

Caring for your creek-lines to reduce bushfire risk



Key Points

Creek-lines are a valuable asset to any property and offer many environmental and production benefits.

In general, creek-lines can slow down the speed of fire across a property.

Fire intensity within the creek-line can be reduced with appropriate plant selection, spacing and woody weed control.

Vegetation around creek-lines should be left to grow naturally except when it is near built assets or part of an ecological grazing regime.

In most cases, grazing near or in creek-lines damages the environment and water quality downstream.

If grazing is your only option, the correct livestock selection, grazing duration and time of year is critical to avoid damage to your creek-line (see Page 12).

Fencing off your creek-line will improve water quality and biodiversity, stabilise the stream bed and banks and create an enjoyable nature space.

Introduction

Many landholders are concerned that the vegetation in their creek-line may make their property more at risk from fire. While this is understandable, it is often not the case. Many creek-lines can actually help reduce fire risk, and this happens in several ways.

Creek-lines are wetter and cooler than the surrounding area, particularly in the first half of summer. If a moving fire comes into contact with this cooler microenvironment, it will naturally tend to slow down. The trees and vegetation in creek-lines also provide a welcome windbreak to reduce the speed of fire travelling across the landscape.

We need to look after our creek-lines, not just because they can be an asset in the event of a bushfire, but also because of the many values they offer to our properties. Creek-lines can host a huge number of native plant and animal species and this biodiversity is important to the biological functioning of your property. Creeks and waterways continue to hold cultural significance and importance to First Nation Groups, who lived by them and were sustained by them for thousands of years. Creek-lines also provide cool shady areas to enjoy nature which brings joy and beauty to our lives.

In most cases, the only part of your creek-line where vegetation needs to be managed with grazing to reduce fire risk is where it runs close to built assets. The rest of the creek-line should be allowed to be left alone to grow naturally. This will be greatly helped by fencing off these areas from livestock, which damage creek-line environments and water quality.

While allowing livestock into creek-lines to graze is a common practice, there are other effective ways to safely manage vegetation along creek-lines, while protecting this fragile environment at the same time.

This fact sheet explains why we should value creek-lines, how fire behaves around creek-lines, how to protect your built assets, and tips for managing any necessary grazing around creek-lines to reduce impact. On page 14 and 15, you will find a detailed plan for how to fence off creek-lines to successfully manage this precious asset and reduce fire risk.

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Mountain galaxias (*Galaxias olidus*)



Sacred kingfisher (*Todiramphus sanctus*)

Importance of creeks and impacts of grazing

Why are creeks important for your property?

Have you ever wondered about the role your creek-line plays for the rest of your property?

Creeks provide a home to many unique plants and animals (e.g. reed warbler, crested shrike-tit and sacred kingfisher) that are adapted to a wetter environment than the surrounding landscape.

Many creek-lines have permanent waterholes through summer, providing the last refuge for plants and wildlife including mountain galaxias. This native fish species relies on year-round water to survive.

Creek-lines can also help in the event of a bushfire. Being vegetated, they act as wind breaks to slow down the speed of a bushfire. They often remain damp into summer, creating a cool wet area which reduces bushfire risk.

Fenced revegetated creek-lines make good agricultural sense. They help manage livestock, provide shade, reduce the chance of livestock injury, eliminate access to contaminated drinking water, reduce wind speeds and wind chill across paddocks and provide habitat for beneficial insects.

Impacts of grazing

Grazing is commonly allowed in and around creek-lines. However, creek-lines are extremely sensitive and need to be managed as a separate part of the property, not as a continuation of the paddock.

Creek-lines are highly erodible due to the powerful energy of flowing water, and in most instances, grazing in creek-lines will worsen soil erosion. Creek beds and banks are easily damaged by grazing and concentrated hoof action, particularly when wet.

The weight of grazing animals and their hooves causes soil compaction. Compaction reduces plant growth as the compacted soil layer restricts the movement of water, air and roots through the soil.

Livestock can also impact native plants and habitat values through trampling or eating plants, reducing plant vigour, increasing disease risk and reducing a plant's ability to flower, set seed and regenerate. This also has impacts on the animals and insects that rely on a healthy coverage of vegetation.

Giving livestock access to creek-lines will cause damage and pollution to permanent waterholes, harming native fish such as mountain galaxias and other aquatic species including insects that native fish feed on.

Local catchments supply drinking water to towns in the Adelaide Hills, Fleurieu Peninsula and suburban Adelaide. The turbidity caused by livestock soil disturbance, as well as faeces and urine, pollutes water and can result in pathogenic and algal outbreaks, such as cryptosporidium and blue-green algae. This results in higher water treatment costs for taxpayers.

