

# PROPERTY FIRE MANAGEMENT PLANNING KIT

*Balancing fire safety and land management with the  
conservation of bushland plants and animals*

## POWERLINE EASEMENTS, FIRE AND BIODIVERSITY SUPPLEMENT



This Supplement was developed in partnership with Powerlink.  
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## The South East Queensland (SEQ) Fire and Biodiversity Consortium

The SEQ Fire and Biodiversity Consortium is a network of land managers and stakeholders committed to improving fire and biodiversity management outcomes, supporting and disseminating fire ecology research, facilitating partnerships between key stakeholders and building the capacity of land managers and private land owners in South East Queensland.

The SEQ Fire and Biodiversity Consortium gratefully acknowledges the support from the following stakeholder organisations: Brisbane City Council; City of Gold Coast; Department of Transport and Main Roads (Darling Downs District); Gympie Regional Council; Healthy Land and Water; Ipswich City Council; Lockyer Valley Regional Council; Logan City Council; Moreton Bay Regional Council; Powerlink; Queensland Fire and Emergency Services; Queensland Parks and Wildlife Service; Redland City Council; Scenic Rim Regional Council; Seqwater; Somerset Regional Council; South Burnett Regional Council; Sunshine Coast Council and Toowoomba Regional Council.

The SEQ Fire and Biodiversity Consortium gratefully acknowledges the support of Healthy Land and Water. Healthy Land and Water is an independent, not-for-profit organisation working to improve the sustainable use of land and waterways in South East Queensland. The SEQ Fire and Biodiversity Consortium is supported by Healthy Land and Water through funding from the Australian Government's National Landcare Program.



National  
Landcare  
Program



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**Disclaimer:** This document has been prepared in consultation with a range of stakeholders, including Powerlink. It has been developed purely as an aid to property fire management planning and in no way acts as a guarantee for bushfire safety. The aim of the Powerline Easements, Fire and Biodiversity Supplement is to minimise risk and to improve biodiversity conservation efforts, however a degree of risk will always remain when homes and other assets are located close to vegetation. Thus, whilst every effort has been pursued to make the information within this Supplement as accurate and factual as possible, those involved in compiling this document take no responsibility for any adverse outcomes, actions or losses resulting from its implementation. This publication does not purport to provide legal advice, and any recommendations herein do not necessarily represent current public policy. No person should act solely on the advice given here and should seek additional advice as required and assume responsibility for their actions.

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**Photo credits:** Craig Welden (SEQ Fire and Biodiversity Consortium); Steve Martin (Powerlink); Julian Selke (Department of Transport and Main Roads); Dr Tanya Strevens (freelance writer); Nadine Andersen Photography.

Cover photo: *Prepare Act Survive Fire Danger Rating Sign, Gympie 2018 (C.Welden).*

## INTRODUCTION

This Powerline Easement, Fire and Biodiversity Supplement is designed to accompany the **SEQ Fire and Biodiversity Consortium Property Fire Management Planning Kit**, a fire management planning resource for private landholders and public land managers [www.fireandbiodiversity.org.au/publications.html](http://www.fireandbiodiversity.org.au/publications.html).

Powerline easements often traverse private property, whereby landholders may be exposed to the risk of fire within the vicinity of a powerline. To ensure safety, property function and biodiversity values are maintained, landholders need to be equipped with the knowledge and skills to identify and manage fire risk near powerlines. Powerline easements can offer important biodiversity value. Researchers, together with land managers and energy distribution and transmission network service providers (such as Powerlink), are working together to identify and best manage these values in line with safe operating procedures. The aims of this Supplement are:

1. to provide information and advice for those whose work and/or livelihoods may take them into the vicinity of powerlines, and who may have to manage a situation with fire on powerline easements; and
2. to provide information relevant to the biodiversity value of powerline easements.

Queensland's high voltage electricity transmission network is owned, developed, operated and maintained by Powerlink Queensland, a State Government Owned Corporation. Powerlink's network extends 1,700 km north of Cairns to the New South Wales border, comprising more than 15,000 circuit kilometres of transmission lines. Powerlink's transmission network is the central link in the electricity supply chain, transporting electricity generated at major power stations through its transmission network to the distribution networks owned by Energex and Ergon Energy (part of the Energy Queensland Group) and Essential Energy (in northern New South Wales).

