'*, Ginninderra Press, Canberra, 2003, pages 159–160

**F**

Our cattle survived but were sold the next day, as we have no fences, feed or water. The farm is ruined. It will take years to restore our sheds, cars, hay, machinery and infrastructure.

Dorothy Topfer in Stephen Matthews, *'How did the fire know we lived here?'*, Ginninderra Press, Canberra, 2003, page 172

**G**

Brindabella and Namadgi National Parks are now little more than eerily silent graveyards for the flora and fauna that once inhabited them. I drive through them a few times each week and grieve for what was lost through what I believe was a needlessly hot and long fire.

David Menzel in Stephen Matthews, *'How did the fire know we lived here?'*, Ginninderra Press, Canberra, 2003, page 177

**H**

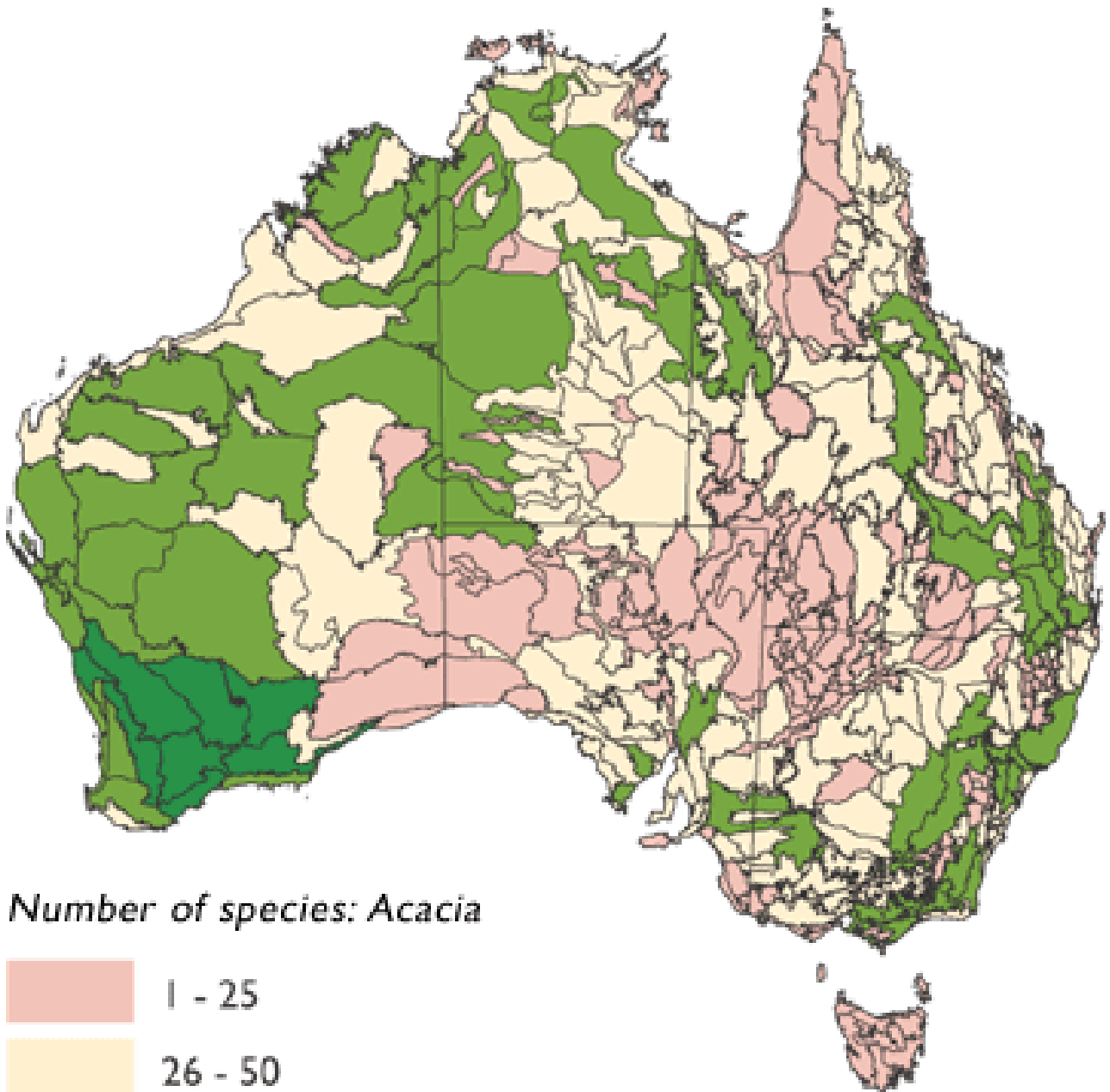
**I**

**1** What different types of impacts of bushfires are included here? For example, there is loss of possessions, but also a loss of amenity.