Animal health can be negatively impacted through the consumption of their faeces and urine as they graze in a creek-line. Good animal husbandry requires that grazing animals are given dedicated troughs for clean drinking water.

Behaviour of fire around creek-lines

As a landholder, minimising bushfire risk is of ongoing and critical importance. By understanding how fire behaves in and near creek-lines, we can implement management practices that minimise bushfire risk without causing lasting environmental impacts.

Common questions about fire behaviour and creeks

Can creek-lines act as a windbreak to slow down fire?

Yes. Healthy creek-lines can slow fire down. The over-storey canopy in a well vegetated creek-line can act as a windbreak and slow down the wind speed and hence the rate of spread of fire especially on the down-wind side. A fast moving, wind driven grass/paddock fire will be slowed down by the vegetation in the creek-line, much like a windbreak of trees and shrubs would do.

Do creek-lines act as wicks, causing fire to travel along their length?

In general, no. Fire moves more quickly through open country than vegetated areas. Wind direction and speed will determine whether a fire will travel along the length of a creek-line. If the wind direction is parallel to

the creek-line, the fire will move a lot slower along the creek-line compared to the surrounding paddock. If the wind direction is travelling across a creek-line, the fire will be much less likely to travel laterally along the length of the creek-line. However, on properties where paddocks are overgrazed as a bushfire prevention strategy, creek-lines can act as wicks if the wind direction is parallel to the creek-line, as that will be the only fuel available to burn. Overgrazing is definitely not a recommended land management strategy.

Does green vegetation and damp soil in a creek-line slow fire down?

Yes. If the ground-storey vegetation is growing in damp or wet soil, these plants are often better hydrated and less inclined to ignite than water-stressed plants in drier locations. Often these damp low areas are the least impacted by fire across your property and may not burn at all.

Does the type of vegetation in my creek impact fire intensity?

Yes. The main driver of fire intensity in a creek-line is the mid-storey vegetation layer (in particular shrubby wattles and woody weeds). Thicker/taller vegetation in the mid-storey can potentially lead to increased flame heights, heat output and spotting. If this layer is dense, it provides a ladder for the fire to climb into the upper-storey tree canopy.

Are grass dominated creek-lines less of a fire risk compared to well vegetated creek-lines?

That depends. Grassy creek-lines will burn more quickly but less intensely and will enable better fire-fighting access than well vegetated creek-lines. However they will not provide a wind break and slow a fast moving fire to the same extent. Native grasses burn with less intensity than introduced grasses such as phalaris and wild oats. This is because native grasses produce much less biomass (fuel) and are therefore a reduced fire risk.

Will the native vegetation in my creek-line suffer from a bushfire?

No. Australian native vegetation is adapted to fire and will generally regenerate without any help (besides weed control).

Can I make it easier to extinguish a creek-line fire?

Yes. The main risk that creek-lines pose is they are sometimes inaccessible and fires within them are often difficult to fully extinguish and mop-up via air and ground resources. You can make your creek more accessible for fire fighting by choosing appropriate plant species, planting them well apart and keeping woody weeds under control. See breakout box *Tips on reducing fire risk from creek-line vegetation*.

Is it necessary to graze my entire creek to reduce the risk of fire?

No. The priority is to protect your important built assets such as your house and sheds. Some people believe that reducing fuel levels across all areas of their property is essential, but most of the time this is not practical or necessary. The vegetated creek-lines further away pose much less risk to built assets and do not need to be grazed.

TIPS ON REDUCING FIRE RISK FROM CREEK-LINE VEGETATION

- Maintain access to the creek-line by removing dense woody weeds such as blackberry and gorse as they can burn with greater intensity compared to grass.
- To reduce the chance of ember attack, particularly near built assets, plant smooth bark species such as river red-gums (*Eucalyptus camaldulensis*) and blackwood trees (*Acacia melanoxylon*).
- Ensure the creek-line is not densely planted – space trees 20m apart.
- Plant shrubby wattles such as golden wattle (*Acacia pycnantha*) no closer than 10m apart.
- Maintain a low fuel area either side of creek-line fence-lines.

Can well vegetated creek-lines increase ember attack to built assets?

Yes, but this risk can be greatly reduced by managing fuel levels in creek-lines close to built assets. However, if the ember attack originates from outside your property, there is very little you can do besides significantly reducing fuel levels around built assets and using appropriate construction to prevent embers entering your buildings.

Should I create a fire-break in creek-line vegetation?