*Powerlink transmission lines*



*Powerlink transmission lines with a grasstree (Xanthorrhoea sp.) in the foreground.*

### POWERLINK PRIORITISING SAFETY

*“To ensure the safety of the community, our employees and contractors.”*

Whenever you are undertaking any activity on a powerline easement, including fire management, remember to ‘look up and live’ for your personal safety and the safety of others around you. Always take care and assume overhead powerlines are live and potentially dangerous. Planning is crucial to working safely around powerlines. [www.powerlink.com.au/safe-life](http://www.powerlink.com.au/safe-life)

## POWERLINE EASEMENTS



*Grandchester transmission lines, Qld*

The purpose of powerline easements is to control activities near a transmission line to ensure public safety and the security of electricity supply. An easement provides Powerlink with a legal 'right of way' over a portion of land. Powerline easements are registered on the title of affected land, but ownership of the land remains with the landholder. This means the landholder may use the land for many purposes, provided it doesn't compromise safety or conflict with easement terms and conditions. Where fire control activities (i.e. hazard reduction) are still considered necessary from within the easement, early advice to Powerlink will allow an assessment of risks associated with conducting the burn (contact details below). This advice may result in adjustments to the planned burn. Regardless of the outcome, transmission lines should be considered live at all times.

Powerline easements are often identified as a logical place to conduct prescribed burns or to fight wildfires, due to the comparatively lower fuel loads to the surrounding areas and removal of the upper canopy. However, fires burning beneath or near transmission lines can endanger people and animals, damage property and other objects, and have the potential to interrupt electricity supply. It is therefore preferable NOT to attempt fire control activities near powerline easements or transmission lines.

To ensure the safety of people and the transmission network, Powerlink restricts certain activities on its easements. A comprehensive guide to activities that are permitted, conditional or prohibited on Powerlink easements can be found at [www.powerlink.com.au/co-use-form](http://www.powerlink.com.au/co-use-form) or call Powerlink.



*Powerlink's Wandoan Substation, Surat Basin, Qld*

### CONTACTING POWERLINK

If you see a fire burning near powerlines or substations, even if you're unsure what risk the fire poses, call 000 immediately. Please also notify Powerlink.

For general enquiries:  
**FREECALL 1800 635 369**  
 (during business hours)

In an emergency:  
**FREECALL 1800 353 031**  
 (24 hrs, 7 days a week)

Email:  
[website.enquiries@powerlink.com.au](mailto:website.enquiries@powerlink.com.au)

## FIRES NEAR POWERLINES

The information contained on pages 5 - 7 has been sourced from the Powerlink information sheet titled *Fire and high voltage transmission line safety* ([www.powerlink.com.au/transmission-lines](http://www.powerlink.com.au/transmission-lines)).

If you are involved in fire control activities you should be aware of the hazards and potential consequences of fires near or under powerline easements and transmission lines so you can reasonably assess the risks. Only low intensity prescribed burns should be performed on easements (i.e. <1m flame height) with an approved burning plan. If fire intensities are higher, electrical arcing can occur (see *Flashovers* text box), posing a risk to people nearby and electricity supply to large areas.

### FLASHOVERS

A flashover is when electricity, especially at higher voltages, jumps across an air gap due to the creation of a conductive path by the heat of the fire and smoke. A flashover may occur between wires or from wires to the ground – this may be seen as a flash or heard as an explosion or loud cracking sound.

Under everyday conditions, the height of wires and their separations are designed to be entirely safe. However, the combination of dense smoke and hot gases generated by a large fire directly under, or near, a high voltage transmission line, can create a conductive path that can increase the distance an electrical arc can jump and therefore the potential for a flashover.

Flashovers are potentially life threatening to persons standing in the vicinity of the flashover (much like when lightning strikes the ground). Flashovers can also cause damage to nearby equipment and the transmission line and can cause possible interruptions to power supply to homes.