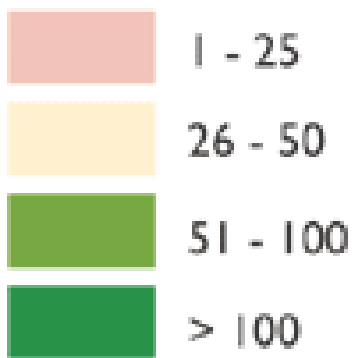
**2** Are there any good aspects that result from a bushfire?

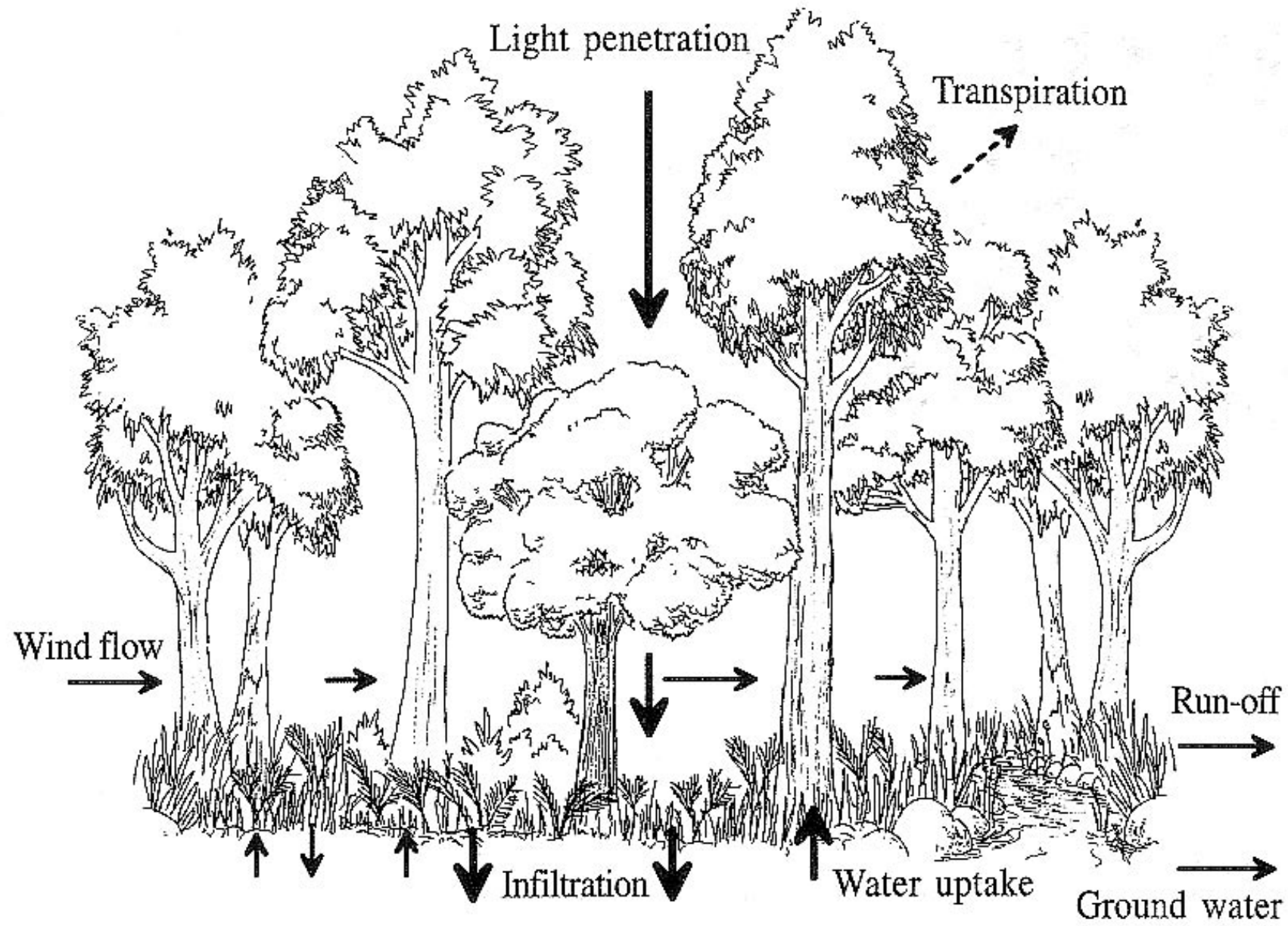
**3** Add any information to the table.