Yes, in some cases, this might be useful. On lengthy vegetated creek-lines, creating a 30m wide break in the vegetation may provide a useable fire-break. These break areas could be created where the creek-line vegetation is sparse or at and around creek crossings (see diagram on Page 15.). However, if the Fire Danger Index (FDI) is 50 (severe) or above, when most bushfires occur, it may be dangerous to enter these fire-break areas to try to control a fire.



Creating a buffer to protect built assets near your creek

It is important to establish a safe buffer distance to maintain as a low fuel zone surrounding built assets and important infrastructure. Type of vegetation, legal requirements and distance from buildings all need to be considered.

Trees and shrubs to plant in the buffer area

When planning to revegetate your creek, if part of your creek-line is close to your or your neighbour's built assets, this area should only be planted with smooth-bark eucalypts such as river red-gums (*Eucalyptus camaldulensis*) or other smooth-bark local natives such as blackwoods (*Acacia melanoxylon*). These species need to be spaced at least 20m apart during planting to allow gaps in the canopy when the trees reach maturity. Smooth-barked trees generate less embers than species with stringy bark such as messmate stringybark (*Eucalyptus obliqua*) or with ribbon bark such as Tasmanian blue-gum (*Eucalyptus globulus*), the non-indigenous agroforestry tree.

When planting the mid-storey shrubs, it is best to plant them 10m away from other trees and shrubs to reduce the chance of a fire moving up into the tree canopy. In particular, shrubby wattles (*Acacia* species) only live for a few decades and once dead, exacerbate bushfire risk. Avoid planting shrubby wattles in your buffer area.

Legal considerations before clearing native vegetation in the buffer area

If the area has been previously planted with native trees and shrubs and the density creates a fire risk to your built assets, these natives can be legally thinned out to reduce the fire risk.

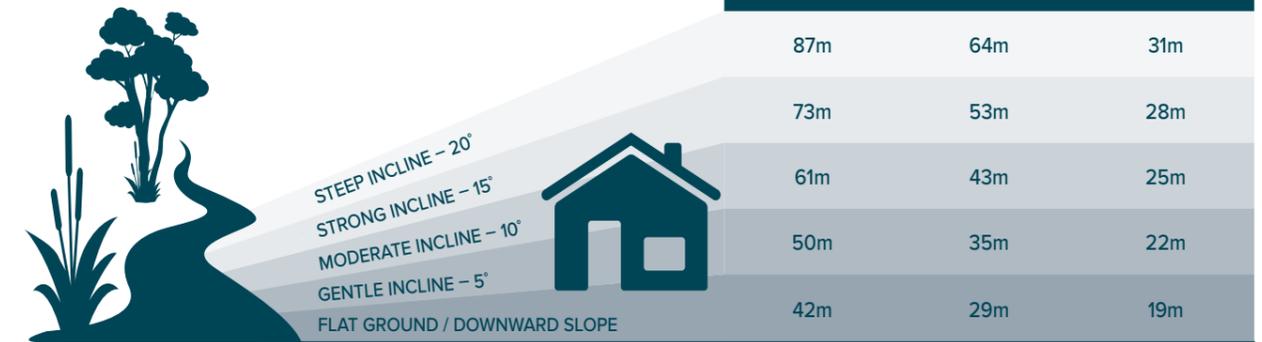
If the area contains local native plants which have grown naturally, the Native Vegetation Act (1991) states that clearance of all vegetation is allowed in the first 10m from your built assets. In addition, clearance of all vegetation apart from large trees is allowed from 10 to 20m from your house only.

Livestock grazing is considered a form of vegetation clearance. Landholders who want to begin grazing, modifying or removing naturally grown native vegetation outside these areas can apply to the Country Fire Service for approval. If your creek-line has always been grazed, you can continue to graze it without requiring legal permission.

Recommended fuel reduction distance from a built asset

The Australian Standard - Construction of Buildings in Bushfire Prone Areas, provides recommended buffer distances to manage native vegetation near built assets to reduce the impact of bushfire (Figure 1, below).