Powerlink transmission lines

### Fire Behaviour

Fire is unpredictable and can move quickly. Fire behaviour is influenced by a number of factors including:

- the amount, type, moisture content and location of fuel for the fire. Powerlink utilises the *Overall Fuel Hazard Assessment Guide* by Hines *et al.*, 2010 to evaluate fuels on easements ([www.fireandbiodiversity.org.au/literature/173786/Overall fuel hazard assessment guide 4th ed](http://www.fireandbiodiversity.org.au/literature/173786/Overall%20fuel%20hazard%20assessment%20guide%204th%20ed))
- the topography of the land, in particular the steepness of the slope; and
- the time of day, weather and climatic conditions including temperature, wind speed and direction.

This image is taken from a video of a flashover. To see the full video, go to [www.facebook.com/ripleyvalleyruralfire/videos/10201418939249124/](https://www.facebook.com/ripleyvalleyruralfire/videos/10201418939249124/)



### Safety Risks

Large fires burning adjacent to or under transmission lines have the potential to:

- create electrical arcs, known as flashovers, that can endanger people, animals and risk damage to property and other objects;
- damage or destroy wires, insulators and supports of the transmission line; and
- interrupt electricity supply to households and industry.

## SAFETY ADVICE FOR FIRES NEAR POWERLINES

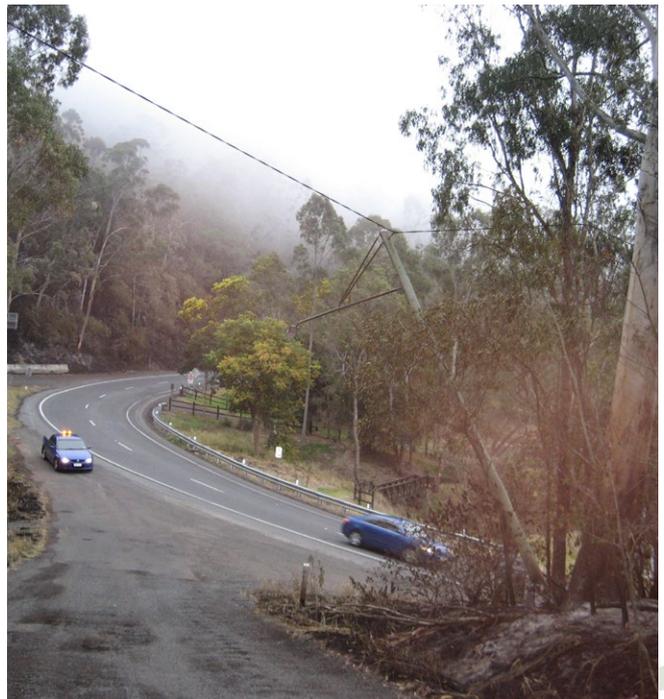
When there is a fire close to a powerline remember:

- Keep people, equipment and vehicles at least 25 metres from powerlines and towers.
- Electricity, especially at high voltages, can ‘jump’ across several metres of air gap. This means that direct contact with the high voltage wire is not required to produce a potentially fatal event.
- Smoke can act as a conductor. Fires burning on or near powerline easements can greatly increase the chances of a flashover occurring (refer to page 5).
- Don’t count on rubber tyres on vehicles to stop a flashover from occurring.
- Don’t stockpile, windrow<sup>1</sup> or heap combustible material under powerlines.
- Exercise caution if using powerline easements: to access fire locations; as readymade firebreaks; as a break from which to commence back burning operations; or as a refuge area in a firestorm.



*Planned burn within the vicinity of powerlines, The Gap, Qld.*

The Energy Networks Association<sup>2</sup>, in consultation with emergency services groups across Australia, has produced *National Guidelines on Electrical Safety for Emergency Personnel*. Powerlink endorses the use of these guidelines. The guidelines provide critical information relating specifically to fire control near high voltage powerlines, including the special conditions that apply to the use of water in fire control activities near powerlines. An extract from the *National Guidelines on Electrical Safety for Emergency Personnel* follows. A full version of the guidelines can be purchased from [www.saiglobal.com](http://www.saiglobal.com) or by calling 131242. If you are involved in fire management or control near high voltage powerlines, please familiarise yourself with these guidelines and the recommended control measures.



