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A new methodology for State-wide mapping of bushfire prone areas in Queensland

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Release Notes

This analysis resulted in the production of a number of mapping outputs that include spatial datasets, online mapping systems and cartographic products. These can be accessed from the following Queensland Government initiatives:

- SPP Interactive Mapping System published by the Department of State Development, Infrastructure and Planning located at www.dsdip.qld.gov.au/spp-mapping
- Downloadable data packages via the Queensland Government Information Service located at http://qspatial.information.qld.gov.au/geoportal/catalog/main/home.page
- Descriptive metadata about these data sets from the Queensland Spatial Catalogue located at http://qspatial.information.qld.gov.au/geoportal/catalog/main/home.page
- A Bushfire Prone Area Viewer online mapping system published by the Public Safety Business Agency (PSBA); accessible upon request to the PSBA GIS Unit by email at the following address: QFRSGISUnit@psba.qld.gov.au.

Acronyms

CSIRO	Commonwealth Scientific and Industrial Research Organisation
DNPRSR	Department of National Parks, Recreation, Sport and Racing
DNRM	Department of Natural Resources and Mines
DSITIA	Department of Science, Information Technology, Innovation and the Arts
GIS	Geographic Information System
NP	National Park
QLUMP	Queensland Land Use Mapping Program
SPP	State Planning Policy

Executive Summary

A new State-wide mapping methodology has been developed to identify Bushfire Prone Areas in support of bushfire hazard provisions of Queensland's State Planning Policy, which came into effect on 2 December 2013. This new methodology scales bushfire hazard based on the Potential Fire-line Intensity of a severe bushfire, and can be used to predict the radiation profile of areas adjacent to potentially hazardous vegetation and an associated Potential Impact Buffer. Potential Fire-line Intensity is also a useful indicator of the level of safety afforded for resident egress and firefighter access.

This new methodology was developed to overcome a number of known limitations with the methodology described in Queensland's previous State Planning Policy 1/03: *Mitigating the Adverse Impacts of Flooding, Bushfires and Landslides (SPP 1/03)* (Department of Emergency Services and Department of Local Government and Planning 2003). These limitations include the failure to account for regional variation of bushfire weather severity and an ambiguous weighting of hazard according to topographic aspect.

This improved research-based bushfire hazard assessment and mapping methodology will allow Queensland local governments to more accurately identify areas at risk from bushfires and to have greater confidence in the design of mitigation strategies that are proportional to the potential level of threat.

The project produced a full series of mapping products for the state at 25m resolution including:

- Maximum Landscape Slope
- Vegetation Hazard Classes used to estimate Potential Fuel Load
- Fire Weather Severity
- Potential Fire-line Intensity - derived by combining the above three variables
- Bushfire Prone Area including:
    - Potential Bushfire Intensity classes derived from the classification of Potential Fire-line Intensity mapping
    - Potential Impact Buffers for land adjacent to areas of Very high, High and Medium Potential Bushfire Intensity
- Grassfire Prone Areas
- Low Hazard area

The new Bushfire Prone Area mapping was found to have an average reliability of 85%, based on a semi-quantitative expert appraisal. This reliability assessment identified a number of opportunities to improve the accuracy of mapping, such as improved delineation of non-remnant treed vegetation in peri-urban landscapes.

The new bushfire hazard mapping and underlying methodology provides a major improvement in the scientific credibility and practical utility of spatial information to mitigate adverse impacts of future bushfires through land use planning.

1 Introduction

This document describes a new science-based methodology for State-wide mapping of Bushfire Prone Areas in Queensland. It replaces the method for mapping bushfire hazard described in SPP 1/03.

The methodology has been used to produce new State-wide Bushfire Prone Area mapping for use by local governments to inform the preparation of planning schemes in accordance with natural hazard provisions of a new State Planning Policy (Department of State Development, Infrastructure and Planning 2013). This process can be used to periodically update State-wide Bushfire Prone Area mapping as new source information becomes available. The new methodology can also be used by local governments or other organisations with access to more detailed spatial information on vegetation and other landscape characteristics to produce localised hazard mapping.

The new methodology was developed to overcome limitations in the original SPP 1/03 approach with respect to its inherent scientific assumptions, currency, resolution and inadequate consideration of regional differences in fire weather severity. This method is used to identify Bushfire Prone Areas based on the calculation of Potential Fire-line Intensity from geographic data sets on Potential Fuel Load, Fire Weather Severity and Maximum Landscape Slope.

The spatial model of Potential Fire-line Intensity is based on the McArthur (1967) forest fire behaviour model and Byram's fire-line intensity (1959). The new approach also identifies land that may be subject to significant bushfire attack in a Potential Impact Buffer adjacent to areas of Medium, High or Very high Potential Bushfire Intensity (i.e. potentially hazardous vegetation). The method also identifies complementary Grassfire Prone Areas and Low Hazard Areas where severe bushfires and grassfires are unlikely to cause significant impact under weather conditions adopted for this project.

The use of contemporary datasets and scientifically-based processing methods provide substantial improvements to the approach described in SPP 1/03.This approach also improves the opportunity for greater commonality between the design of bushfire related land use planning provisions and the methods used to estimate building exposure for the purposes of building design.

The methodology has been implemented using a raster or cell based geographic information system at 25m resolution for the whole of Queensland. Access to more up-to-date and detailed spatial information will enable users to improve the accuracy of Bushfire Prone Area maps at more detailed scales.

2 Methodology

The methodology described in this report provides an overview of procedures used for the State-wide delineation of Bushfire Prone, Grassfire Prone and Low Hazard Areas (Figure 1).

A Bushfire Prone Area is land that could support a significant bushfire or be subject to significant bushfire attack.

The Bushfire Prone Area includes potentially hazardous vegetation with a Medium, High or Very high Potential Bushfire Intensity. Bushfires in these areas have the potential for high to extreme levels of flame attack, radiant heat and ember attack as a result of high potential fuel loads, slope and severe fire weather. Bushfire impacts in the Bushfire Prone Area are potentially harmful to people and to property.

Land that could be subject to significant bushfire attack from embers, flames or radiant heat is included in a Potential Impact Buffer with a default width of 100m from all areas of Medium, High or Very high Potential Bushfire Intensity.

Bushfire Prone Area

- **An area with the potential to support a significant bushfire or the potential to be subject to significant bushfire attack.**
- Very high Potential Bushfire Intensity
- High Potential Bushfire Intensity
- Medium Potential Bushfire Intensity
- Potential Impact Buffer

Grassfire Prone Area

- **An area that could support a significant grassfire**

Low Hazard Area

- **An area that is unlikely to support a significant bushfire or grassfire**

Figure 1: Overview of Bushfire Prone Area and associated mapping classes

A Grassfire Prone Area includes land that could support or be subject to attack from a low to moderate intensity grassland fire. Grassfire Prone Areas including native grassland, rural grassland and associated land uses, crop land or horticultural areas that may be subject to relatively frequent vegetation fires that are often fast moving and may result in high levels of smoke, flame and ember hazard. These fires are usually of low to moderate intensity due to the low to moderate overall fuel load.

A Low Hazard Area includes land that is unlikely to support a bushfire or grassfire and includes rainforest, mangroves, water bodies, sparsely vegetated areas and urban areas.

2.1 Potential Fire-line Intensity

Bushfire impact mechanisms can affect people and property through flame attack, radiant heat exposure, ember attack, wind attack, smoke hazard and convective heat exposure (Ramsay 1987; Blanchi and Leonard 2008; Leonard and Blanchi 2012). Of these impact mechanisms, flame attack, radiant heat exposure and ember attack (Figure 2) are most relevant to land use planning and building decisions that seek to reduce the risks to life and property in new developments (Leonard and Blanchi 2012).

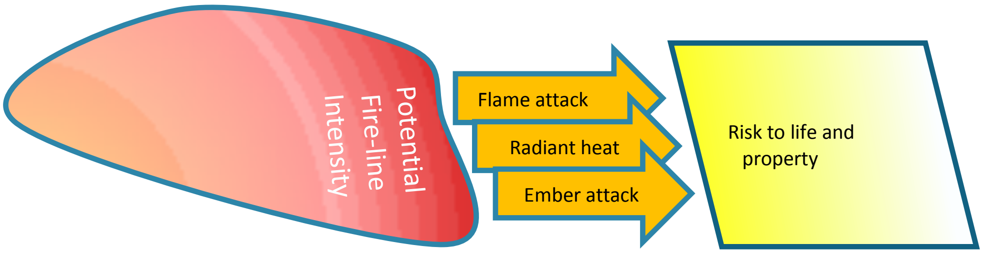


Figure 2: Significant impact mechanisms relevant to landscape scale planning decisions

At a landscape scale, the preferred metric for indicating the potential severity of these impact mechanisms is fire-line intensity. Fire-line intensity is a standardised measure of the rate that an advancing head fire would consume fuel energy per unit time per unit length of fire front introduced by Byram (1959).

One of the main benefits of the fire-line intensity metric is that it can be used to estimate the potential flame length (e.g.Byram 1959; Alexander and Cruz 2012) and thus the radiant heat expected at various distances from potentially hazardous vegetation. Radiant heat measures can in turn be used to estimate required minimum distance from hazardous vegetation needed to afford safety levels to people and/or buildings (e.g.Cheney, Gould et al. 2001; Zárate, Arnaldos et al. 2008; Siggins, Newnham et al. 2013). Fire-line intensity can also be used to derive estimates of flame length, radiant heat and other fire metrics to provide approximate estimates of Bushfire Attack Level (Standards Australia, 2009), which can provide a connection between landscape scale bushfire metrics and site level decisions for building design (refer Section 3.6, 3.7).

The equation (1) is used to calculate the fire-line intensity.

$$I = H \times w \times R \quad (1)$$

In this equation, I is Byram's Fire-line Intensity (usually expressed in kilowatts per linear meter (i.e. kW/m)), H is the net low heat of combustion (kJ/kg), w is the fuel consumed in the active flame front (kg/m^2) and R is the linear rate of fire spread (m/sec).

While Byram's Fire-line Intensity equation is useful for studying bushfire behaviour, additional findings from other Australian fire scientists (Noble, Bary et al. 1980; McArthur 1967) can be integrated to produce a mathematical function for mapping Potential Fire-line Intensity and thus Potential Bushfire Intensity classes, using a spatial model.

This modified approach calculates Potential Fire-line Intensity from spatial inputs using the McArthur Mk 5 Forest Fire Danger Meter (McArthur 1973) and three other basic equations (2), (3), (4) from Noble et al. (Noble, Bary et al. 1980). Potential Fire-line Intensity is derived from Byram (1959) in equations (5) and (6).

The Forest Fire Behaviour model developed by A. G. McArthur implemented in the 1977 Mk5 Forest Fire Behaviour Meter (McArthur 1973) is the most widely used fire spread model in Australia since its inception, and forms the basis for calculation of fire intensity for fire-fighting activities and building control regulations (Standards Australia 2009).

These equations incorporate three key variables: total fuel load (W), the McArthur Forest Fire Danger Index ($FFDI$) and slope (θ).

The rate of spread of a fire (R in km/h) is firstly calculated using equation (2).

$$R = 0.0012\, FFDI\, W \quad (2)$$

However, on sloping terrain, and assuming upslope progression of the fire, a correction factor needs to be applied to R in Equation (3):

$$R_\theta = R \times \exp(0.069\,\theta) \qquad (3)$$

where slope (θ) is expressed in degrees and 0.069 is an empirical coefficient derived by McArthur. This calculation therefore assumes a worst case, where the fire is moving up a slope. The rate of spread of a fire in km/hr is then given in Equation (4):

$$R_\theta = 0.0012\, FFDI\, W\ \exp(0.069\,\theta) \qquad (4)$$

The Fire-line Intensity (*FI*) from Byram (1959) is calculated in units of kW/m in Equation (5):

$$FI = 516.7\, W\, R_\theta \qquad (5)$$

A spatially applicable version of the fire-line intensity equation is produced by combining equations (4) & (5) as follows in Equation (6):

$$FI = 0.62\, W^2\, FFDI\, \exp(0.069\,\theta) \qquad (6)$$

Equation (6) can be readily applied to spatial landscape inputs used in the analysis described in this report - Potential Fuel Load (tonnes/ha), Maximum Landscape Slope (degrees) and Fire Weather Severity (Forest Fire Danger Index) - to calculate Potential Fire-line Intensity, as symbolically represented in Figure 3.

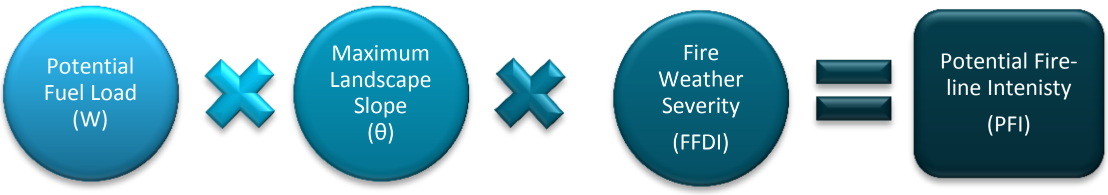


Figure 3: Spatial variables used to determine Potential Fire-line Intensity

Potential Fire-line Intensity can thus be represented as a continuous metric spatial which can also be categorised into classes representing different levels of Potential Bushfire Intensity.

The methodologies used to develop three inputs to the calculation and mapping of Fire-Line Intensity – Potential Fuel Load, Maximum Landscape Slope and Fire Weather Severity are described below.

2.2 Potential Fuel Load

The fuel load, or in the case of this project the Potential Fuel Load, is a key driver of fire behaviour, fire-line intensity and bushfire hazard.

In this analysis, Potential Fuel Loads represent the approximate mass (measured in tonnes/ha) of combustible fuel material that would typically accumulate if vegetation is not regularly burnt or subject to fuel reduction practices.

Potential Fuel Loads are assigned to vegetation categories (Vegetation Hazard Classes) formed by amalgamating land use and vegetation types with a moderately consistent fuel load and structure. Potential Fuel Load estimates for this study have been derived from a combination of expert appraisals and field measurements using the upper range of fuel loads for each fuel element (i.e. surface, near surface, elevated and bark as per the Department of Sustainability and Environment's '*Overall Fuel Hazard Assessment Guideline*').

The Potential Fuel Load assigned to each Vegetation Hazard Class is generally representative of the higher fuel load expected for the typical vegetation types, landscape and site conditions within each Vegetation Hazard Class. This Potential Fuel Load of each Vegetation Hazard Class would approximate the 80th percentile fuel load of the "long unburnt condition" for the class (generally greater than 10 years without burning).

While there is likely to be considerable variation between potential and actual fuel loads (which will change in many cases from season to season, year to year and site to site), the assumption of a Potential Fuel Load is appropriate for informing land use planning decisions to mitigate bushfire risk because it is rarely possible to assume the ongoing management of reduced fuel loads in hazardous bushland adjacent to areas proposed for human settlement. Where land use planners have high confidence in the ability and commitment of adjacent landholders to manage fuel loads at reduced levels, it would be possible to adjust the calculation of Potential Fuel Loads and the Potential Fire-line Intensity of adjacent hazardous bushland.

2.2.1 PATCH AND CORRIDOR FILTERING

Patch and corridor filtering is needed to identify and amend the estimated hazard potential of narrow or small patches of vegetation likely to prevent a running fire front from reaching its potential. It is also necessary to identify and amend the estimated hazard potential of small isolated patches and thin corridors of vegetation that are produced as artefacts of the GIS analysis process used to combine slope and vegetation mapping. The fire-line intensity in these small patches is unlikely to reach the level predicted using equations presented in Section 2.1.

The filtering process to remove or downgrade hazard levels of small patches and narrow corridors involves three stages - merging small patches of a single Vegetation Hazard Class less than 0.5 ha; merging small Vegetation Hazard Class patches between 0.5 and 1 ha with higher or moderate fuel loads (greater than 8 tonnes/ha); and removing narrow corridors of vegetation less than 100m wide through a process of patch erosion and dilation. These small patches are merged with surrounding vegetation by allocating a patch to the Vegetation Hazard Class that is most common to the patch boundary.