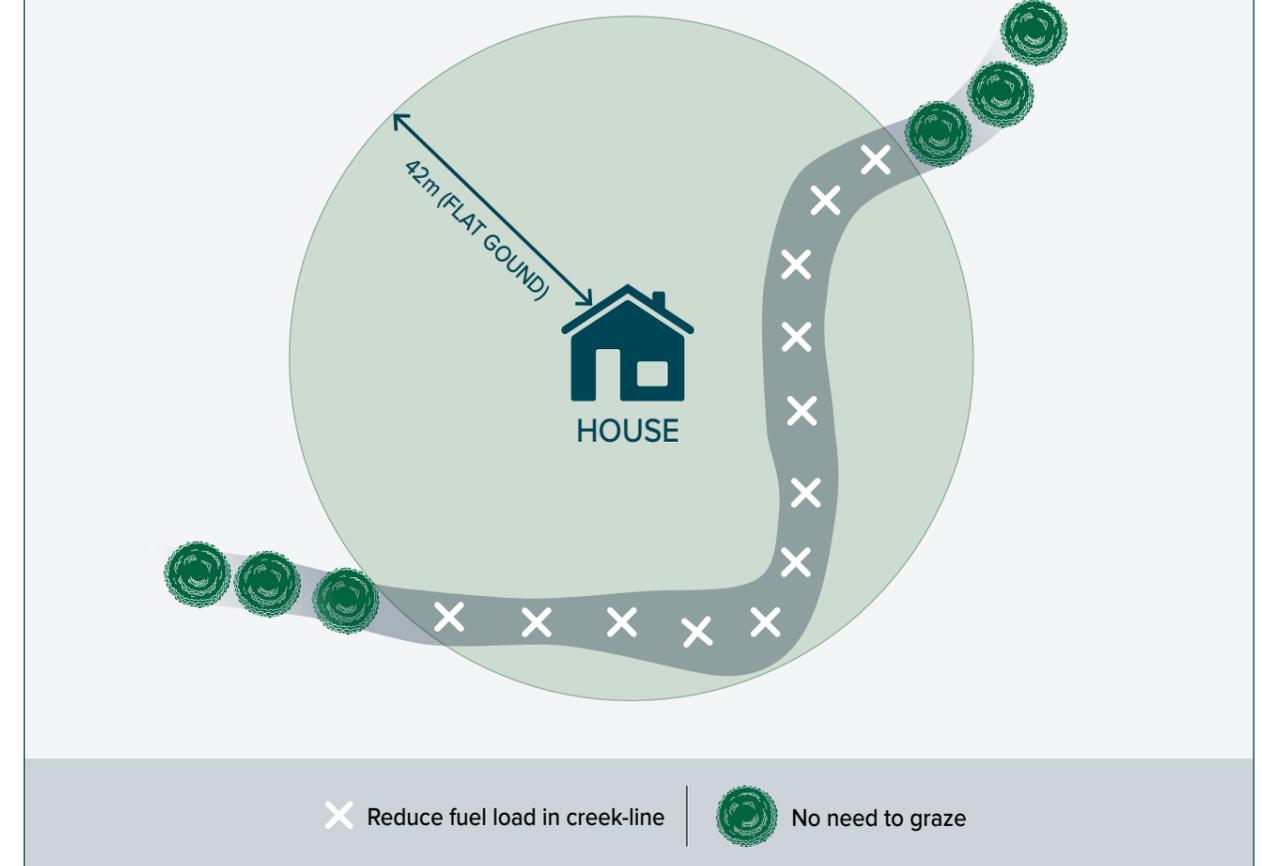
FIGURE 1 Minimum safe distance (in metres) between a building and an un-grazed well vegetated creek-line to limit radiant heat exposure to the building.



Adapted from the Department of Environment and Water, Managing Native Vegetation: How to reduce the impact of bushfire and the steps you need to take August 2020, Appendix 02, Table 1.

For example, Figure 2 shows a situation with a well vegetated ungrazed creek-line on flat ground that has 'tall trees with touching canopies'. The vegetation within 42m from the house is recommended to be managed to limit radiant heat exposure to the building.

FIGURE 2



Making informed decisions around the 'if, when and how to' graze

Most of the time, you shouldn't need to graze your creek-lines. However, if a stretch of the creek-line is near your built assets, grazing may be necessary to protect these from fire. This can be done in a way to protect the sensitive creek-line environment, through appropriate choice of livestock, duration and timing of grazing.

If your property is in a Mount Lofty Ranges reservoir catchment area, (see map on Page 10) the water in your creek-line is being used as drinking water by others. Any grazing in these creek-lines will contribute to water supply contamination.

The following decision tool will help you decide if, when and where to graze and what type of livestock to use, depending on your situation.

When considering grazing, use this tool to help you decide the best option for managing vegetation along your creek-lines.