*Burnt out powerline on the Toowoomba Range, Qld.*

1 Windrow: A long line of piled slash or debris resulting from forest or scrub clearing (Australasian Fire and Emergency Service Authorities Council 2012).

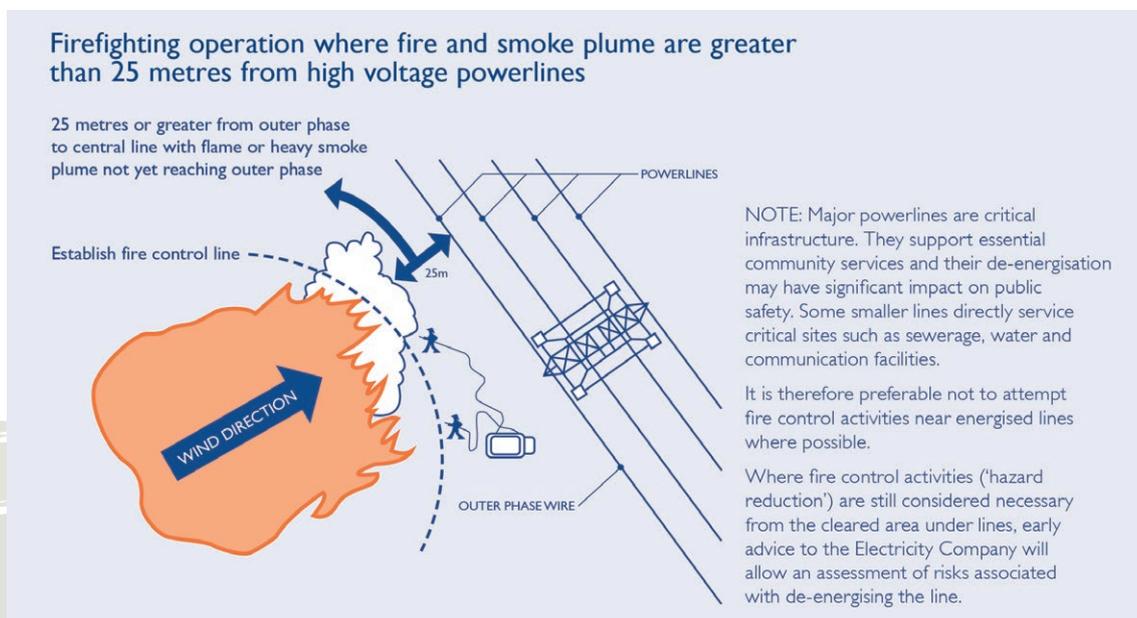
2 Energy Networks Australia is the peak national body representing gas distribution and electricity transmission and distribution businesses throughout Australia. For more information go to [www.energynetworks.com.au/](http://www.energynetworks.com.au/)

## FIRE CONTROL NEAR HIGH VOLTAGE POWERLINES

(Extract from the *National Guidelines on Electrical Safety for Emergency Personnel*, [www.saiglobal.com](http://www.saiglobal.com))

Hazards	Control Methods
<ul style="list-style-type: none"> <li>• Sagging wires due to failures or high temperature.</li> <li>• Wood pole structures may fail causing wire to fall.</li> <li>• Flashover may occur between wires or from wires to the ground or structures through burning vegetation (this may be seen as a flash or heard as an explosion).</li> </ul>	<ul style="list-style-type: none"> <li>• Do not directly attack fires in cleared areas beneath lines.</li> <li>• Do not spray water on or near wires or insulators from the ground or air.</li> <li>• Wait for fire to burn clear of the cleared areas beneath the lines before commencing mop-up operations.</li> <li>• At all times treat lines as live until clearance has been given by the Electricity Company ON SITE.</li> <li>• At all times keep personnel and vehicles at a minimum of 25m clear of a head fire, or a flank fire burning under or within 25m of the powerlines (see diagram below illustrating a firefighting operation).</li> <li>• When working near or under live powerlines, approach no closer than 25m to the fire edge to conduct mop-up of grass fires. Mop-up may include the knockdown of low (less than 2m high) isolated flames/spots/smouldering logs that are not producing a convection column or heavy smoke plume. In such cases:             <ul style="list-style-type: none"> <li>- Never direct the hose stream into the powerline.</li> <li>- Never direct the hose stream into a smoke plume that is near (less than 25m from) or reaching powerlines. Keep stream no higher than a person's head height.</li> <li>- Never direct the hose stream at a burning bush or tree (more than head height) in a powerline easement.</li> </ul> </li> <li>• Bushes or trees burning in powerline easements present a real threat of creating a flashover to earth from the wires – KEEP AT LEAST 25m CLEAR.</li> <li>• When crossing powerline easements, ensure there is adequate clearance (which will vary between 3m to 8m depending on the voltage of the line) between the highest point of the vehicle (including aerials) and powerlines, avoiding areas with tall vegetation under lines.</li> </ul>