Vegetation classes with a continuous fuel load generally have a uniform fuel distribution that supports continuous flame spread. In contrast, non-continuous fuel load classes contain patches of fuel which prevent or limit head fire intensity and can interrupt the movement of a fire front. Small continuous patches of isolated fuel (less than one hectare) surrounded by non-continuous vegetation will result in reduced fire-line intensity.

2.3 Maximum Landscape Slope

Topographic slope is an important variable controlling fire spread, the rate of fuel consumption and thus Potential Fire-line Intensity. Slope mapping for this analysis was created from a Smoothed Digital Elevation Model derived from global land surface heights recorded during the February 2000 Shuttle Radar Topographic Mission. The Smoothed Digital Elevation Model data provides state wide coverage that is not available from airborne LiDAR, and is well suited to landscape scale modelling of Potential Fire-line Intensity under higher levels of Fire Weather Severity.

Slope mapping derived from the Smoothed Digital Elevation Model product provides a good basis for landscape modelling of Potential Fire-line Intensity, by providing a balance between the fine-scale topographic detail evident in higher resolution LiDAR terrain mapping and the broader-scale representations of terrain slope.

The methodology developed to derive slope mapping is based on the maximum potential slope of the landscape that could influence the rate of fire spread and thus the Potential Fire-line Intensity. Slope is represented as the maximum slope between each 25m pixel and its eight neighbouring pixels (Figure 4).

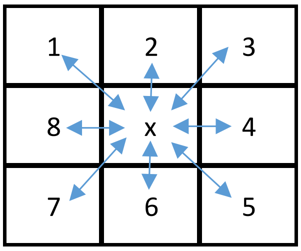


Figure 4: Calculation of Maximum Landscape Slope between each 25m central pixel and its neighbours

2.4 Fire Weather Severity

Fire behaviour is influenced by a range of weather variables including recent precipitation, current wind speed, relative humidity and temperature. Due to the complexity of these influences, they are commonly combined into a single weather index that can be used to estimate potential fire behaviour. The McArthur (1973) Forest Fire Danger Index is the best known, most widely used and thoroughly tested fire weather index adopted by fire agencies in Australia and Australian regulatory instruments (such as AS3959 - Standards Australia 2009).

The Forest Fire Danger Index is used as the basis for invoking community warnings in Australia and assessing the nature of fire behaviour that may pose a risk to communities. An index of 1 means that a fire will not burn, or burn so slowly that control presents little difficulty. An index of 100 means that fires will burn so fast and hot that control is virtually impossible. It is also a useful metric to characterise the destructive potential of fire weather severity (e.g. Bradstock and Gill 2001; Blanchi, Lucas et al. 2010).

The Forest Fire Danger Index for a 1:20 year or 5% annual exceedance probability (5% chance of occurring any year) was adopted in this analysis to reflect the severity of bushfire events suited to mitigation through land use planning, based on advice from the Queensland Fire and Emergency Services.

Temperature, wind, relative humidity and precipitation weather products produced by the Australian Bureau of Meteorology were used to create a gridded prediction of Forest Fire Danger Index at a resolution of 0.75 degree (or approximately 83km) at three hourly intervals over the period from 1979 to 2011. These temperature and relative humidity gridded weather data were adjusted to reflect the expected climate in 2050 using an Intergovernmental Panel on Climate Change A1FI climate scenario. Current wind speed and precipitation grids were retained due to a higher level of statistical uncertainty in future changes with these variables.

The modified temperature and humidity grids were combined with current wind speed and precipitation to form a statistical distribution of Forest Fire Danger Index for each cell of the Bureau of Meteorology weather grid.

The 1:20 year Forest Fire Danger Index in coastal areas was redefined by adopting the Forest Fire Danger Index predicted for the nearest inland grid cell because of the unwarranted averaging effect of the ocean on values of coastal grid cells. Cells within 0.75 degrees of any coastline were replaced with the value of the nearest grid cell greater than 0.75 degrees from the coast.

The final step in this stage of analysis was to generate a 25m grid from the 0.75 degree gridded data set using a two dimensional spline.

2.5 Potential Impact Buffer

A Potential Impact Buffer adjacent to areas of Very high, High or Medium Potential Bushfire Intensity identifies land that may be subject to significant flame attack, radiant heat or ember attack (Figure 5).

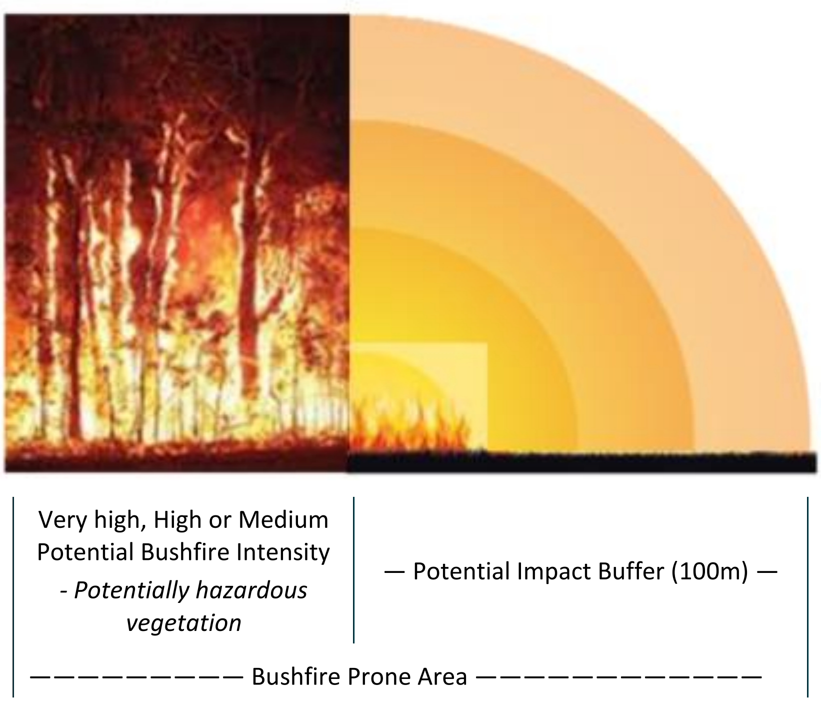


Figure 5: Potential Impact Buffer

The default width of 100m for the Potential Impact Buffer has been determined from analysis of heat radiation decay curves and national research indicating that in most fires over 80% of housing loss and 80% of human life loss has occurred within 100m of bushland (Chen and McAneney 2004; Blanchi, Leonard et al. 2013). The width of 100m also coincides with the approximate distance needed to avoid injury to people without specialised protective clothing due to radiant heat exposure from a bushfire with a very high intensity (Section). The radiation profile within the Potential Impact Buffer also varies according to Potential Fire-line Intensity, as also described in Section 3.8.

3 Results

This section details the modelling results of each of the variables used to calculate Potential Fire-line Intensity (i.e. Potential Fuel Load, Maximum Landscape Slope, Fire Weather Severity) and its categorisation to produce Potential Bushfire Intensity classes. The modelling of all variables was performed for all land and inland water in Queensland as a complete 25m resolution grid.

A demonstration area of 5km x 5km area near Clear Mountain (approximately 30km north-west of Brisbane in South East Queensland) has been used to illustrate application of the modelling methodology (see Figure 6). This area was selected for its diverse combination of urban, semi-rural and bushland landscapes, including a variety of vegetation classes. The area ranges from about 38m to 288m above sea level.

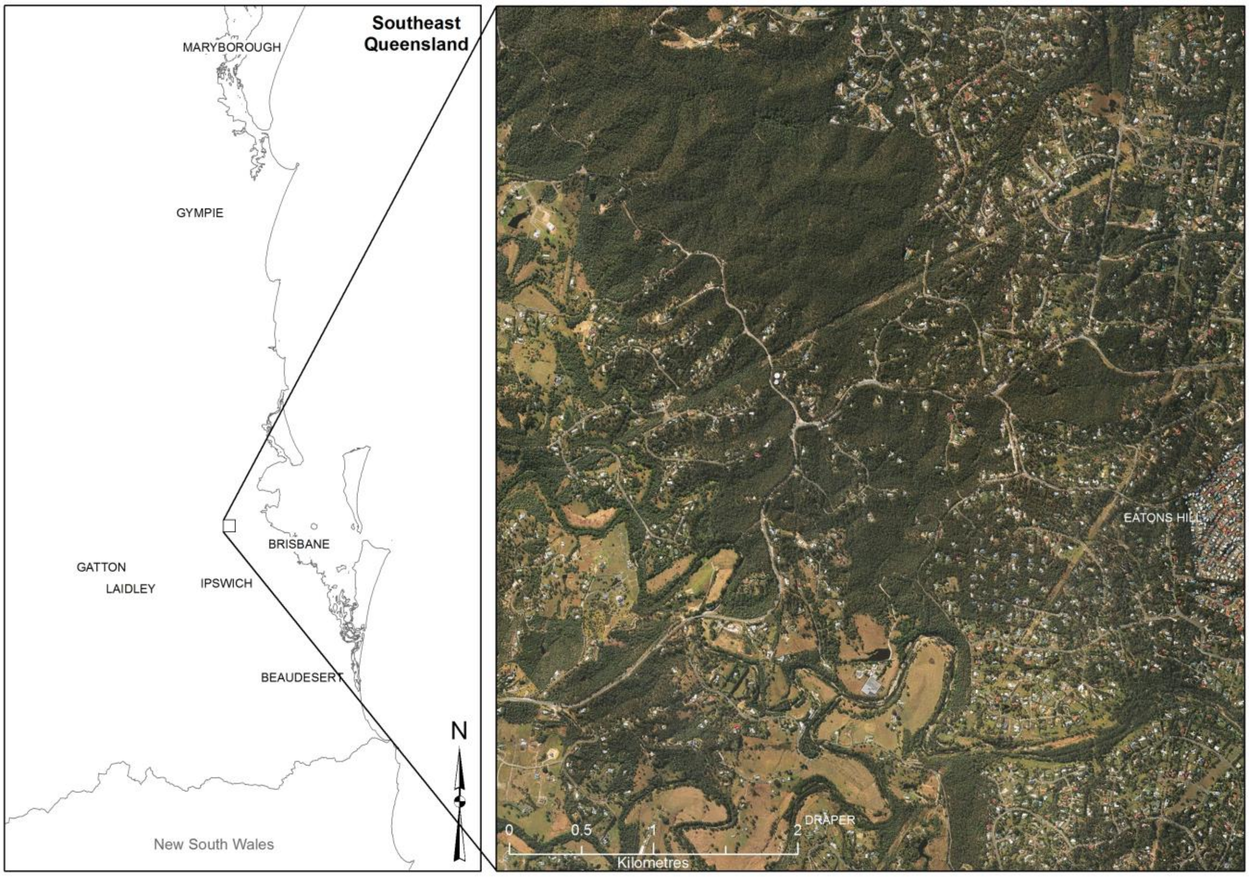


Figure 6: Location of Clear Mountain demonstration area

3.1 Vegetation Hazard Classes

Available State-wide land use and vegetation data sets were used to delineate twenty Vegetation Hazard Classes likely to have moderately consistent Potential Fuel Load. Decision rules used to create Vegetation Hazard Classes are summarised in Figure 7. A detailed description of each Vegetation Hazard Class is provided in Appendix A . Vegetation Hazard Class mapping for the Clear Mountain demonstration area and Queensland are shown in Figure 8 and Figure 9 respectively.

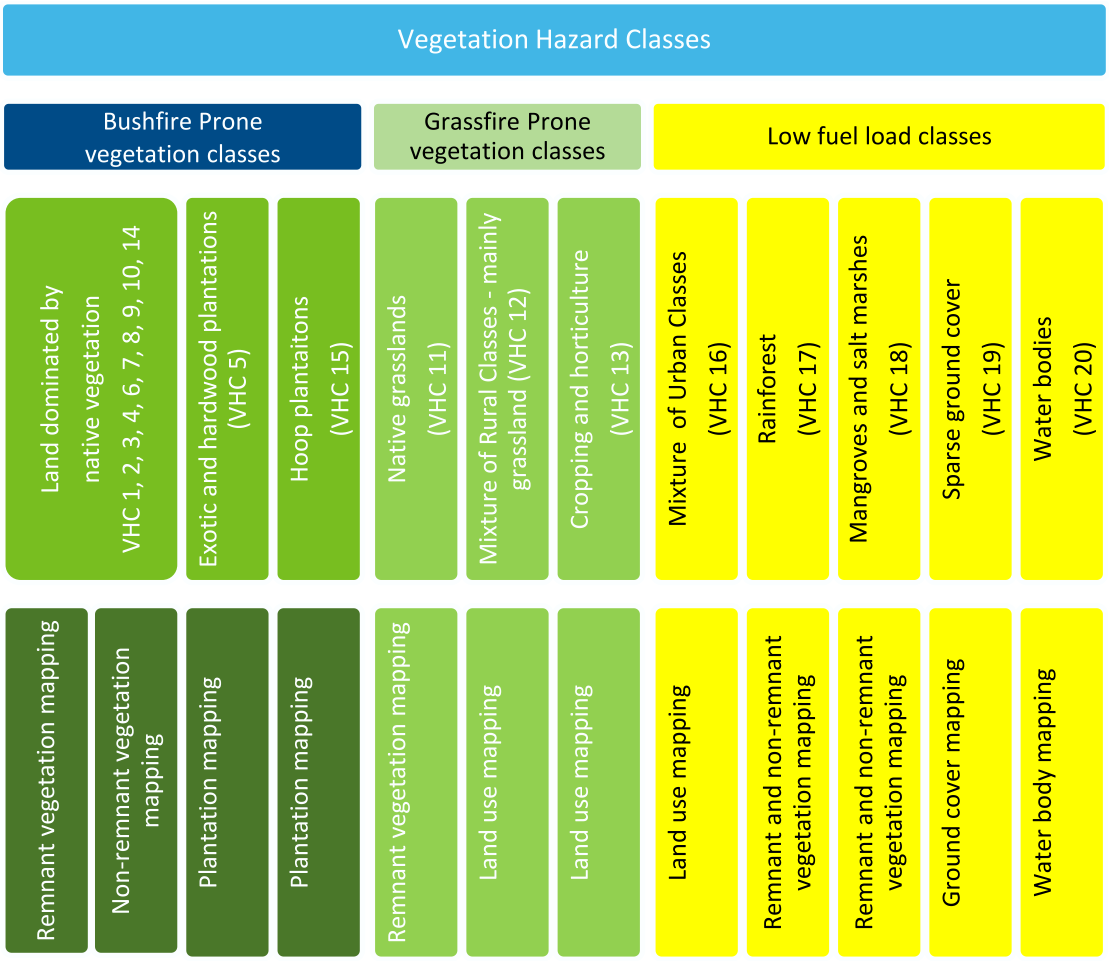


Figure 7: Overview of Vegetation Hazard Classes and mapping inputs

Remnant native vegetation Bushfire Prone classes were mapped by combining Remnant Vegetation Regional Ecosystem types based on their membership of Fire Regime Groups developed by the Queensland Parks and Wildlife Service (Neldner et al, 2012; Appendix 1). Fire Regime Groups were developed to categorise related regional ecosystems that share common fire management intent for the purpose of practical fire management. Fire Regime Groups are also linked to a series of State-wide planned burn guidelines for each of Queensland's thirteen bioregions.

Equivalent non-remnant vegetation classes were also mapped by amalgamating Pre-clear Regional Ecosystem types based again on their membership of a Fire Regime Group. Vegetation is mapped as non-remnant where it is attributed as non-remnant in Regional Ecosystem mapping, or where the Foliage Projective Cover of the vegetation is above a specified threshold (Table 1). Higher thresholds were used in urban areas to minimise confusion with buildings, watered grass and shaded areas. Foliage Projective Cover mapping from 2011 was used in this analysis.