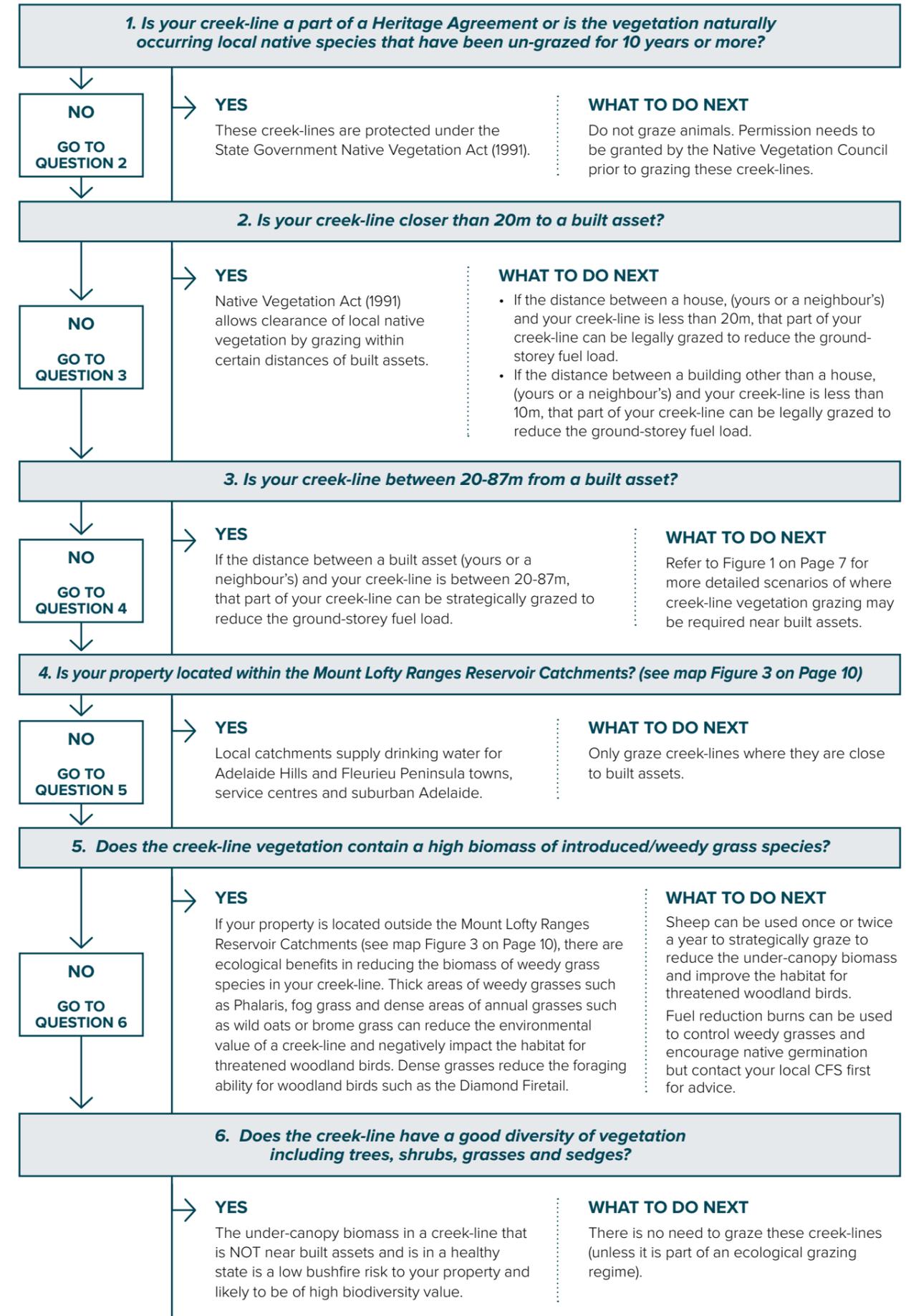
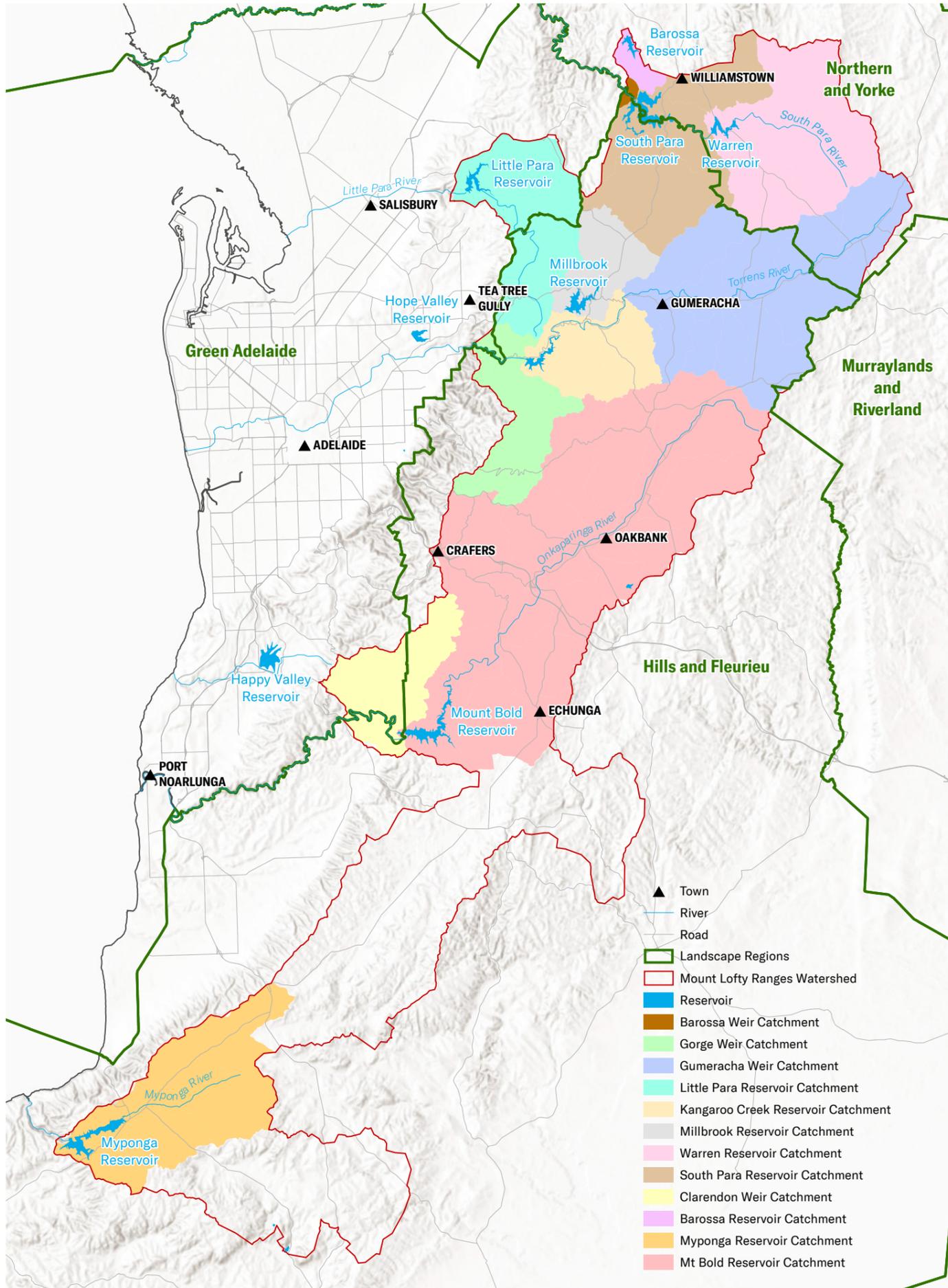