**Diagrammatic guidelines for managing a fire fighting operation where fire and smoke are greater than 25 metres from high voltage powerlines.**



## VEGETATION MANAGEMENT IN POWERLINE EASEMENTS



*Powerlink transmission lines with *Banksia sp* in the foreground.*

Management of vegetation and access tracks within, and adjacent to, powerline easements are essential for the safe and reliable operation of the transmission network. Vegetation management within powerline easements is collectively referred to as land maintenance. Powerlink has established standards and routine maintenance cycles to ensure safe, reliable and cost-effective outcomes are achieved. Prescribed burning on easements is not part of Powerlink's land management program. However, Powerlink works with landholders to mitigate fire risk through effective fire management planning (including fuel load assessments) and engagement activities with key stakeholders.

Powerlink maintains the transmission network in a variety of ways, including focusing on the control of any incompatible vegetation by selectively applying approved herbicides and/or removal of these species. If vegetation is identified beyond the easement boundary that is considered a risk, management options will be discussed with the landholder.



*Powerlink transmission lines.*

### COMMUNITY PROGRAMS

Powerlink delivers community and environment programs to build relationships and be a good corporate citizen. Powerlink engages with landholders on joint land management, including managing fuel loads and access. Powerlink has delivered several successful community and environmental programs in partnership with local councils in areas where its infrastructure is located. For example, Powerlink and Townsville City Council are working together to deliver a greening program dedicated to increasing vegetation density and improving habitat for local native wildlife while promoting water efficiency.

For further details go to: [www.powerlink.com.au/programs/townsville-city-council-revegetation-initiative](http://www.powerlink.com.au/programs/townsville-city-council-revegetation-initiative)

## REDUCING THE RISK OF WILDFIRES FOR BIODIVERSITY

Fire ecologist Dr Lesie Felderhof, has been working with Powerlink with a view to minimising the impact of fire on biodiversity, particularly in powerline easements or corridors. In her presentation at Bushfire 2016 - Connecting Science, People and Practice, a national conference held in Brisbane, Dr Felderhof outlined the complexity of managing linear corridors, and the need to balance maintenance of essential infrastructure within a matrix of multiple tenures, land uses and habitats. Dr Felderhof also identified that the linear shape of easements results in a high edge to area ratio, creating lengthy boundary effects (e.g. increased risk of weed invasion).

Dr Felderhof maintains that the key to minimising risk and successfully balancing safe maintenance of easements and biodiversity values is:

- clear communication with all identified stakeholders;
- strong leadership;
- a strategic approach incorporating adaptive fire management; and
- whole-of-property planning (refer to the SEQ Fire and Biodiversity Consortium Fire Management Planning Kit – [www.fireandbiodiversity.org.au/publications.html](http://www.fireandbiodiversity.org.au/publications.html))

Many landholders/managers view easements as sacrificial land and useful as fire breaks and access tracks. Dr Felderhof suggests that, given the ongoing risk of risk of wildfire and its detrimental effects on life, property and biodiversity, these areas require specific management in their own right (e.g. fuel reduction and weed management).