Table 1: Foliage Projective Cover thresholds used to map non-remnant vegetation

Mapped Land Use	*South East Queensland, Far North Queensland and Central Queensland Bio-Regions*	*All other bioregions*
Urban	Foliage Projective Cover > 60%	Foliage Projective Cover > 60%
Rural	Foliage Projective Cover > 50%	Foliage Projective Cover > 11%

Bushfire Prone vegetation classes also includes Exotic or hardwood plantations (Vegetation Hazard Class 5) and Hoop plantations (Vegetation Hazard Class 15) identified from spatial information on plantation type provided by HQPlantations.

Grassfire Prone Areas includes: Native grasslands, sedgelands and balds (Vegetation Hazard Class 11), Mixture of rural classes – mainly grassland (Vegetation Hazard Class 12) and Cropping and horticulture (Vegetation Hazard Class 13). Classes 12 and 13 are derived from land use information from the Queensland Land Use Mapping Program (QLUMP) produced by the Department of Science, Information Technology, Innovation and the Arts and the Department of Natural Resources and Mines. QLUMP is part of the Australian Collaborative Land Use Mapping Program coordinated by the Australian Bureau of Agricultural and Resource Economics and Sciences.

Low fuel load classes include: Mixture of Urban Classes (Vegetation Hazard Class 16), Rainforest (Vegetation Hazard Class 17), Mangroves and salt marshes (Vegetation Hazard Class 18), Sparse ground cover (Vegetation Hazard Class 19) and Water bodies (Vegetation Hazard Class 20). Sparse ground cover (Vegetation Hazard Class 19) is mapped from ground cover mapping information produced by the Department of Science, Information Technology, Innovation and the Arts. Water bodies (Vegetation Hazard Class20) is mapped from a combination of State water body information and selected classes from Remnant Vegetation Regional Ecosystem Mapping classes.

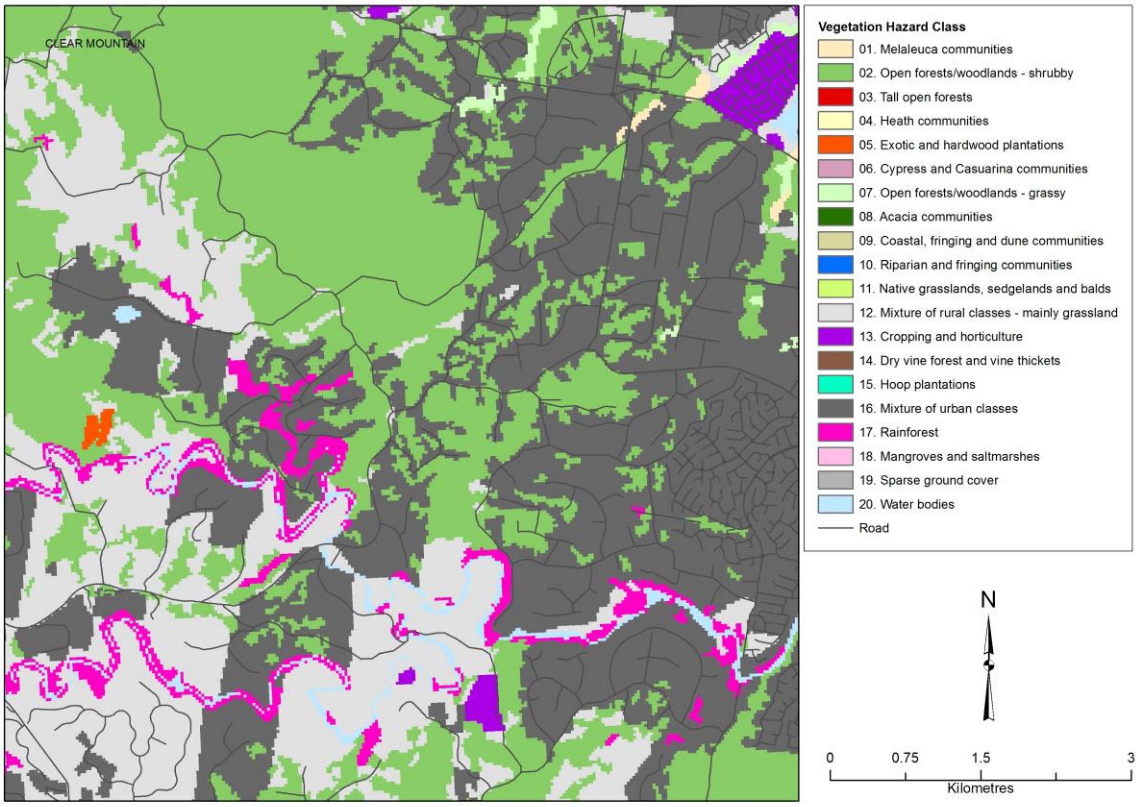


Figure 8: Distribution of Vegetation Hazard Classes in Clear Mountain

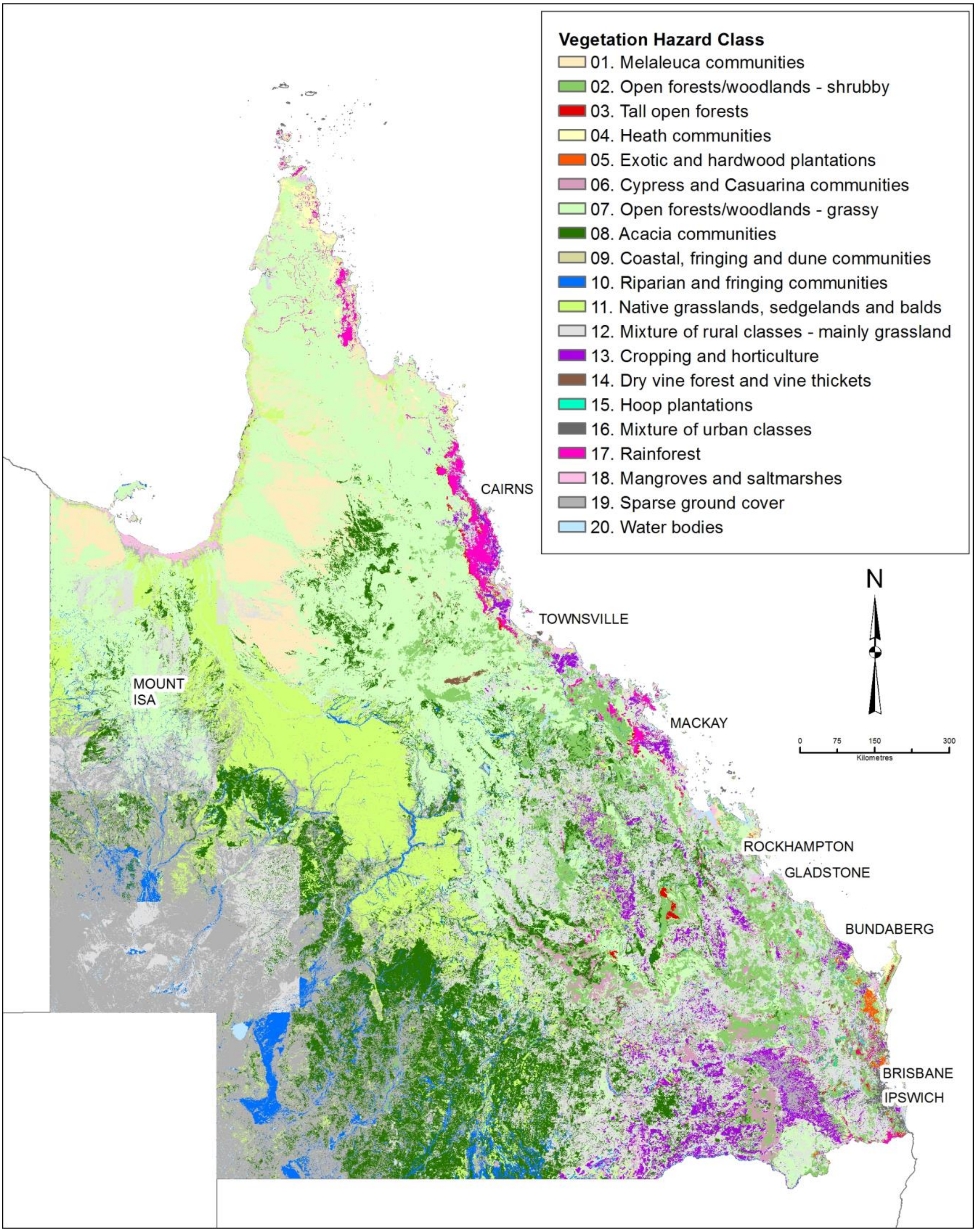


Figure 9: Vegetation Hazard Classes for Queensland

The accuracy of the Vegetation Hazard Class mapping is limited to the age and resolution of the inputs used to create them, the choice of thresholds used to identify non-remnant vegetation from foliage cover mapping, and the allocation of various mapping information categories to Vegetation Hazard Classes.

While the ages of the input datasets range from 1999 to 2012, most Vegetation Hazard Classes are current to 2009 or 2011, which is the date of regional ecosystem mapping and Foliage Projective cover mapping.

3.2 Potential Fuel Load

Information from a coordinated field measuring program using the Department of Sustainability and Environment's '*Overall Fuel Hazard Assessment Guideline*' was used to support the estimation of Potential Fuel Loads for each Vegetation Hazard Class (Table 2). These data were used to generate mapping of Potential Fuel Loads for Queensland by applying fuel load estimates to each Vegetation Hazard Class (Figure 10).

Table 2: Vegetation Hazard Classes and Potential Fuel Loads

Vegetation Hazard Class	*Vegetation Hazard Class description*	*Potential Fuel Load (tonnes/ha)*
1	Melaleuca communities	33
2	Open forests / woodlands - shrubby	30
3	Tall open forests	28
4	Heath communities	27
5	Exotic and hardwood plantations	26
6	Cypress and Casuarina communities	20
7	Open forests / woodlands - grassy	19
8	Acacia communities	10
9	Coastal, fringing and dune communities	8
10	Riparian and fringing communities	8
11	Native grasslands, sedgelands and balds	5
12	Mixture of rural classes - mainly grassland	5
13	Cropping and horticulture	5
14	Dry vine forest and vine thickets	5
15	Hoop Plantations	5
16	Mixture of urban classes	3
17	Rainforest	1
18	Mangroves and saltmarshes	1
19	Sparse ground cover	1
20	Water bodies	0

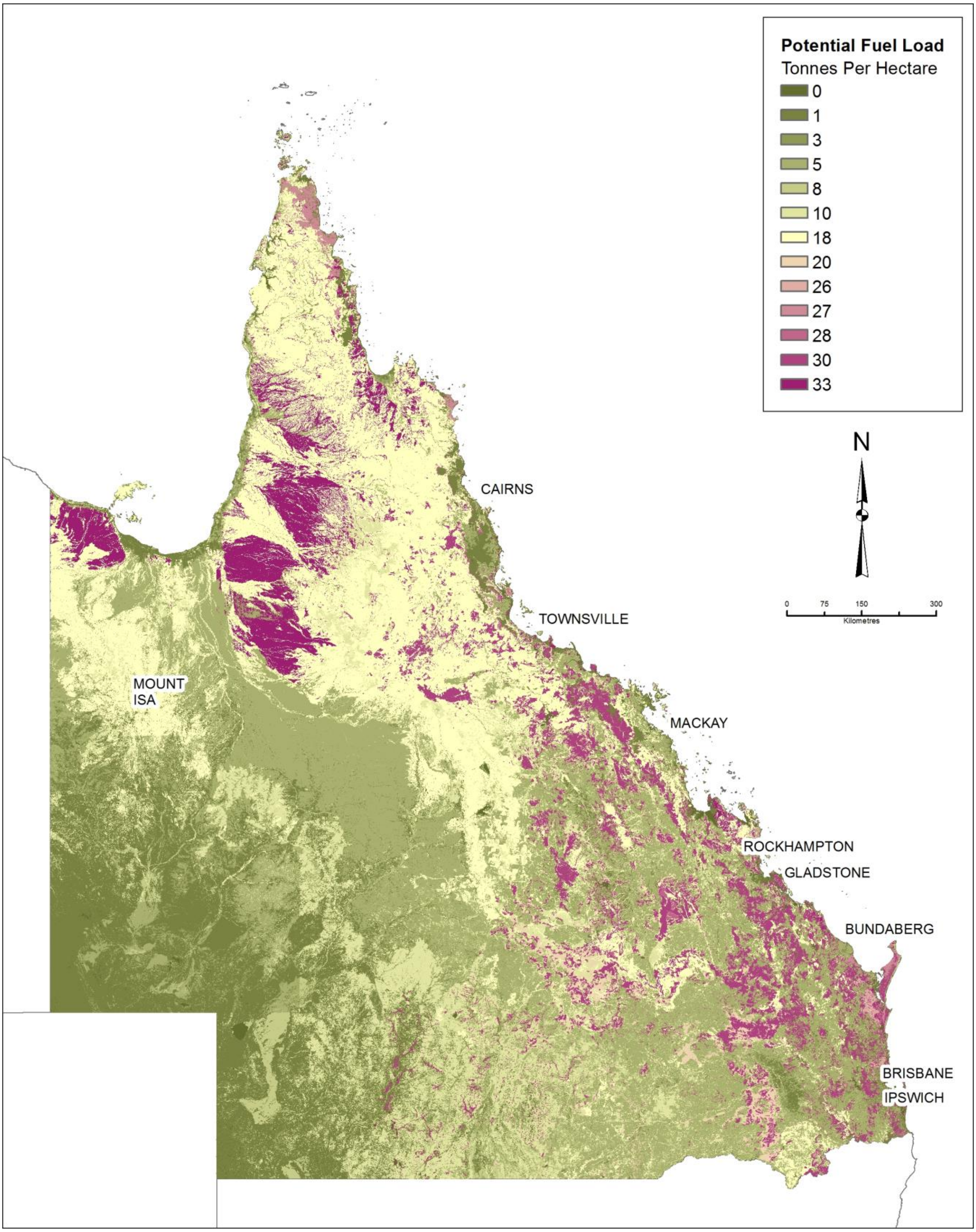


Figure 10: Potential Fuel Load for Queensland

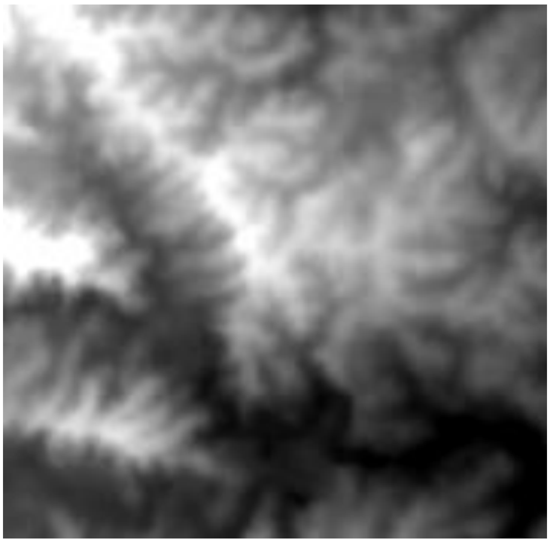
3.2.1 PATCH AND CORRIDOR FILTERING

The patch and corridor filtering approach described in Section 2.2.1 was applied to all Queensland data sets. An example of the effect of these filtering processes is shown in Figure 11.

Figure 11: Potential Fuel Load for Clear Mountain. Left: Unfiltered. Right: Filtered

3.3 Maximum Landscape Slope

Figure 12 shows the Smoothed Digital Elevation Model for the Clear Mountain area alongside a high resolution (1m pixel size)Digital Elevation Model derived from airborne LiDAR data. While the airborne LiDAR data Digital Elevation Model provides a more detailed representation of topographic variation, there is a strong correlation in the elevation heights shown in both datasets (Figure 13). In Figure 13 the black dashed line shows the 1:1 correlation between data sets, and the red line shows the best fit regression line, indicating negligible bias in the measurements. This analysis verifies that the Smoothed Digital Elevation Model and LiDAR datasets provide very similar information at the scales required for this analysis.