FIGURE 3

Mount Lofty Ranges Reservoir Catchments



A well-cared-for creek that has been re-vegetated appropriately to protect nearby built assets.



Minimising impact from crash-grazing

Often livestock are left to graze in creek-lines for too long and at inappropriate times of the year causing serious damage. Use the following information to help you improve the way you use grazing.

Duration

Ideally, grazing should occur with the maximum number of animals for the shortest time possible (e.g. a few days) to reduce grass to ankle height. This style of grazing is often referred to as 'crash-grazing'. Grazing in the creek-line requires careful management and observation to minimise the environmental impact. Before grazing, check your creek-line for habitat features or desirable vegetation you wish to protect or closely monitor during a grazing event.

Size of area

The size of the grazing area should be determined by the number and type of livestock used to reduce grass to ankle height after no more than a few days. Temporary electric fencing can be effectively used to

create smaller areas so that livestock can be moved on when most of the grass has been grazed down.

Timing

If crash-grazing is necessary, ideally landholders should aim to crash-graze once a year when the creek has dried out, usually between January to the end of March.

Where crash-grazing is required to protect built assets from summer bushfire risk, spring crash grazing may be unavoidable. However at this time of year the creek-line is often still wet, and soil and water quality will be impacted negatively by grazing. Landholders should aim to graze while the water in the creek-line is still flowing, as late in spring as possible, so urine and faeces can be dispersed and vegetation can recover on the disturbed soil once the animals are removed.