*Right: SEQ Fire and Biodiversity Consortium Coordinator Craig Welden and Rural Fire Service Community Educator Jan Block, helping landholders develop a property fire management plan during a SEQ Fire and Biodiversity Consortium fire management workshop at Closeburn Rural Fire Brigade, Qld.*



*Powerlink transmission lines and sulfur crested cockatoo (*Cacatua galerita*)*

## MANAGING EASEMENTS FOR BIODIVERSITY



*Mahogany glider ([Petaurus gracilis](#))  
in a nest box, Nth Qld*

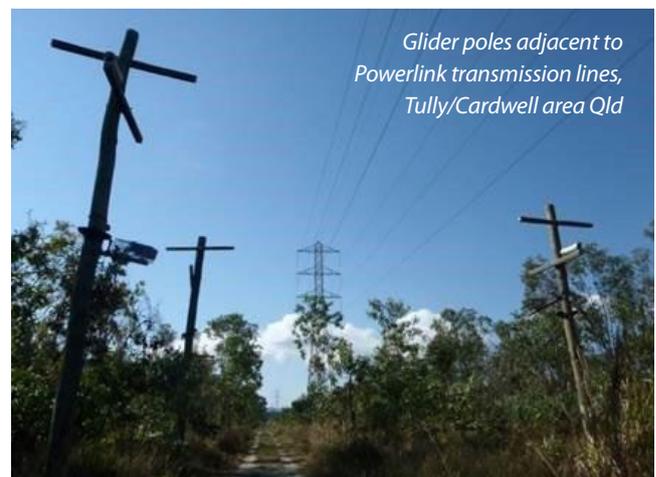
Whilst powerline easements are necessary to enable the delivery of essential services to the community, there is a need to understand how these easements function with respect to flora and fauna (Stevens 2007). For instance, while the area of habitat replaced by powerline easements may not be great, the total area of habitat likely to be affected can be extensive due to the combined barrier and edge effects between the easement and natural vegetation (e.g. weed invasion, exposure to predators, loss of ground cover). There is a growing body of research that seeks to better understand these impacts, some of these studies are described below.

Powerlink partnered with the University of Queensland (UQ) to conduct research in an area known to be mahogany glider habitat along a powerline near Tully in far north Queensland (Brady & Baxter 2013). The area was fragmented by linear clearings including a high voltage transmission line easement. The purpose of the research was to improve understanding of the glider and its habitat, and to assist in reducing the impact of the powerline and any upgrades. A detailed observational and radio tracking study of the glider was undertaken in order to understand how gliders use fragmented habitat, and whether vegetation changes around powerline clearings influence their behaviour and habitat use.

Overall findings indicated that the easement vegetation was changing in structure and composition, compared to similar

remnant vegetation used by gliders. Foraging did not appear to be influenced by proximity to the powerline easement, with the gliders frequently utilising the vegetation right up to the edge of the easement. This highlights the importance of maintaining the natural properties of vegetation along the easement edge. Recommendations were provided for easement vegetation management to ensure most benefit and least detriment to the glider (Brady & Baxter 2013). [www.uq.edu.au/news/article/2012/10/endorsed-mahogany-glidiers-benefit-uq-research](http://www.uq.edu.au/news/article/2012/10/endorsed-mahogany-glidiers-benefit-uq-research)

Further research and monitoring by UQ has provided guidance for the design, location and installation of glider poles to facilitate glider movement across easements after power transmission line upgrades.



*Glider poles adjacent to  
Powerlink transmission lines,  
Tully/Cardwell area Qld*

## MANAGING EASEMENTS FOR BIODIVERSITY



Captured *Antechinus stuartii*.

Stevens (2007) sought to quantify the barrier effect posed to small mammals by powerline easements in NSW. The study involved the mark-recapture of ground mammals at four sites over a two-year period. Results demonstrated the barrier effect recording a low rate of easement crossing by two common small mammal species, *Rattus fuscipes* and *Antechinus stuartii*, even where vegetation in the linear opening had grown tall and dense or where linkages were constructed across the easement. When translocated, more than half of the animals returned to their original side of the easement proving that they can and will cross the easement if they have to.

The effects on rainforest wildlife, caused by clearings for infrastructure such as powerlines and highways, have been studied in the Wet Tropics in far north Queensland (Goosem 2004). Impacts include: habitat loss through clearing; road mortality; disturbance from traffic movement, noise and headlights; pollution; and weed and feral invasions. Measures to mitigate impacts on wildlife have been, or are being trialled, proving successful for many species such as small mammals, possums, gliders, reptiles and frogs. Impacts can be reduced by maintaining canopy connectivity and restoring vegetation corridors, or by using innovative methods such as faunal road under passes and over passes i.e. tunnels and rope bridges (Goosem, 2004).