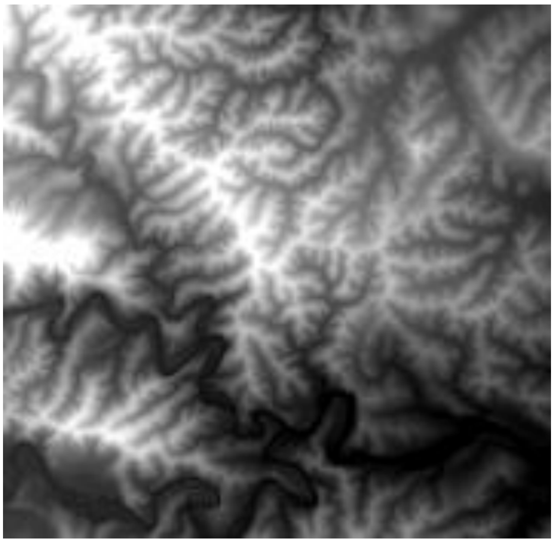


Figure 12: Digital elevation models for Clear Mountain. Left: Smoothed Digital Elevation Model data at 30 m resolution . Right: High resolution Digital Elevation Model from 1m airborne LiDAR survey data

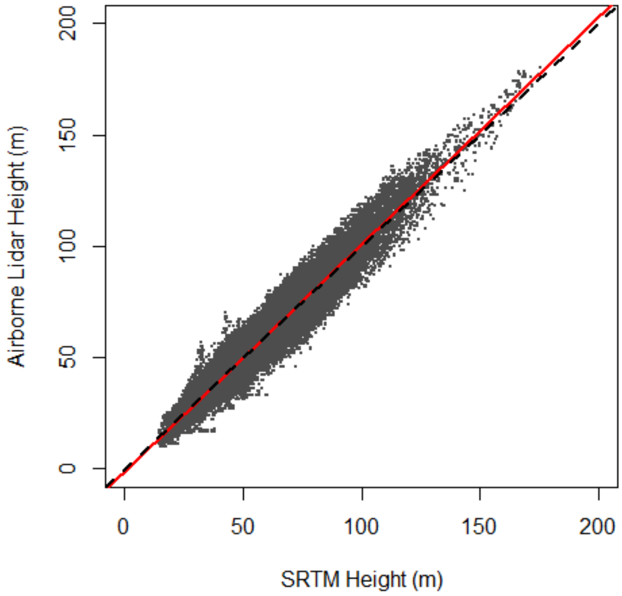


Figure 13: Relationship between terrain heights derived from Smoothed Digital Elevation Model (SRTM) data and airborne LiDAR data for Clear Mountain

The LiDAR data tend to produce higher local slope estimates than the Smoothed Digital Elevation Mode data, however these local slopes are less relevant to fire spread under severe weather conditions than the terrain slope shown in the Smoothed Digital Elevation Mode data.

Figure 14 shows the distribution of slope classes for the Clear Mountain demonstration area using the Smoothed Digital Elevation Model (left) and airborne LiDAR data (right). Maximum Landscape Slope mapping for Queensland produced from the Smoothed Digital Elevation Model is shown in Figure 15.

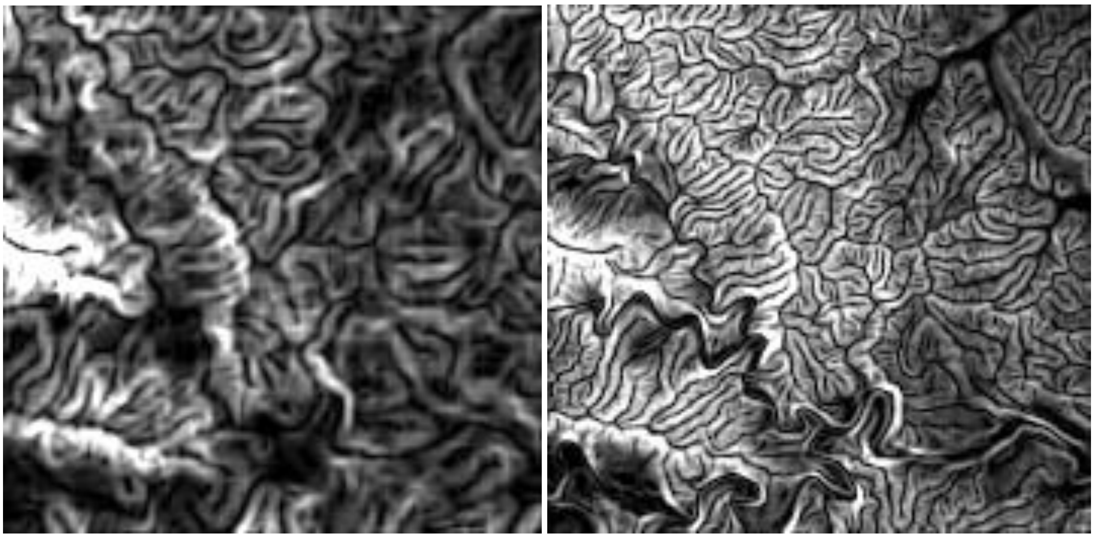


Figure 14: Slope mapping for Clear Mountain. Left: Derived from Smoothed Digital Elevation Model. Right: Derived from airborne LiDAR survey data.

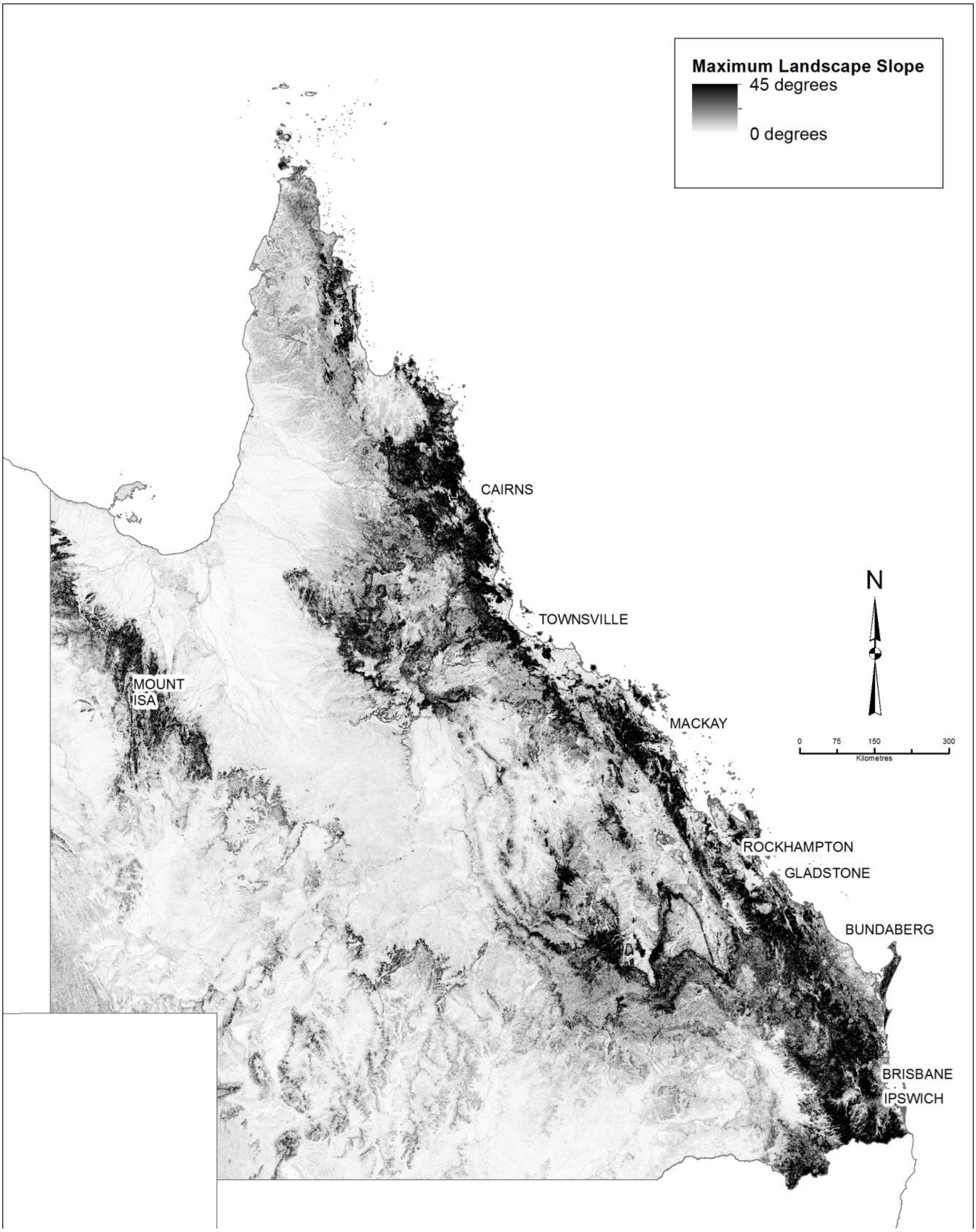


Figure 15: Maximum Landscape Slope for Queensland

3.4 Fire Weather Severity

While there is negligible variation of Forest Fire Danger Index for the Clear Mountain demonstration area, the Fire Weather Severity mapping for Queensland (Figure 16) shows that extreme Forest Fire Danger Index weather events of greater than 100 occur more frequently in western Queensland than coastal and northern parts of the state. Of note is that zones of less severe Forest Fire Danger Index (under 50) occur in Cape York, the Wet Tropics and in parts of coastal South East Queensland.

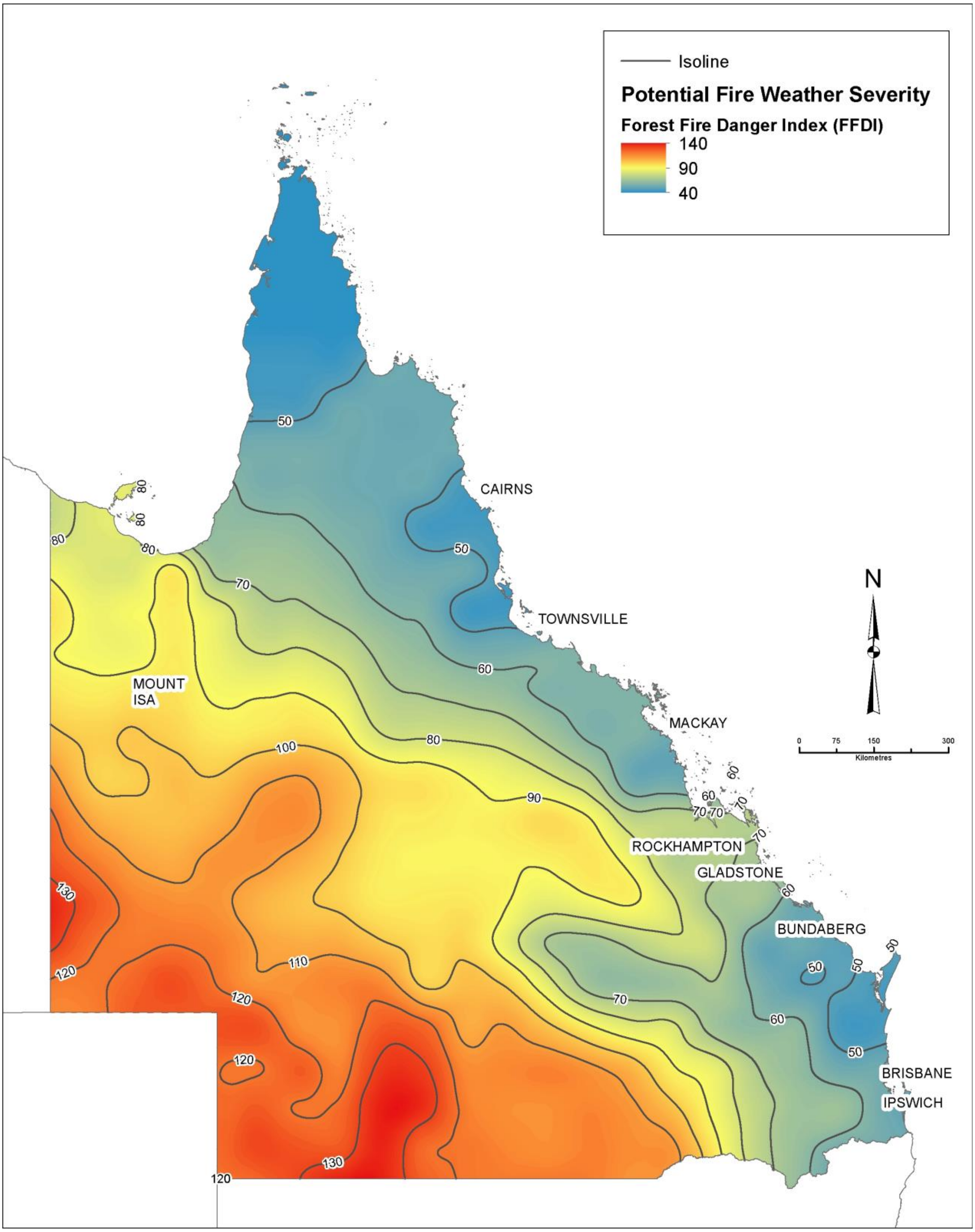


Figure 16: Fire weather severity for Queensland

3.5 Potential Fire-line Intensity

Potential Fuel Load, Maximum Landscape Slope and Fire Weather Severity mapping were combined using the simplified McArthur equation (Section 2.1) at a resolution of 25m to produce Potential Fire-line Intensity mapping for the Clear Mountain demonstration area (Figure 17) and Queensland (Figure 18).