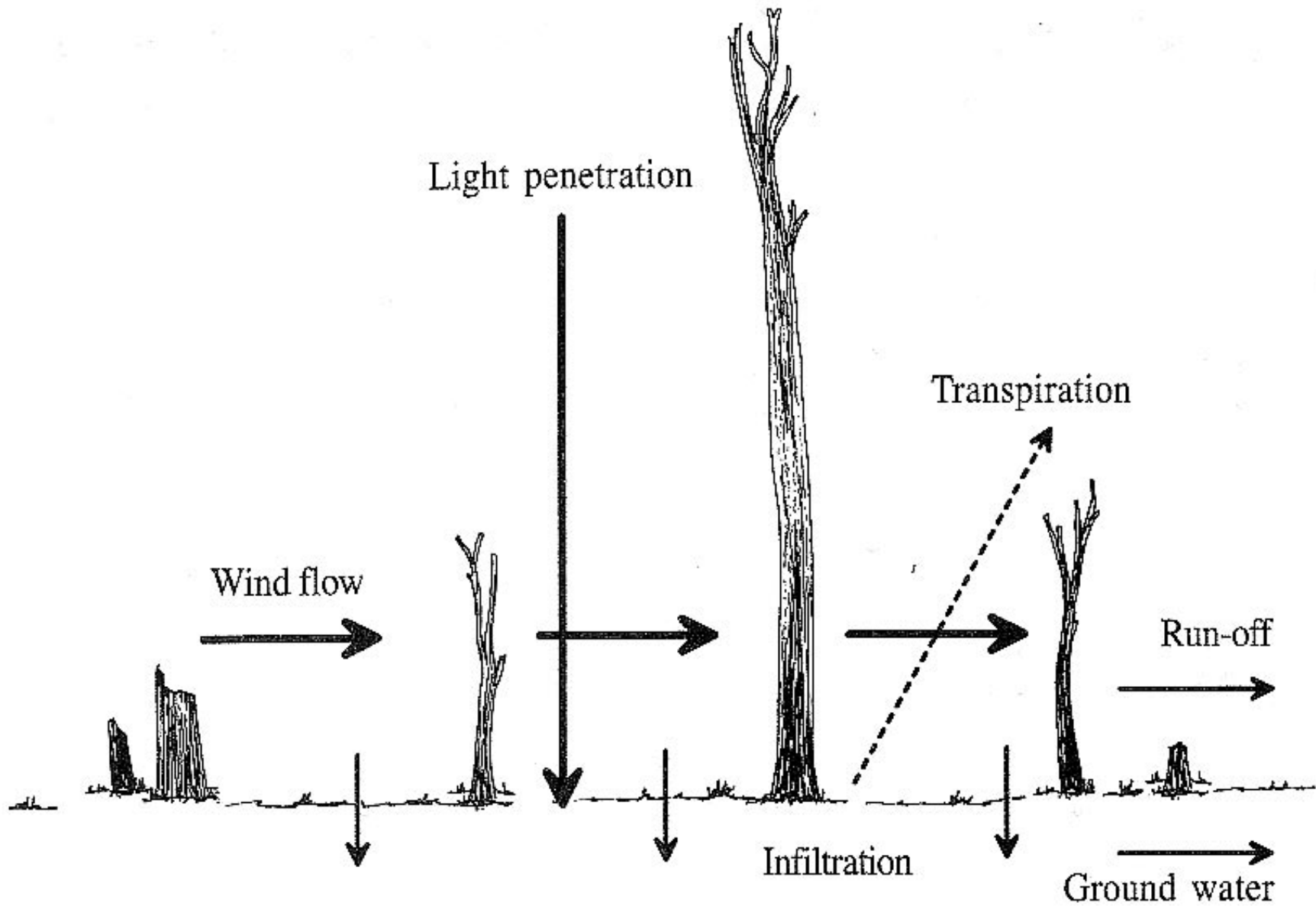
**4** Talk to people in your community about their bushfire experience. Are they similar to the stories from the Canberra people above?



*Number of species: Acacia*













**Ash Wednesday, 1863**  
Victoria, South Australia  
418,000 heathens burnt  
121 dead  
2,879 buildings lost  
more than 100 fires  
\$440 million damage  
*I could not believe the speed  
at which the flames moved -  
there is no way you could have  
beaten it running.*

**Black Friday, 1838**  
Victoria  
1.2-2 million heathens  
77 dead  
600 buildings destroyed  
*Nothing like the rage of the  
demon had ever gripped  
melancholic Victoria.*

**Black Thursday, 1812**  
Victoria, New South  
Wales, Western Australia  
and New Zealand  
The ash under spreading  
concentric every  
direction of the wind like a  
sheet of fire out of a furnace

1939

1898