Goosem & Marsh (1997), used trapping to investigate rainforest and grassland rodent community movement

across a cleared grassy powerline easement, compared with that of surrounding tropical rainforest in north-eastern Queensland. The results showed that movement of rainforest rodent species across easements were almost completely inhibited. The better adapted grassland rodents were also impacted. However, the rainforest rodents (e.g. *Rattus sp.*) used regrowth connections along gullies to successfully cross the powerline easement. This study illustrates the importance of low lying vegetation in powerline easements to support the movement of native fauna and maintaining biodiversity.

Powerline easements, whilst modified and requiring further research, continue to support native vegetation, provide habitat for native species and are a necessary link between adjacent intact vegetation.

## RESOURCES

### Guidelines

- *National Guidelines on Electrical Safety for Emergency Personnel*, 6th Edition (2001), published by Standards Australia. ISBN: 0 7337 7200 5. Produced by the Energy Networks Australia in consultation with emergency services groups across Australia. [www.saiglobal.com](http://www.saiglobal.com)
- *Overall Fuel Hazard Assessment Guide*, 4th Edition (2010), published by the Victorian Government Department of Sustainability and Environment Melbourne. ISBN: 978-1-74242-676-1 (print), ISBN: 978-1-74242-677-8 (online). Prepared by Hines, F., Tolhurst, K., Wilson, A. and McCarthy, G. [www.fireandbiodiversity.org.au/\\_literature\\_173786/Overall\\_fuel\\_hazard\\_assessment\\_guide\\_4th\\_ed](http://www.fireandbiodiversity.org.au/_literature_173786/Overall_fuel_hazard_assessment_guide_4th_ed)
- *Bushfire Glossary*, 5th Review (2012), prepared by the Rural and Land Management Group for the Australasian Fire and Emergency Service Authorities Council, [www.afac.com.au/docs/default-source/doctrine/bushfire-terminology.pdf](http://www.afac.com.au/docs/default-source/doctrine/bushfire-terminology.pdf)

### Brochures/Fact sheets

#### Powerlink

- *Fire and High Voltage Transmission line safety*: [www.powerlink.com.au/transmission-lines](http://www.powerlink.com.au/transmission-lines)
- *Powerlink Queensland Activities on an Easement*: [www.powerlink.com.au/easements](http://www.powerlink.com.au/easements)
- *Burning Sugar Cane near transmission lines*: [www.powerlink.com.au/transmission-lines](http://www.powerlink.com.au/transmission-lines)

### SEQ Fire and Biodiversity Consortium

- *Recommended Fire Regimes* (Fact Sheet 3): [www.fireandbiodiversity.org.au/publications.html](http://www.fireandbiodiversity.org.au/publications.html)
- *Property Fire Management Planning Kit Part A and B*: [www.fireandbiodiversity.org.au/publications.html](http://www.fireandbiodiversity.org.au/publications.html)

### Scientific Reports and Conference Presentations

- BRADY, DR G. AND BAXTER, DR M (2013) *Mahogany Glider Research Report*, University of Queensland.
- FELDERHOF, L (2016) *Corridor fires: What's different?* Bushfire 2016 Conference, Theme 7: Fire Management for Linear Infrastructure.
- GOOSEM, M. (2004) *Linear infrastructure in the tropical rainforests of far north Queensland: mitigating impacts on fauna of roads and powerline clearings*. In: Lunney, D. *Conservation of Australia's Forest Fauna*, 2nd Edition, Royal Zoological Society of New South Wales, Mossman, pp. 418-434.
- GOOSEM, M. AND MARSH, H. (1997) *Fragmentation of a Small-mammal Community by a Powerline Corridor through Tropical Rainforest*. *Wildlife Research* 24 (5) pp. 613 – 629.
- STREVS, T. (2007) *Powerline easements: ecological impacts and effects on small mammals*. PhD thesis, University of Wollongong.



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