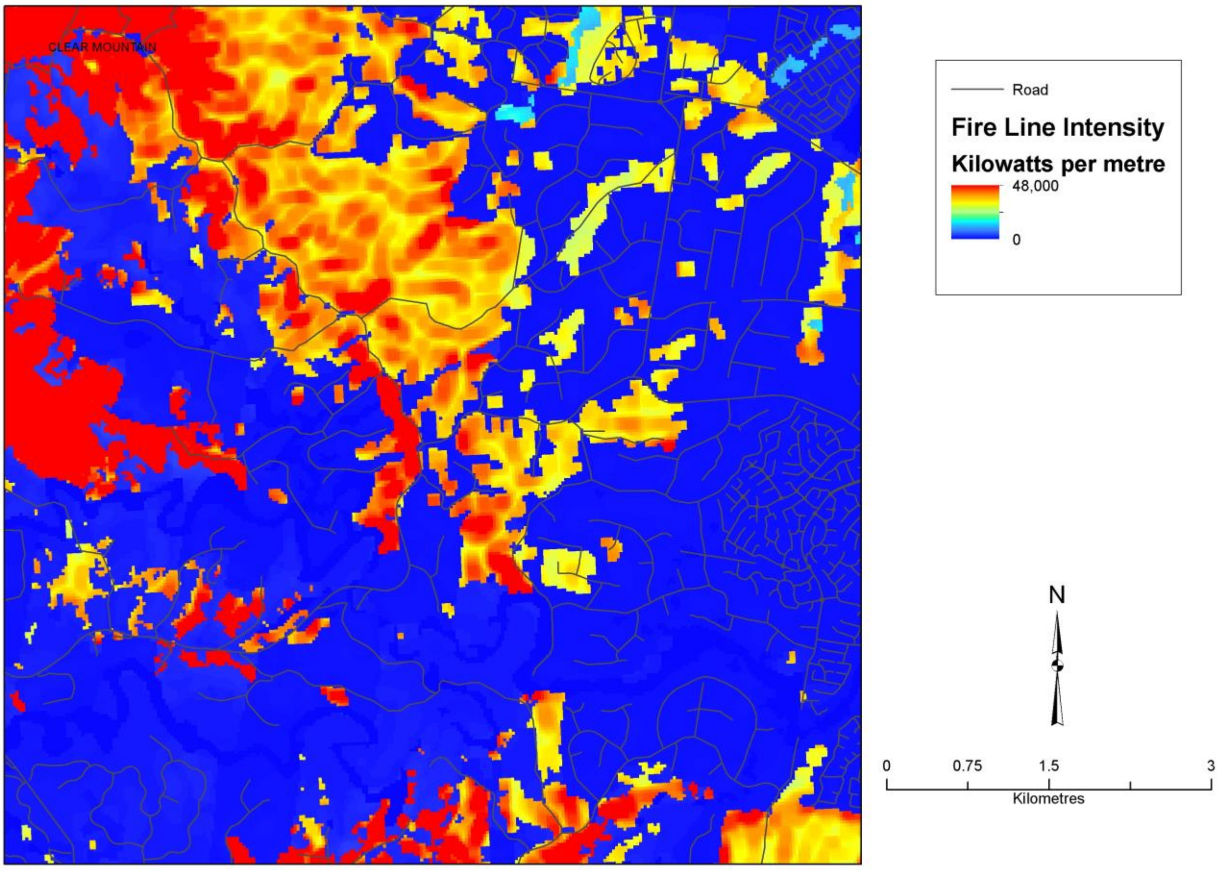


Figure 17: Potential Fire-line Intensity for Clear Mountain

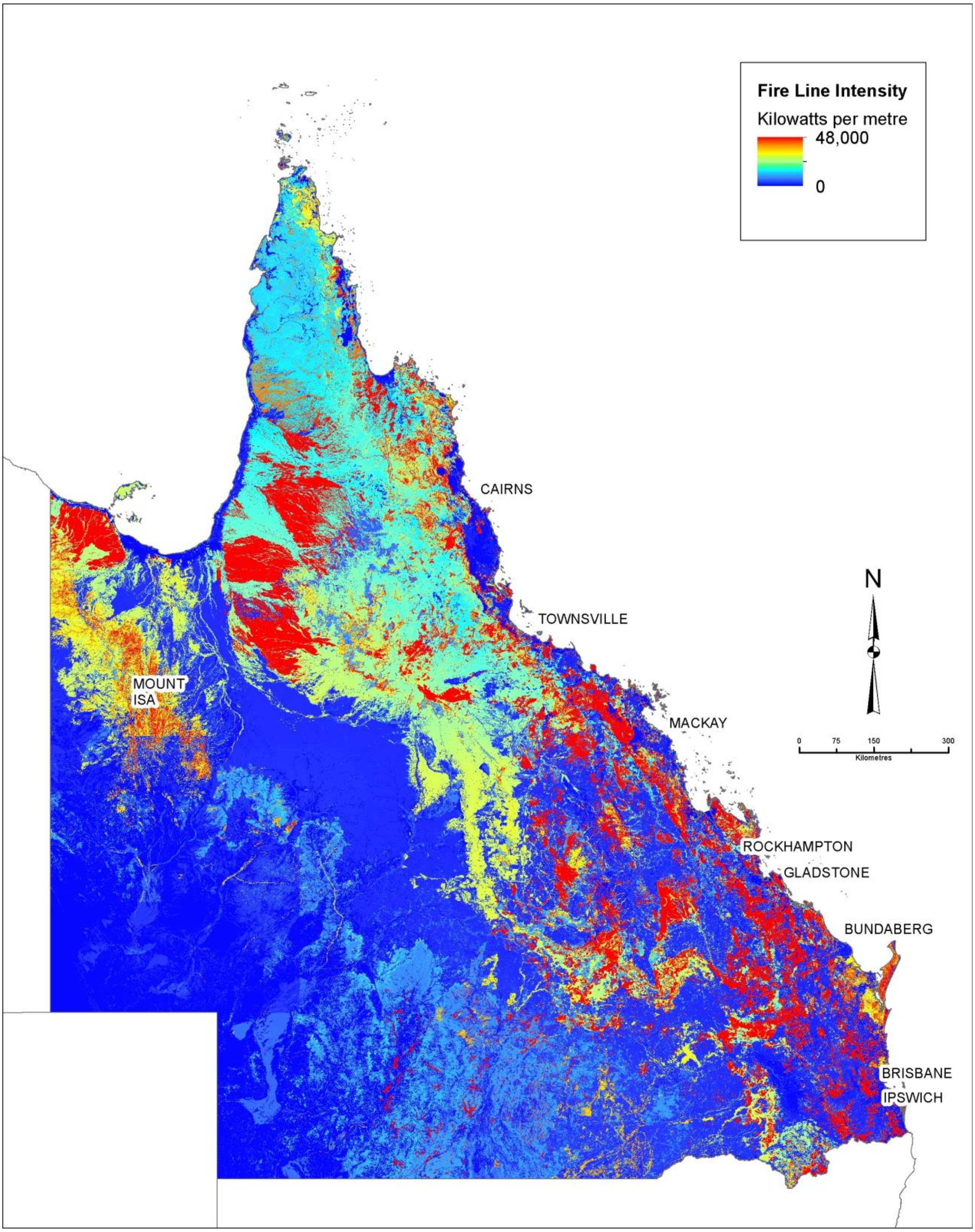


Figure 18: Potential Fire-line Intensity for Queensland

3.6 Potential Bushfire Intensity

Potential Bushfire Intensity mapping was generated by classifying the Potential Fire-line Intensity according to the categories outlined in Table 3.

Table 3: Potential Bushfire Intensity classes and corresponding Potential Fire-line Intensity ranges

Potential Bushfire Intensity Class	*Potential Fire-line Intensity*
1. Very high (potential intensity)	40,000+kW/m
2. High (potential intensity)	20,000 – 40,000kW/m
3. Medium (potential intensity)	4,000 – 20,000kW/m

This mapping shows that areas of Very High Potential Bushfire Intensity occur in forested parts of the demonstration area (Figure 19). This landscape is also dominated by Low Hazard Areas and Grassfire Prone Areas due to a combination of low fuel loads in urban and cleared areas.

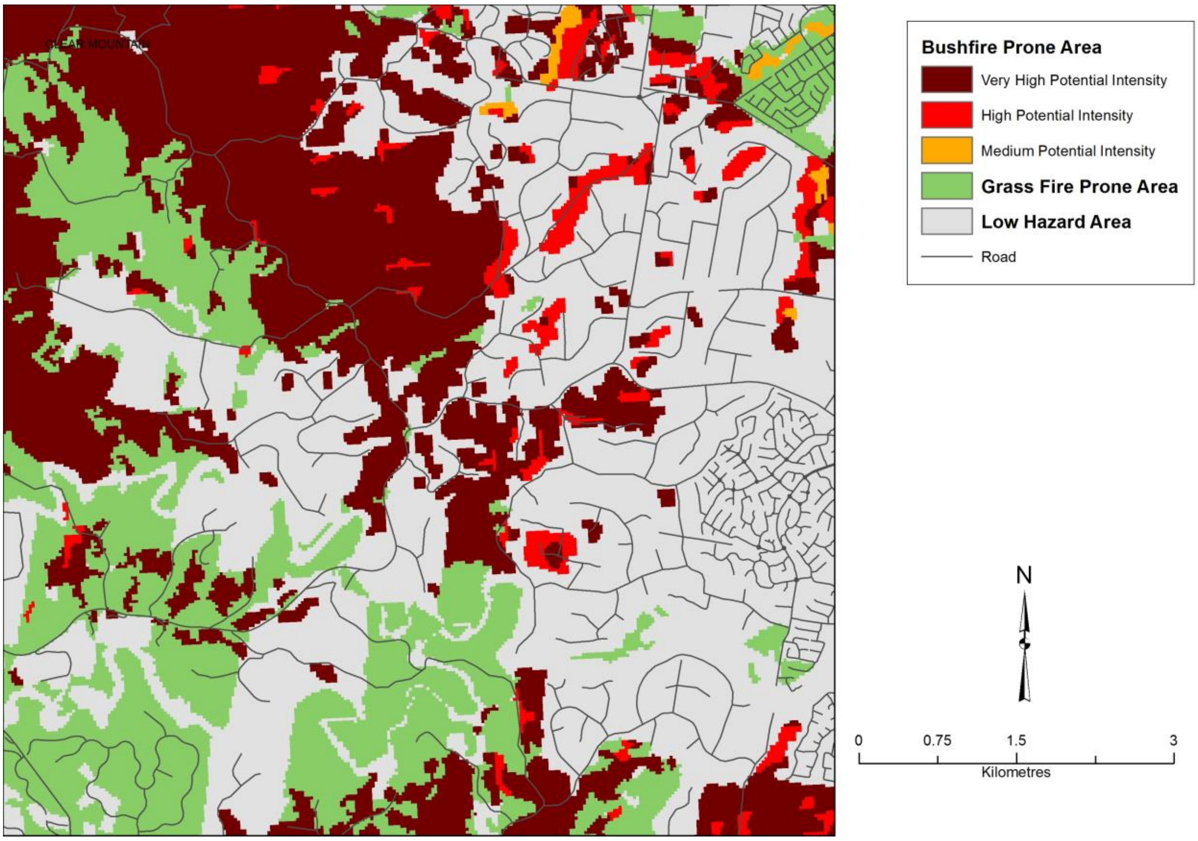


Figure 19: Potential Bushfire Prone Areas for Clear Mountain

The Potential Bushfire Intensity classification for Queensland is shown in Figure 20. Although Fire Weather Severity is higher in the south-west of the state, the lower slope and fuel loads are insufficient to achieve a moderate or higher intensity classification. However, grassfires in these western areas can burn with reasonable speed and intensity following major rain and flood events where continuous fuel loads have developed. In contrast, south east, central north and north-west parts of the state have a very high potential bushfire intensity, mainly due to the high Potential Fuel Load (19-30 tonnes/ha). Many parts of the state would rarely achieve this intensity or fuel load because of regular burning (e.g. tropical savannah). Low hazard areas of urban areas, rainforest and mangroves, and other areas with discontinuous or virtually no available fuel may experience some fires, but only under extreme drought and weather conditions greater than the conditions represented in Fire Weather Severity mapping used in this analysis.

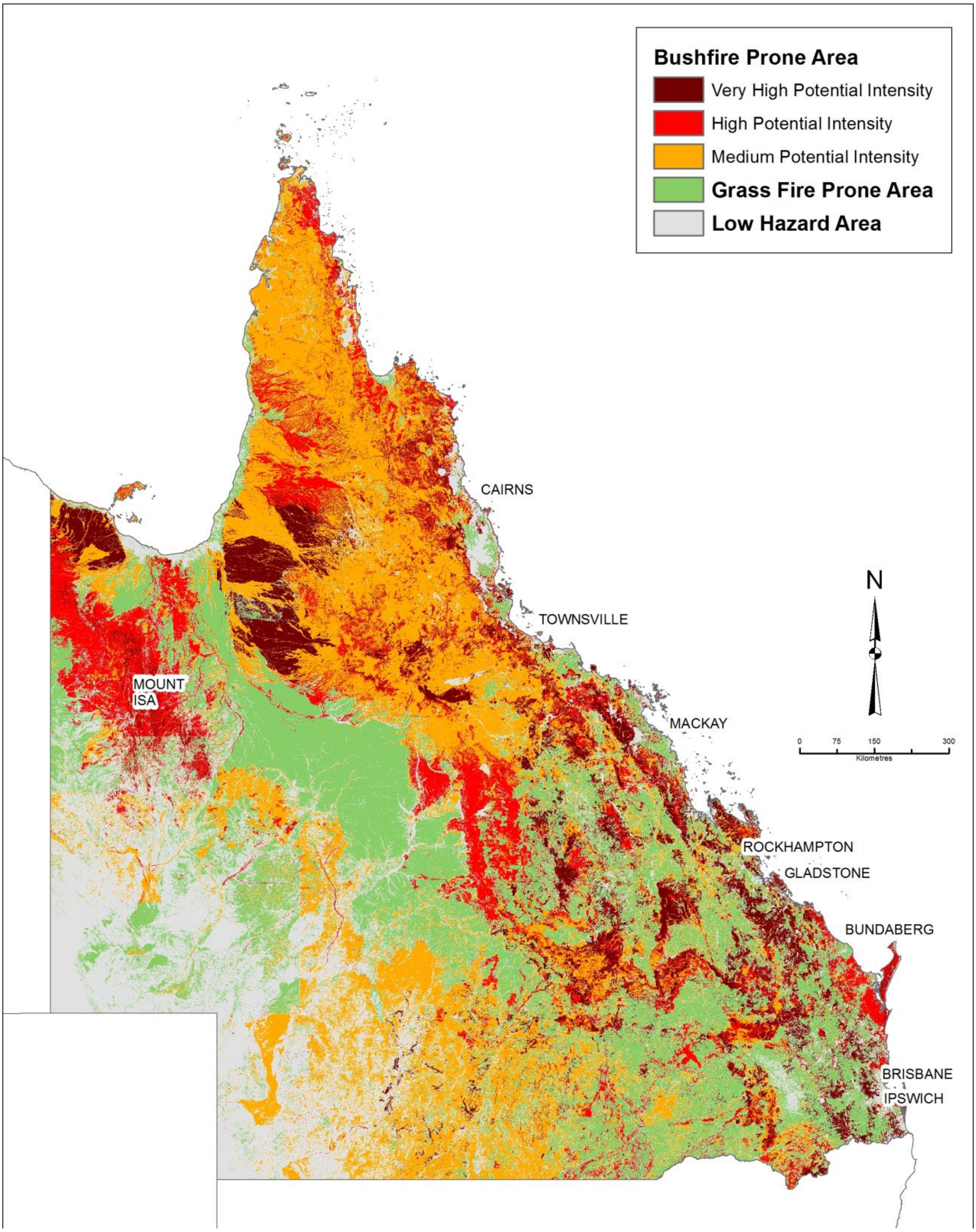


Figure 20: Bushfire Prone Areas, Grassfire Prone Areas and Low Hazard Areas for Queensland

3.7 Potential Impact Buffer

A Potential Impact Buffer of 100m was delineated around areas of Medium to Very high Potential Bushfire Intensity greater than 1 ha (see Figure 21).

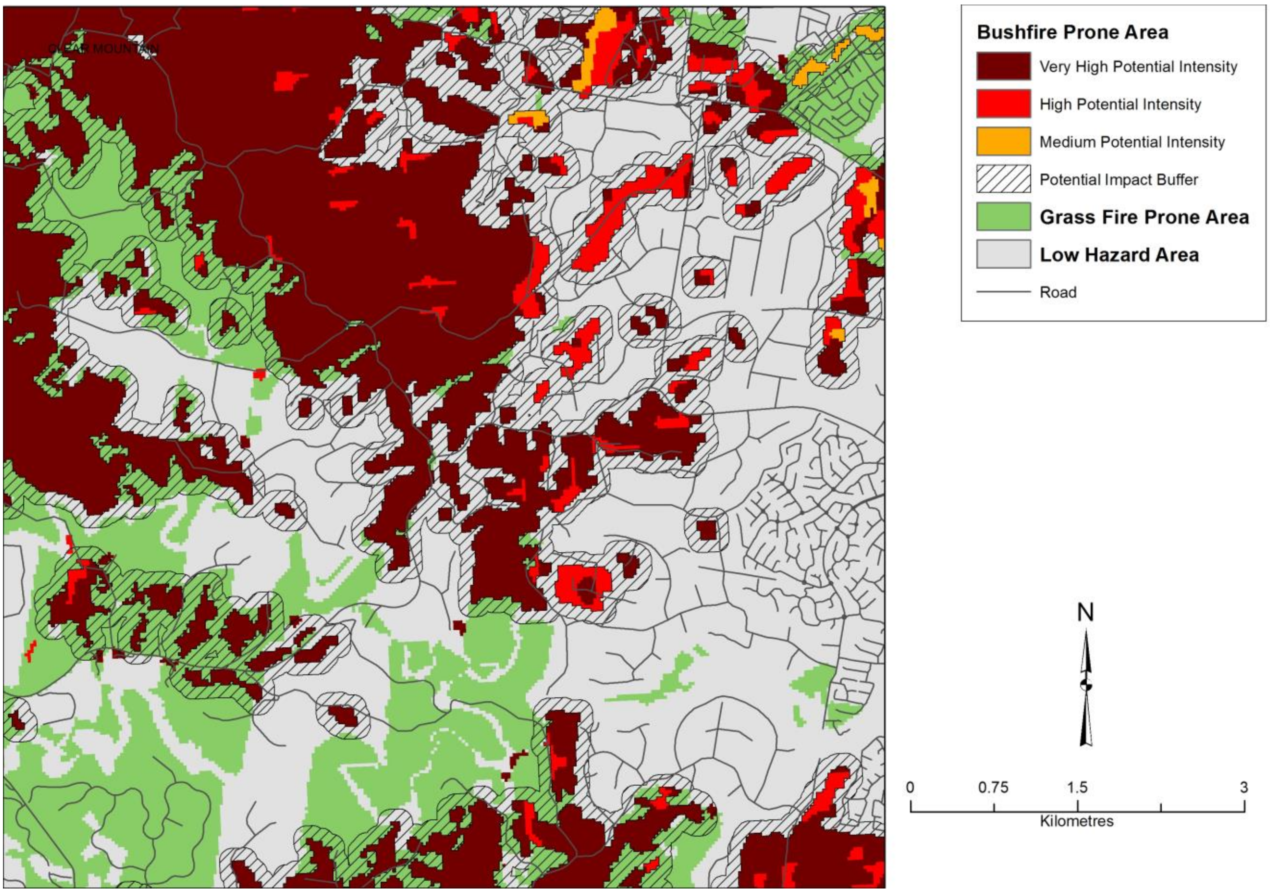


Figure 21: Potential Impact Buffers for Clear Mountain

3.8 Radiant heat profile

A potential radiant heat profile has been calculated for land adjacent to potentially hazardous vegetation based on a number of assumptions about the general patterns of fire front geometry. These assumptions are based on specified criteria for flame temperature and geometry similar to those in AS3959 – the Australian Standard for construction of homes in bushfire prone areas. These potential radiant heat profiles are depicted as a series of curves (Figure 22). While alternative calculation methods and tables can also be used to predict radiation exposure for more specific conditions (e.g. Standards Australia 2009), the curves presented here are appropriate for use in determining likely levels of safety and potential impacts from potentially hazardous vegetation as a companion to the Bushfire Prone Area mapping methodology described in this report. These profiles can be used to inform the development of detailed land use planning measures to reduce risks to life and property.