TIPS FOR CRASH-GRAZING

- Creek-line crash-grazing is the term used to describe grazing with the maximum number of animals for the shortest time possible to reduce grass to ankle height.
- Monitor grazing carefully to ensure soils, desirable plants or habitat features are not being degraded.
- Animals should never be grazed for so long that bare ground becomes visible.
- Grazed areas should be small. Animals should be removed after several days to minimise the time they spend in these sensitive areas.
- Crash-graze either when the creek has totally dried out in summer/early autumn or as late as possible in spring while the creek is still flowing.
- Sheep are preferred as they are the least damaging grazing animal.



Livestock choice

Grazing animals differ in the type and amount of vegetation they consume, the areas they access within the creek-line and the way in which they graze. This will influence how the vegetation, creek health, biodiversity and fire fuel loads will respond to the grazing event.

Although grazing a creek-line will always have adverse effects, there are relative **positives** and **negatives** to consider when choosing between grazing animals if they must be used.

	Positives	Negatives
Sheep	<ul style="list-style-type: none"> • Least damaging grazer in creek-lines compared with other livestock • Softer on the environment – they weigh almost six times less than cattle, with comparatively reduced soil disturbance, compaction and potential for erosion • Often avoid damp and wet ground when grazing, so they do not create as much damage to creek beds 	<ul style="list-style-type: none"> • More selective grazers compared to cattle, which means they reduce vegetation less evenly than cattle • Display more camping behaviour, which results in a high level of disturbance in a concentrated area • Less adapted to grazing tall dense grass, so are less effective at reducing fuel loads
Cattle	<ul style="list-style-type: none"> • Cattle can flatten tall grass, reducing the time needed to keep them in the creek-line 	<ul style="list-style-type: none"> • Heavy animals - adults can weigh up to 700kg or more • Cattle hooves can sink up to 15 centimetres into damp and wet ground, causing soil compaction, erosion and vegetation damage • Never graze dairy or beef calves in a creek as calf manure can be particularly high in pathogens dangerous to humans such as cryptosporidium
Goats	<ul style="list-style-type: none"> • May reduce the biomass of blackberries and other woody weeds to provide access for more effective control treatments • Like sheep, goats are a lighter animal compared with cattle 	<ul style="list-style-type: none"> • Least selective grazers, can damage or kill desirable native shrubs if left in a location for more than a few days • Harder to confine to a grazing area and may not respect temporary electric fencing
Horses	<ul style="list-style-type: none"> • May avoid the wetter creek channel or rough terrain 	<ul style="list-style-type: none"> • Not suitable as creek-line grazers as they are too heavy and can cause significant soil compaction and erosion • Least selective grazer and are unlikely to eat taller grasses, which makes them ineffective at reducing fire fuel loads • Risk of injury to horses due to terrain



How to fence off and protect your creek

Why fence off your creek-line?

Revegetating and fencing off creek-lines from grazing animals is the best way to protect and care for your creek. Creek-line fencing provides the landholder with more options for managing grazing animals. Landholders who fence off creek-lines and plant creek-line buffers with native vegetation improve water quality as the vegetation filters out nutrients and pathogens from farm paddocks. Slowing paddock run-off into the creek can reduce potential bank erosion. Well vegetated creek-lines increase biodiversity, stabilise the creek and create an enjoyable nature space. This benefits the entire region.

Distances from creek banks

The diagram on Page 15 shows the recommended creek-line fencing layout. It ensures there is adequate width on top of the bank for plant roots to stabilise the creek banks. These vegetation widths are sufficient to act as wind breaks and to achieve biodiversity benefits through habitat creation.

Design, materials and access

When designing your creek-line fencing, allow greater room between the fence and the outside bends of the creek-line. Creek-lines are dynamic and change overtime. The outside bends are the areas where we see the most erosion, particularly after large floods. If a creek bank is vertical on outside bends, it is most susceptible to collapsing and the fence will be undermined.