Figure 22 shows the maximum radiation exposure (kW/m^2) for a range of distances from potentially hazardous vegetation, for different levels of Potential Fire-line Intensity that correspond to the approximate upper and lower levels for Very High, High and Medium Potential Bushfire Intensity.

Two radiation thresholds in this profile are particularly relevant to the protection of human safety during the passage of a fire front. Human skin is damaged by exposure levels greater than 2 kW/m^2, as shown as a pink dashed line in Figure 22. This profile indicates that a minimum distance of approx 43m is required to prevent injury when adjacent to an area of potentially hazardous vegetation with Medium Potential Bushfire Intensity (4,000 kw/m). A distance of approx 100m would be required to avoid injury from radiant heat from a bushfire front if adjacent to an area of potentially hazardous vegetation with Very High Potential Bushfire Intensity.

Similarly, a fully garbed firefighter can typically withstand a short period of exposure to radiant heat of 7kW/m^2 (Zárate, Arnaldos et al. 2008) (as represented by the blue dashed line in Figure 22) if separated from the fire front by a distance of approx. 15m for a fire with an intensity of 4,000 kw/m (lower limit for a Medium Potential Bushfire Intensity), and approx. 46m for a fire front with an intensity of 70,000 kw/m (assumed upper limit for Very high Potential Bushfire Intensity). These separation distances do not account for the ember, radiaton or flame attack that may occur from spot fires away from the main fire front.

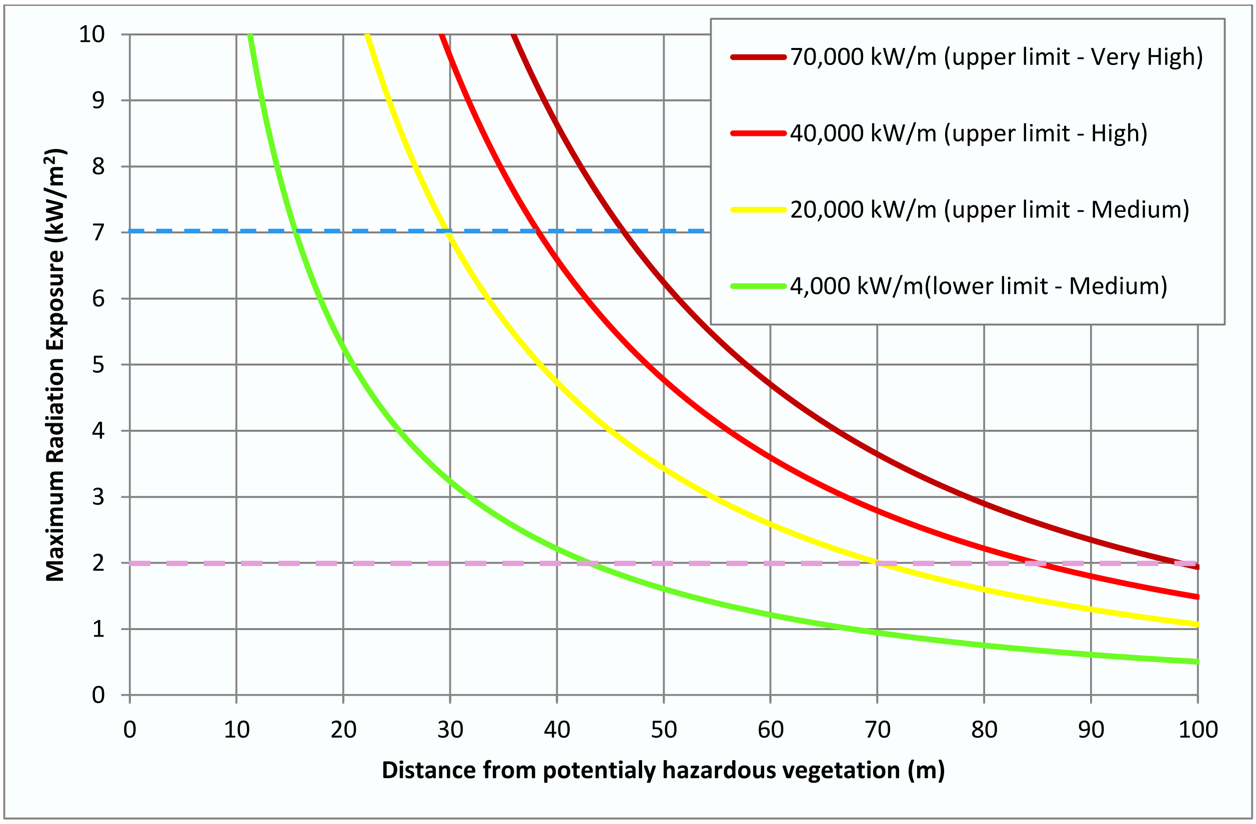


Figure 22: Relationship between maximum radiation exposure (kW/m^2) and distance from hazardous vegetation (m)

3.9 Reliability assessment

An assessment of the reliability of Bushfire Prone Area mapping was undertaken by land management professionals with experience in bushfire management to verify its suitability for land use planning or other bushfire mitigation purposes and to provide useful feedback on mapping issues that could be addressed in future revisions of the mapping.

A semi-quantitative, systematic methodology was used to indicate the reliability of Bushfire Prone Area and Vegetation Hazard Class mapping. Experts from eleven (11) organisations participated in the assessment that assessed 51 areas of interest within the geographic region between the Atherton Tablelands, the Gold Coast and Goondiwindi. Most assessments were conducted as desk-top evaluations supported by site inspections where necessary.

The reliability assessment considered the methodology used to generate Bushfire Prone Areas and relevant input data sets such as available regional ecosystem mapping, land use mapping and information on the extent of non-remnant vegetation. The assessment also considered the potential applications of mapping.

The assessment found that the average reliability of Bushfire Prone Area mapping was 85%. Five (5) of these organisations reported that mapping was more than 90% reliable. Bushfire Prone Area map reliability was found to be highly correlated with the quality and interpretation of vegetation mapping generated for this project (i.e. Vegetation Hazard Class mapping).

Bushfire Prone Area mapping was also reported to be of much greater accuracy than bushfire hazard mapping released by the Queensland Fire and Rescue Service in 2008. Organisations also indicated that Bushfire Prone Area mapping is comparable to other high resolution natural resource mapping compiled by local governments in Queensland.

The assessment highlighted important opportunities to improve the reliability of Bushfire Prone Area mapping by revising vegetation mapping, especially in sparsely forested semi-rural landscapes. Some semi-rural landscapes were misclassified as urban landscapes. Other limitations in mapping include the misclassification of some lakes as semi-permanent wetlands and the over-estimation of hazard for some urban parks. A more detailed analysis of non-satisfactory mapping collated from this consultation will be used as input to a future revision of mapping.

Organisations that participated in these reliability assessments reported that mapping with a reliability of 90% is most suited to the preparation of local government planning schemes or other strategic bushfire mitigation planning decisions. Larger scale assessments and site inspections of Bushfire Prone Areas can be used by local governments to identify and resolve remaining mapping issues.

This assessment has demonstrated the successful application and benefits of a semi-quantitative and systematic reliability assessment methodology to provide an improved understanding of the strengths and limitations of mapping produced by this project. This assessment methodology can also be applied by organisations seeking to verify that its reliability is suited to land use or other decision making in their area of interest. There are significant opportunities to improve the reliability of State-wide or local Bushfire Prone Area mapping by accessing up-to-date and more refined input datasets.

4 Conclusions

This report has demonstrated the application of a new repeatable method for landscape scale, State-wide mapping of Bushfire Prone Areas in Queensland. Grassfire Prone Areas and Low Hazard Areas identified by this approach can be used to inform strategic planning of other bushfire mitigation activities and help to raise community awareness. These methods provide useful mapping information for the mitigation of potential bushfire impacts through land use planning. These mapping products provide improved spatial detail and greater confidence in bushfire hazard mapping compared to previous State-wide bushfire hazard mapping products. The calculation of Potential Fire-line Intensity as the basis for modelling Bushfire Prone Areas, Potential Bushfire Intensity classes and Potential Impact Buffers utilises robust and well accepted scientific assumptions about bushfire behaviour in Australia. Radiant heat profiles and corresponding Potential Fire-line Intensity estimates can also be used to inform the development of localised land use planning measures that can further reduce risks to human life. Mapping and associated scientific information generated through the process described in this report can also be used to inform a range of other bushfire mitigation and preparation actions in Queensland.

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Appendix A Vegetation Hazard Classes

Vegetation Hazard Class 1. Melaleuca communities

Potential fuel load: 33 tonnes / ha

Melaleuca Communities are assumed to have the highest potential fuel load of any Vegetation Hazard Class. This category includes melaleuca forest and woodland communities, as well as some swamps, wetlands and dry coastal heath communities. The vegetation has relatively high oil content and will often present a high bark fuel hazard due to presence of paperbark trees. Further, it commonly has a thick elevated fuel layer with a dense heath or shrubby understorey.

Photo: Byfield NP, Rockhampton, R Healy & M Brook

Main localities

Coastal parts of Fraser Island, Bribie Island, Agnes Waters / 1770, Capricorn Coast, Saunders Beach, Townsville and extensive areas in the Gulf and Cape York Peninsula.

Fire Regime Groups:

Dry coastal heath communities; Melaleuca communities; Melaleuca forest/woodland; Melaleuca forest/woodland communities; Melaleuca forests and woodlands; Melaleuca gallery forests; Melaleuca on gley soils; Melaleuca swamps; Melaleuca wetlands and fringing communities; Melaleuca woodlands; Submerged melaleuca/palm/vine forest swamps; Rainforest (where Tall Open Forest is estimated to contribute >40% of map unit); Wetlands (including mound springs); Wetlands and swamps

Regional Ecosystem Types

Dry coastal heath communities

3.2.14, 3.3.51, 3.3.52a, 3.3.52c, 3.7.6x2,

Melaleuca communities

11.2.5, 11.2.5a, 11.2.5b, 11.3.12, 11.3.12a, 11.3.38a, 11.5.8, 11.8.11a, 12.11.21, 12.2.5a, 12.2.7, 12.2.7a, 12.2.7c, 12.3.12, 12.3.3c, 12.3.4, 12.3.4a, 12.3.5, 12.3.5a, 12.3.6, 12.5.4a, 12.5.9a, 12.9-10.11, 2.10.6, 2.10.6x1, 2.3.24, 2.3.24a, 2.3.24b, 2.3.24x1, 2.3.24x11, 2.3.24x12, 2.3.24x12c, 2.3.24x13, 2.3.24x2, 2.3.24x2a, 2.3.28, 2.3.28a, 2.3.28b, 2.3.28c, 2.3.28d, 2.3.28e, 2.3.28f, 2.3.28g, 2.3.28x1, 2.3.28x11, 2.3.28x12, 2.3.28x13, 2.3.28x15, 2.3.28x16, 2.3.28x17a, 2.3.28x17b, 2.3.28x40, 2.3.29, 2.3.29x1, 2.3.29x2, 2.3.29x40, 2.3.29x40a, 2.3.29x40b, 2.3.29x41, 2.3.29x42, 2.3.36, 2.5.14, 2.5.14a, 2.5.14x1, 2.5.14x50, 2.5.14x51, 2.5.15, 2.5.15a, 2.5.15b, 2.5.15c, 2.5.15d, 2.5.15e, 2.5.15x2, 2.5.15x7, 2.5.16, 2.5.16a, 2.5.16b, 2.5.16x40, 2.7.1x3a, 2.7.1x3b, 2.7.1x3c, 2.7.1x4, 2.9.1x92, 2.9.6, 2.9.6a, 2.9.6b, 2.9.6x40

Melaleuca forest/woodland

7.12.60c

Melaleuca forest/woodland communities

7.11.40a, 7.11.40b, 7.11.40d, 7.11.41a, 7.11.48a, 7.11.48b, 7.12.56c, 7.12.60b, 7.2.11b, 7.2.11c, 7.2.3h, 7.2.4h, 7.3.8b, 7.3.8c, 7.3.9a, 7.3.9b, 7.5.4g

Melaleuca forests and woodlands

8.2.13b, 8.3.11, 8.3.2, 8.5.2a, 8.5.2c, 8.5.6, 8.5.7

Melaleuca gallery forests

3.3.10a, 3.3.10b, 3.3.10c, 3.3.10d, 7.3.50a, 7.3.50b, 8.3.15, 8.3.3a, 8.3.3b

Melaleuca on gley soils

7.1.5, 7.12.60a, 7.2.11a, 7.2.11e, 7.2.11f, 7.3.34, 7.3.5a, 7.3.5b, 7.3.5c, 7.3.5d, 7.3.5e, 7.3.5f, 7.3.5g, 7.3.8a, 7.3.8d

Melaleuca swamps

3.2.4a, 3.2.4b, 3.2.4c, 3.2.4d, 3.2.4e, 3.3.12, 8.2.11, 8.2.4c, 8.2.7a, 8.2.7e, 8.3.13a, 8.3.13b

Melaleuca wetlands and fringing communities

9.3.10, 9.3.10a, 9.3.10b, 9.3.11, 9.3.11a, 9.3.11b, 9.3.4, 9.3.7

Melaleuca woodlands

3.10.16a, 3.10.16b, 3.10.16c, 3.10.16x2, 3.11.18a, 3.11.18b, 3.11.18c, 3.12.16a, 3.12.16b, 3.12.16c, 3.2.16, 3.2.3, 3.3.13, 3.3.14a, 3.3.32, 3.3.33, 3.3.41, 3.3.42a, 3.3.42c, 3.3.43, 3.3.43x1, 3.3.47, 3.3.48a, 3.3.48b, 3.3.49a, 3.3.49b, 3.3.49x1, 3.3.50a, 3.3.50b, 3.3.50c, 3.5.13, 3.5.14a, 3.5.14b, 3.5.14c, 3.5.15a, 3.5.15b, 3.5.16, 3.5.17a, 3.5.17b, 3.5.18, 3.5.27, 3.7.6, 3.7.6b, 3.7.6x1, 3.7.6x3, 9.12.39, 9.12.40, 9.3.24, 9.5.13a, 9.5.13b, 9.5.13c, 9.5.14, 9.5.15b, 9.7.1b

Submerged melaleuca/palm/vine forest swamps

7.1.3a, 7.2.10c, 7.2.4g, 7.2.8, 7.2.9a, 7.2.9b, 7.2.9d, 7.3.25a, 7.3.6, 7.3.6a, 7.3.6b

Wetlands (including mound springs)

6.3.10, 6.3.10a, 6.3.10b, 6.3.11, 6.3.11a, 6.3.11b, 6.3.11f, 6.3.13b, 6.3.1a, 6.3.23, 6.3.3a

Wetlands and swamps

11.2.4, 11.3.27, 11.3.27a, 11.3.27b, 11.3.27c, 11.3.27d, 11.3.27e, 11.3.27f, 11.3.27g, 11.3.27h, 11.3.27i, 11.3.27x1a, 11.3.27x1b, 11.3.27x1c, 11.3.2b, 11.5.17, 11.5.3b,

Major mapping inputs (also Vegetation Hazard Classes 2, 3, 4, 6, 7, 8, 9, 10, 14)

Regional Ecosystem V6.1 (DSITIA); PreClear V6 (DSITIA); Foliage Projective Cover 1988-2010 (DSITIA); QLUMP V7 (DSITIA); Fire Regime Groups 2012 (DNPRSR)

Vegetation Hazard Class 2. Open forests / woodlands – shrubby

Potential fuel load: 30 tonnes / ha

Vegetation in this category will often feature a dense understory and full canopy. The canopy contributes high volumes of leaf and bark litter which can become suspended above the understory. This category includes shrubby eucalypt communities alongside shrubby open forests.

Photo: Numinbah, Gold Coast, R Anderson

Main localities:

Alpha/Jericho, Kingaroy /Nanango, Miriam Vale, Geta, Mt Perry.

Fire Regime Groups

Eucalypt communities – shrubby; Eucalypt forest and woodland-shrubby; Open forests – shrubby; Open forests/woodlands - grassy/shrubby; Open forests/woodlands – shrubby; Shrubby open forests

Regional Ecosystem Types

Eucalypt communities - shrubby

11.10.11, 11.10.11a, 11.10.12, 11.10.13, 11.10.13a, 11.10.13b, 11.10.7, 11.10.7a, 11.11.12, 11.11.15, 11.11.15a, 11.11.15b, 11.11.15c, 11.11.15d, 11.11.3, 11.11.3c, 11.11.4, 11.11.4a, 11.11.4b, 11.11.4c, 11.11.4d, 11.11.6, 11.11.7, 11.11.7a, 11.11.7x1, 11.11.8, 11.12.1, 11.12.10, 11.12.13, 11.12.13a, 11.12.13b, 11.12.17, 11.12.19, 11.12.1a, 11.12.20, 11.12.3, 11.12.5, 11.12.6, 11.12.6a, 11.12.6b, 11.12.8, 11.12.8a, 11.12.8b, 11.12.9, 11.12.9a, 11.3.29a, 11.4.12, 11.5.12, 11.5.12a, 11.5.2, 11.5.20, 11.5.21, 11.5.3, 11.5.8a, 11.5.8b, 11.5.9, 11.5.9a, 11.5.9b, 11.5.9c, 11.5.9d, 11.7.4, 11.7.4c, 11.7.6, 11.7.7, 11.8.2, 11.8.2a, 11.8.5, 11.8.8, 11.9.7, 11.9.7a, 9.10.1, 9.10.1a, 9.10.1b, 9.10.1c, 9.10.4, 9.10.5, 9.10.6, 9.10.7a, 9.10.7b, 9.10.7c, 9.11.10, 9.11.1a, 9.11.1b, 9.11.2, 9.11.2a, 9.11.2b, 9.11.2c, 9.11.2d, 9.12.14, 9.12.1e, 9.12.20, 9.12.29, 9.12.3, 9.12.30a, 9.12.35, 9.12.41, 9.12.42, 9.12.4a, 9.12.4b, 9.12.4c, 9.12.5, 9.7.6

Eucalypt forest and woodland-shrubby

6.3.18, 6.3.4, 6.3.8, 6.7.16, 6.7.5

Open forests - shrubby

7.11.32g, 7.11.36, 7.11.38a, 7.11.38b, 7.11.41b, 7.12.12c, 7.12.26c, 7.12.26d, 7.12.26e, 7.12.26f, 7.12.37h, 7.12.4, 7.12.51a, 7.12.58, 7.12.5f, 7.12.5g, 7.12.65c, 7.12.66a, 7.12.66c, 7.12.66d, 7.8.16a, 7.8.16b, 7.8.16c,

Open forests/woodlands - grassy/shrubby

12.11.15, 12.11.16, 12.11.16x1, 12.11.17, 12.11.18, 12.11.18a, 12.11.19, 12.11.22, 12.11.23, 12.11.3, 12.11.3a, 12.11.3b, 12.11.5, 12.11.5a, 12.11.5e, 12.11.5h, 12.11.5j, 12.11.5k, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.12.11, 12.12.12, 12.12.15, 12.12.20, 12.12.21, 12.12.22, 12.12.23, 12.12.24, 12.12.24x1, 12.12.25, 12.12.27, 12.12.28, 12.12.28x1, 12.12.3, 12.12.3a, 12.12.4, 12.12.6x1, 12.12.9, 12.2.8, 12.3.11a, 12.3.15, 12.5.1, 12.5.11, 12.5.1a, 12.5.1b, 12.5.1c, 12.5.4, 12.5.7, 12.5.7a, 12.5.8, 12.8.1, 12.8.10, 12.8.11, 12.8.12, 12.8.1a, 12.8.2, 12.8.24, 12.8.25, 12.8.26, 12.8.8a, 12.9-10.12, 12.9-10.12a, 12.9-10.13, 12.9-10.17, 12.9-10.17a, 12.9-10.17b, 12.9-10.17c, 12.9-10.17d, 12.9-10.18a, 12.9-10.19, 12.9-10.19a, 12.9-10.2, 12.9-10.21, 12.9-10.23, 12.9-10.24, 12.9-10.3, 12.9-10.4, 12.9-10.7, 12.9-10.7a, 12.9-10.8, 12.9-10.9

Open forests/woodlands - shrubby

12.12.14, 12.12.2, 12.12.2a, 12.12.2b, 12.12.6, 12.2.6, 12.5.12, 12.5.3, 12.5.3a, 12.5.5, 12.5.6, 12.5.6c, 12.7.1, 12.7.2, 12.8.20, 12.9-10.1, 12.9-10.14, 12.9-10.14a, 12.9-10.1x1, 12.9-10.20, 12.9-10.5, 12.9-10.5a, 12.9-10.5b, 12.9-10.5c

Shrubby open forests

13.11.1, 13.11.2, 13.12.1, 13.12.2, 13.12.5

Vegetation Hazard Class 3. Tall Open Forest

Potential fuel load: 28 tonnes / ha

Tall Open Forest is among the most hazardous fire vegetation classes. When mature, trees typically reach over 30m and have Projective foliage of 30-70%. This category includes tall open eucalypt forests with rainforest, ferny or grassy understories. Grassy types rely on regular burning to maintain open understorey and generally do not exist as long unburnt areas of very high fuel loads. More shrubby and rainforest understorey types are typically difficult to burn under mild weather conditions, and can develop extreme fuel loads (e.g. High quality Blackbutt forests).

Photo: Mountain Creek, Sunshine Coast, M Reif

Main localities

Western fringe of Wet Tropics, Sunshine Coast hinterland, Gold Coast hinterland, Blacktown Tablelands.

Fire Regime Groups

Eucalypt communities - tall closed; Rainforest (where Tall Open Forest is estimated to contribute >40% of mapping unit); Tall open forests - Eucalyptus montivaga; Tall open forests - moist grassy; Tall open forests - Red mahogany, yellow Stringybark and/or Eucalyptus acmenoides; Tall open forests - Rose gum; Wet open forests

Regional Ecosystem Types

Eucalypt communities - tall closed

11.10.2, 11.10.5, 11.5.7, 11.8.1

Rainforest (where Tall Open Forest is estimated to contribute >40% of mapping unit)

Tall open forests - Eucalyptus montivaga

8.12.8

Tall open forests - moist grassy

7.11.14a, 7.11.14b, 7.11.14d, 7.11.31b, 7.11.31c, 7.11.31d, 7.11.44, 7.11.6, 7.12.21a, 7.12.21b, 7.12.21c, 7.12.21d, 7.12.22a, 7.12.22b, 7.12.22c, 7.12.22d, 7.12.22e, 7.12.61a, 7.3.40, 7.3.42a, 7.3.42b, 7.3.43a, 7.3.43b, 7.5.1a, 7.5.1c, 7.5.1d, 7.8.15a, 7.8.15b

Tall open forests - Red mahogany, yellow Stringybark and/or Eucalyptus acmenoides

8.12.31a

Tall open forests - Rose gum

8.12.4

Wet open forests

12.11.2, 12.12.15a, 12.12.15b, 12.2.4, 12.3.2, 12.5.6a, 12.8.8, 12.8.9

Vegetation Hazard Class 4. Heath communities

Potential fuel load: 27 tonnes / ha

Vegetation in this category will often feature a low canopy of between 1 and 3 metres. The foliage tends to be dense, compact and volatile posing a very high elevated fuel hazard. This category includes both wet and dry coastal heath communities, montane communities and shrublands.


Photo: Lamington National Park, Gold Coast, R Anderson

Main localities:

Northern Cape York, Hervey Bay / Burrum Heads, Capricorn Coast / Emu Park, Hinchinbrook Island, Stradbroke Island, Moreton Island, Bribie Island, Fraser Island.

Main Fire Regime Groups:

Coastal heath communities; Dry coastal heath communities; Fire sheltered shrublands; Forblands and shrublands; Heath and shrublands; Heath communities; Montane communities; Montane heath communities; Riparian, foredune, coral cay island and beach ridge communities; Rock pavement communities; Wet coastal heath communities

Regional Ecosystem Types:

Coastal heath communities

8.11.10, 8.12.29, 8.12.29a, 8.12.29b, 8.2.3a, 8.2.3d, 8.2.4a, 8.2.4b, 8.2.4x2a, 8.2.4x2b, 8.2.4x2c, 8.2.7b

Dry coastal heath communities

12.2.13, 12.2.9, 12.5.10, 12.5.9

Fire sheltered shrublands

7.11.10b, 7.11.19c, 7.11.32b, 7.11.34a, 7.11.34b, 7.11.38c, 7.12.41, 7.12.54a, 7.12.54b, 7.12.54c, 7.12.54d, 7.12.54e, 7.12.65i, 7.12.65j, 7.12.66b, 7.2.2d, 7.2.4k, 7.2.4l, 7.2.4m, 7.2.5b, 7.3.35a, 7.3.35b, 7.3.35c

Forblands and shrublands

Heath and shrublands,

11.12.14, 11.12.18, 11.12.18a, 11.3.33, 11.5.10, 11.5.18, 11.7.5, 11.7.5a, 11.7.5b, 11.8.12, 11.8.7

Heath communities

3.10.19a, 3.10.19b, 3.11.19a, 3.11.19b, 3.12.26a, 3.12.26c, 3.12.26x1, 3.12.27, 3.12.28, 3.2.18a, 3.2.18c, 3.2.19a, 3.2.19b, 3.2.20, 3.2.21, 3.2.22, 3.2.23, 3.3.53x1, 3.3.53x2, 3.3.55, 3.5.19, 3.5.19x1, 3.5.19x2, 3.5.19x3, 3.5.19x4, 3.5.19x5, 3.5.19x6, 3.5.19x7, 3.5.19x8, 3.5.28

Montane communities

7.11.26a, 7.11.26b, 7.11.26c, 7.11.26d, 7.11.26e, 7.11.26f, 7.11.32a, 7.11.32c, 7.11.32d, 7.11.32f, 7.11.32h, 7.11.32i, 7.12.26a, 7.12.26b, 7.12.37a, 7.12.37b, 7.12.37c, 7.12.37d, 7.12.37e, 7.12.37i, 7.12.57, 7.12.62c, 7.12.64a, 7.12.64b, 7.12.64c, 7.12.65a, 7.12.65b, 7.12.65e, 7.12.65f, 7.12.65g, 7.12.65h, 7.5.2h

Montane heath communities

12.12.10, 12.8.19, 8.11.7, 8.12.10a, 8.12.10b, 8.12.29c

Riparian, foredune, coral cay island and beach ridge communities

12.2.11, 12.2.14, 12.2.5,

Rock pavement communities

13.12.3, 13.12.6

Wet coastal heath communities

12.2.10, 12.2.12, 12.2.15, 12.3.13, 12.3.14, 12.3.14a, 12.9-10.22

Vegetation Hazard Class 5. Exotic and hardwood plantations

Potential fuel load: 26 tonnes / ha

This class includes exotic pine and eucalypt plantations. Vegetation in this category will often feature a thick litter of surface pine needles which can permit residual burning. This type often also includes heath understorey on coastal sites. Where well managed, this vegetation will often be characterised by a simple understory, presenting a low or moderate elevated and near surface fuel hazard.

Photo: Mona Mona, Tablelands, T Cooper

Main localities:

Beerburrum, Fraser Coast, Byfield, Ingham, Atherton Tablelands

Main Fire Regime Groups

Plantations

Major mapping inputs

HQPlantations; Regional Ecosystem V6.1 (DSITIA)

Vegetation Hazard Class 6. Cypress and Casuarina communities

Potential fuel load: 20 tonnes / ha (expert estimate)

Vegetation in this category will often feature multiple understories with the most hazardous fuel component usually being elevated fuels. Cypress will readily flare and sustain canopy fires in severe weather conditions. Surface fuels usually do not exceed a moderate level. This category includes Cypress, Casuarina and Bull Oak communities.

Photo: Goondiwindi, N Stephenson

Main localities

Primarily southern inland Queensland from Inglewood to Carnarvon/Tambo. Scattered occurrences on coastal dune areas e.g. Bowen. Also Taroom/Injune, Tambo/Augathella, Chinchilla/Miles.

Fire Regime Groups

Cypress and Bull oak communities; Cypress and Casuarina communities

Regional Ecosystem Types

Cypress and bull oak communities

11.10.6, 11.10.9, 11.12.15, 11.3.14, 11.3.18, 11.3.19, 11.3.32, 11.5.1, 11.5.14a, 11.5.2a, 11.5.4, 11.5.4a, 11.8.9, 11.9.13

Cypress and Casuarina communities

6.3.16, 6.3.17, 6.5.19

Vegetation Hazard Class 7. Open forests / woodlands – grassy

Potential fuel load: 19 tonnes / ha

Vegetation in this category will often feature an open canopy and sparse understory. The majority of the fuel is located on the surface and comprises of leaf litter, grasses and coarse wooded debris. This category mainly features grass-dominated varieties of open eucalypt forests and woodlands.

Photo: Wongabel, Tablelands, T Cooper

Main localities

Carnarvon/Taroom/Theodore, Alpha to Torrens Creek, Chillagoe to Laura, Undara/Mt Surprise, Southern Downs.