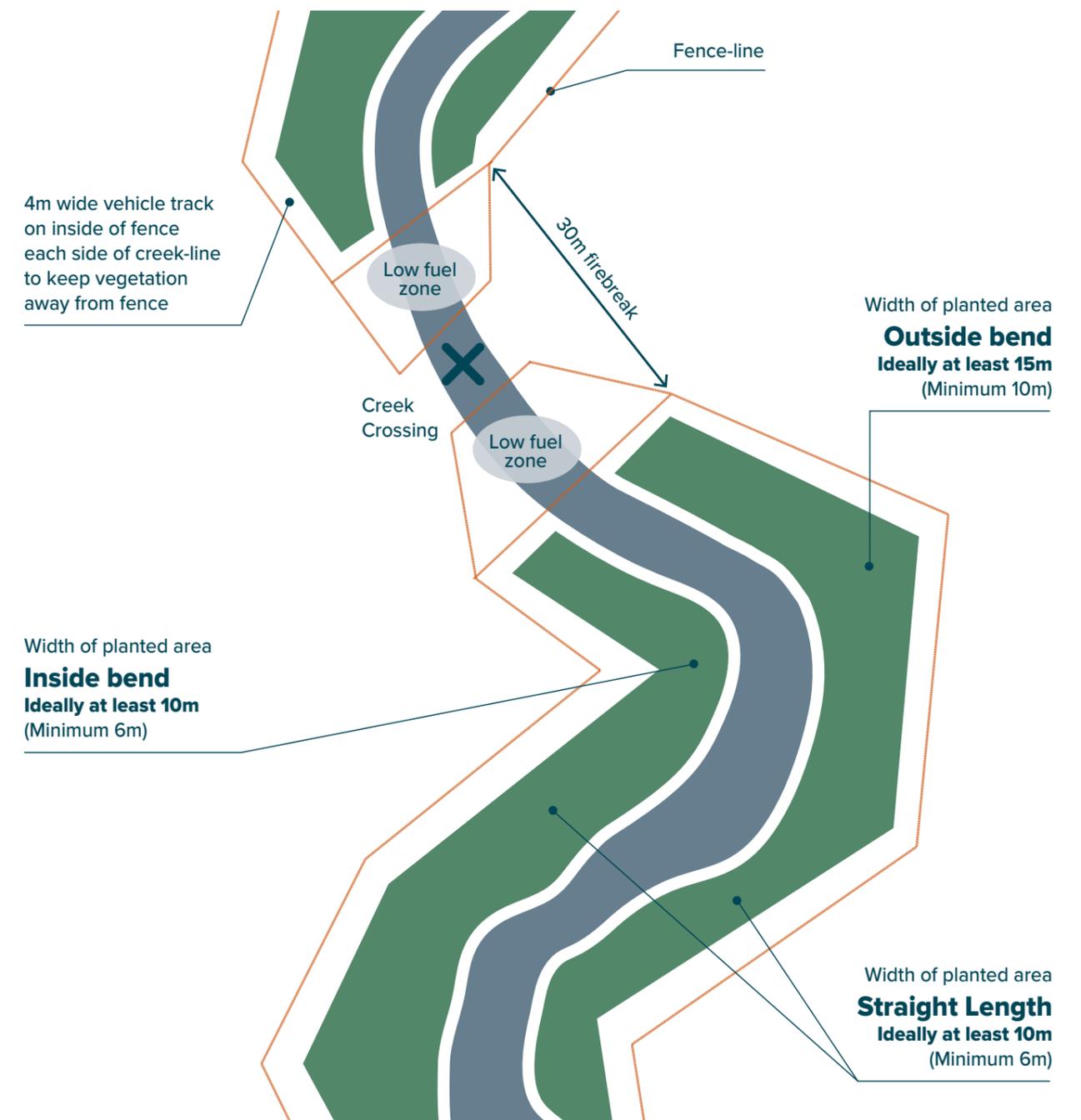
Steel fencing or concrete posts are the best choice to help minimise fire damage. If timber posts are to be used, creosote-treated posts are more resistant to fire than green copper chrome arsenic (CCA) treated posts.

Maintaining a slashed vehicle track with low fuel levels on the inside of the creek-line fence and planting shrubs at least four metres away will reduce the fire intensity near the fence.

Include access gates for maintaining your creek-line and allowing weed control.

Consider not planting trees and shrubs around creek crossings, in order to create potential fire breaks on lengthy vegetated creek-lines.

Creek-line fencing plan, indicating buffer widths and fire breaks.



Resources

Department for Environment and Water, Government of South Australia. **Managing Native Vegetation: How to reduce the impact of bushfire and the steps you need to take. August 2020.** [dew_native_vegetation_managing_fire_final.pdf \(environment.sa.gov.au\)](https://www.environment.sa.gov.au/data/assets/pdf_file/0021/36084/ARI-Technical-Report-252-Understanding-the-relationship-between-grazing-and-wetland-condition.pdf)

Morris, K and Reich, P. **Understanding the relationship between livestock grazing and wetland condition.** Arthur Rhyllah Institute for Environmental Research. **Technical Report Series, No. 252. December 2013.** https://www.ari.vic.gov.au/_data/assets/pdf_file/0021/36084/ARI-Technical-Report-252-Understanding-the-relationship-between-grazing-and-wetland-condition.pdf

Native Vegetation Act 1991. <https://www.legislation.sa.gov.au/lz/path=%2FC%2FA%2FNative%20Vegetation%20Act%201991>



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