Fire Regime Groups

Eucalypt communities; Eucalypt communities - alluvial plains; Eucalypt communities – grassy; Eucalypt communities (sparse fuels); Eucalypt communities (Spinifex dominant); Eucalypt communities (Spinifex or shrub dominant); Eucalypt communities (Spinifex); Eucalypt communities (Tussock grass dominant); Eucalypt communities with spinifex; Eucalypt communities with tussock grasses; Eucalypt forest and woodland-grassy; Eucalypt forests - poorer soils; Eucalypt forests and woodlands; Eucalypt woodlands; Floodplain woodlands; Fringing woodlands; Grassy open forests; Lowland open forest; Open forests - dry grassy; Open forest - moist grassy; Open forests with limited ground fuel; Open forests/woodlands – grassy;

Regional Ecosystem Types

Eucalypt communities

3.10.10, 3.10.10a, 3.10.10b, 3.10.11, 3.10.15a, 3.10.15b, 3.10.21a, 3.10.21b, 3.10.21c, 3.10.6a, 3.10.6b, 3.10.6c, 3.10.6d, 3.10.6x1a, 3.10.6x1b, 3.10.7a, 3.10.7b, 3.10.9a, 3.10.9b, 3.10.9c, 3.10.9d, 3.10.9e, 3.11.10a, 3.11.10b, 3.11.11, 3.11.11x1a, 3.11.11x1b, 3.11.11x1c, 3.11.11x1d, 3.11.11x3, 3.11.12, 3.11.13, 3.11.15, 3.11.15a, 3.11.17, 3.11.17b, 3.11.17x1, 3.11.4, 3.11.5, 3.11.6a, 3.11.6b, 3.11.6c, 3.11.7, 3.11.8, 3.11.8x1, 3.11.8x2, 3.11.9, 3.12.10a, 3.12.10b, 3.12.10c, 3.12.10x2, 3.12.11, 3.12.12, 3.12.13, 3.12.14a, 3.12.14b, 3.12.14c, 3.12.15a, 3.12.15b, 3.12.15x1a, 3.12.15x1b, 3.12.15x1c, 3.12.15x2a, 3.12.15x2b, 3.12.17, 3.12.17a, 3.12.18, 3.12.19b, 3.12.23a, 3.12.23b, 3.12.24, 3.12.25, 3.12.37, 3.12.38, 3.12.7, 3.12.8, 3.12.9, 3.2.10a, 3.2.10c, 3.2.5a, 3.2.5b, 3.2.5c, 3.2.7, 3.2.7a, 3.2.7b, 3.2.8a, 3.2.8b, 3.2.9, 3.3.17a, 3.3.17b, 3.3.18, 3.3.19, 3.3.20a, 3.3.20b, 3.3.20c, 3.3.21, 3.3.22a, 3.3.22b, 3.3.23, 3.3.27a, 3.3.27b, 3.3.27c, 3.3.28, 3.3.29, 3.3.30, 3.3.31a, 3.3.31b, 3.3.31c, 3.3.70, 3.3.8, 3.5.1, 3.5.10, 3.5.10x1, 3.5.11, 3.5.12, 3.5.2, 3.5.21, 3.5.21x1, 3.5.22a, 3.5.22b, 3.5.22c, 3.5.22d, 3.5.22x1, 3.5.22x2, 3.5.23, 3.5.23x1, 3.5.24a, 3.5.24b, 3.5.25a, 3.5.25b, 3.5.25c, 3.5.26, 3.5.31, 3.5.5a, 3.5.6, 3.5.7a, 3.5.7d, 3.5.7x1, 3.5.7x2a, 3.5.7x2b, 3.5.7x2c, 3.5.8a, 3.5.8b, 3.5.8c, 3.5.9a, 3.5.9b, 3.5.9d, 3.7.3, 3.7.4, 3.7.5a, 3.7.5b, 3.8.3a, 3.8.3b, 3.9.2a, 3.9.2x1, 3.9.2x2, 3.9.2x3, 3.9.2x4, 3.9.2x5, 3.9.4, 3.9.4a, 3.9.4b, 3.9.6

Eucalypt communities - alluvial plains

11.3.23, 11.3.26, 11.3.28, 11.3.3, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.3.3c, 11.3.3x1, 11.3.4, 11.3.6

Eucalypt communities - grassy

11.10.1, 11.10.1a, 11.10.1d, 11.11.10, 11.11.10a, 11.11.11, 11.11.20, 11.11.9, 11.12.1b, 11.12.2, 11.12.2a, 11.12.2b, 11.12.2c, 11.2.1, 11.3.10, 11.3.13, 11.3.2, 11.3.29, 11.3.2a, 11.3.30, 11.3.30a, 11.3.30d, 11.3.35, 11.3.35a, 11.3.7, 11.3.9, 11.3.9a, 11.4.13, 11.4.2, 11.5.5, 11.5.5a, 11.5.5c, 11.5.8c, 11.7.3, 11.8.14, 11.8.15, 11.8.4, 11.9.2, 11.9.9, 11.9.9a, 9.11.12, 9.11.13, 9.11.14, 9.11.15a, 9.11.15b, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23a, 9.11.23b, 9.11.23c, 9.11.23d, 9.11.24a, 9.11.24b, 9.11.24c, 9.11.25, 9.11.26a, 9.11.26b, 9.11.29, 9.11.32, 9.11.3a, 9.11.3b, 9.11.3c, 9.11.3d, 9.11.3e, 9.11.3f, 9.11.4a, 9.11.4b, 9.11.5, 9.11.7a, 9.11.7b, 9.12.10, 9.12.11, 9.12.12, 9.12.13a, 9.12.13b, 9.12.13c, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.1a, 9.12.1b, 9.12.1c, 9.12.1d, 9.12.1f, 9.12.2, 9.12.21, 9.12.22, 9.12.23, 9.12.24a, 9.12.24b, 9.12.24c, 9.12.26, 9.12.27, 9.12.28, 9.12.31a, 9.12.31b, 9.12.32, 9.12.32x1, 9.12.33, 9.12.33a, 9.12.33b, 9.12.33c, 9.12.6a, 9.12.6b, 9.12.6d, 9.12.6e, 9.12.7a, 9.12.7b, 9.12.7c, 9.3.16, 9.3.19a, 9.3.19b, 9.3.2, 9.3.20, 9.3.21, 9.3.22a, 9.3.22b, 9.3.25, 9.3.26, 9.3.26a, 9.3.27a, 9.3.27b, 9.3.3a, 9.3.3b, 9.3.3c, 9.3.3d, 9.3.3e, 9.3.5, 9.3.6a, 9.3.6b, 9.3.8, 9.4.1, 9.4.2, 9.5.1, 9.5.10a, 9.5.10b, 9.5.10c, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.3a, 9.5.3b, 9.5.4, 9.5.5a, 9.5.5b, 9.5.5c, 9.5.6a, 9.5.6b, 9.5.7a, 9.5.7b, 9.5.8, 9.5.9a, 9.5.9b, 9.5.9c, 9.7.1a, 9.7.1c, 9.7.3a, 9.7.3b, 9.7.3c, 9.7.5, 9.8.10, 9.8.11, 9.8.12, 9.8.13, 9.8.1a, 9.8.1b, 9.8.1c, 9.8.2a, 9.8.2b, 9.8.2c, 9.8.4a, 9.8.4b, 9.8.4c, 9.8.5a, 9.8.5b, 9.8.9

Eucalypt communities (sparse fuels)

4.3.10, 4.9.12, 4.9.18, K17

Eucalypt communities (Spinifex dominant)

10.10.4a, 10.10.4b, 10.10.4c, 10.10.4d, 10.10.5a, 10.10.5b, 10.10.5c, 10.10.5d, 10.10.5e, 10.3.10, 10.3.10x1, 10.3.10x2, 10.3.20, 10.3.29b, 10.5.10, 10.5.11a, 10.5.11b, 10.5.11c, 10.5.12, 10.5.1a, 10.5.1b, 10.5.1c, 10.5.1d, 10.5.1e, 10.5.1i, 10.5.5a, 10.5.5b, 10.5.5c, 10.5.8a, 10.5.8b, 10.7.10a, 10.7.10b, 10.7.10c, 10.7.11a, 10.7.12a, 10.7.12b, 10.7.1a, 10.7.1b, 10.7.1bx1, 10.7.1c, 10.7.1d, 10.7.1e, 10.7.1f, 10.7.2a, 10.7.2b, 10.7.2e, 10.7.4, 10.7.5, 10.7.7a, 10.7.7b, 10.7.7c, 10.7.7d, 10.7.8b, 10.7.9

Eucalypt communities (Spinifex or shrub dominant)

2.10.1, 2.10.1a, 2.10.2, 2.10.2a, 2.10.2b, 2.10.2c, 2.10.2d, 2.10.2x1, 2.10.2x11, 2.10.2x12, 2.10.2x2, 2.10.4, 2.10.4b, 2.10.4x1, 2.10.4x2, 2.10.7, 2.11.1, 2.11.1a, 2.11.1b, 2.11.1c, 2.12.1, 2.12.1x1, 2.5.11, 2.5.11b, 2.5.11c, 2.5.11d, 2.5.13, 2.5.3, 2.5.3a, 2.7.3, 2.7.3b, 2.7.3c, 2.7.3d, 2.7.3e, 2.7.3f, 2.7.3g, 2.7.3i, 2.7.3x1, 2.7.4, 2.7.5, D23, D50, D51, G3, H23, H28, J16, J19

Eucalypt communities (Spinifex)

4.5.5, 4.5.8, 4.5.8b, 4.7.2, 4.7.7, 4.7.8, G3, H28,

Eucalypt communities (Tussock grass dominant)

10.3.11a, 10.3.11b, 10.3.11c, 10.3.11d, 10.3.15a, 10.3.15ax1, 10.3.15b, 10.3.15c, 10.3.15d, 10.3.15dx1, 10.3.15e, 10.3.15f, 10.3.15g, 10.3.15h, 10.3.15hx1, 10.3.15i, 10.3.15j, 10.3.15k, 10.3.15l, 10.3.15m, 10.3.15n, 10.3.15o, 10.3.27a, 10.3.28a, 10.3.28b, 10.3.5, 10.3.6a, 10.3.6ax1, 10.3.6ax2, 10.3.6ax3, 10.3.6ax4, 10.3.9, 10.3.9x1, 10.3.9x2, 10.4.9, 10.5.2a, 10.5.2ax1, 10.5.2b, 10.5.4a, 10.5.4b, 10.5.4c, 10.5.9a, 10.5.9b, 10.7.11b, 10.7.2c, 10.7.2d, 10.9.5a, 10.9.5ax1, 10.9.5b, 2.10.3, 2.2.2, 2.3.10, 2.3.10a, 2.3.10b, 2.3.10c, 2.3.10d, 2.3.10e, 2.3.10f, 2.3.10x11, 2.3.10x11a, 2.3.10x11b, 2.3.10x12, 2.3.10x13, 2.3.10x40, 2.3.10x41, 2.3.11, 2.3.11a, 2.3.11ax1, 2.3.11b, 2.3.11bx1, 2.3.11bx2, 2.3.11c, 2.3.11d, 2.3.11e, 2.3.11f, 2.3.11g, 2.3.11h, 2.3.11i, 2.3.11k, 2.3.11x1, 2.3.11x40, 2.3.14, 2.3.17, 2.3.17a, 2.3.17b, 2.3.17c, 2.3.17d, 2.3.17e, 2.3.18a, 2.3.20, 2.3.20a, 2.3.20b, 2.3.20c, 2.3.20d, 2.3.20e, 2.3.20g, 2.3.20h, 2.3.20i, 2.3.20j, 2.3.21, 2.3.21a, 2.3.21b, 2.3.21c, 2.3.21d, 2.3.21e, 2.3.21f, 2.3.21g, 2.3.21x1, 2.3.21x12, 2.3.21x13, 2.3.21x2, 2.3.22, 2.3.22x11, 2.3.22x11a, 2.3.22x11b, 2.3.23, 2.3.23b, 2.3.23x1a, 2.3.23x1b, 2.3.23x1c, 2.3.25, 2.3.25b, 2.3.25c, 2.3.25x1, 2.3.25x2, 2.3.25x3, 2.3.26, 2.3.26a, 2.3.33, 2.3.33x3, 2.3.33x4, 2.3.35, 2.3.37, 2.3.6, 2.3.6x1a, 2.3.6x1b, 2.3.9, 2.3.9b, 2.3.9c, 2.3.9d, 2.3.9e, 2.5.1, 2.5.10, 2.5.12, 2.5.12a, 2.5.12b, 2.5.12c, 2.5.1a, 2.5.1b, 2.5.1c, 2.5.1d, 2.5.1x10, 2.5.1x11, 2.5.1x11b, 2.5.2x2, 2.5.2x3, 2.5.2x4, 2.5.3b, 2.5.4, 2.5.5, 2.5.5x11, 2.5.5x11a, 2.5.5x11b, 2.5.5x12, 2.5.5x13, 2.5.5x14a, 2.5.5x14b, 2.5.6, 2.5.6b, 2.5.6c, 2.5.6x1, 2.5.6x10a, 2.5.6x10b, 2.5.6x10c, 2.5.6x10d, 2.5.6x10e, 2.5.6x10f, 2.5.7, 2.5.9, 2.5.9a, 2.5.9x50, 2.5.9x50b, 2.5.9x51, 2.9.1x90, 2.9.1x93, 2.9.2x2, 2.9.3a, 2.9.7, 2.9.7x1, 2.9.7x2, 2.9.7x90, C13, C33, D20, D32, D34, D35, D41, K17

Eucalypt communities with spinifex

1.10.1, 1.10.4, 1.11.1, 1.11.2, 1.11.2a, 1.11.2d, 1.11.2e, 1.11.2f, 1.11.2x1, 1.11.2x1b, 1.11.2x3, 1.11.2x4, 1.11.2x4a, 1.11.2x5, 1.11.3, 1.11.3a, 1.11.3b, 1.11.3x1, 1.11.3x1b, 1.11.3x1c, 1.11.3x1d, 1.12.1, 1.12.1x1, 1.12.1x1b, 1.12.1x3, 1.12.1x4, 1.12.2, 1.5.1, 1.5.3, 1.5.4b, 1.5.4x4, 1.5.7b, 1.7.1, 1.7.1c, 1.7.1f, 1.7.1i, 1.7.1j, 1.7.1x3, 1.7.1x4, 1.7.1x5, 1.9.1x3, 1.9.3, 1.9.4, 1.9.5, 1.9.5b, 1.9.5c, 1.9.6, 1.9.6a, 1.9.6b, D23, D50, D51, G3, H23, H28, J16, J19

Eucalypt communities with tussock grasses

1.11.4, 1.12.1x3b, 1.3.5, 1.3.6, 1.3.6a, 1.3.6c, 1.3.6x1a, 1.3.6x1b, 1.3.6x1c, 1.3.6x1d, 1.3.6x1e, 1.5.4, 1.5.4a, 1.5.4x1a, 1.5.4x1b, 1.5.4x2, 1.5.4x3, 1.5.4x6, 1.5.5, 1.5.5b, 1.5.6b, 1.5.7, 1.5.7x1, 1.5.7x2, 1.5.9, 1.7.1b, 1.7.2, 1.7.2b, 1.7.2x1, 1.9.1a, 1.9.1c, 1.9.1x2, 1.9.2a, 1.9.5a, C13, C33, D20, D34, D35, D41, K17

Eucalypt forest and woodland-grassy

6.3.24a, 6.5.17, 6.5.17a, 6.5.19a, 6.5.5, 6.7.6

Eucalypt forests - poorer soils

8.11.12a, 8.11.12b, 8.11.8a, 8.12.14a, 8.12.14b, 8.12.14x2a, 8.12.14x2b, 8.12.14x2c

Eucalypt forests and woodlands

8.10.1a, 8.10.1b, 8.11.1, 8.11.3a, 8.11.3b, 8.11.3c, 8.11.4, 8.11.5a, 8.11.5b, 8.11.6, 8.11.8, 8.11.8b, 8.12.12a, 8.12.12b, 8.12.12d, 8.12.14c, 8.12.14d, 8.12.20a, 8.12.20c, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27a, 8.12.27b, 8.12.31b, 8.12.32, 8.12.5a, 8.12.5b, 8.12.5c, 8.12.6a, 8.12.6b, 8.12.7a, 8.12.7b, 8.12.7c, 8.12.9, 8.3.13c, 8.3.13d, 8.3.5, 8.3.6a, 8.3.6c, 8.3.8, 8.5.1a, 8.5.1b, 8.5.3a, 8.5.3b, 8.5.5, 8.9.1,

Eucalypt woodlands,

5.3.2, 5.3.20, 5.3.20a, 5.3.20b, 5.3.20c, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.3.7, 5.3.8, 5.3.8a, 5.3.8b, 5.3.8c, Floodplain woodlands, 3.3.11, 3.3.15, 3.3.16, 3.3.24, 3.3.25a, 3.3.25b, 3.3.25c, 3.3.35, 3.3.36, 3.3.36a, 3.3.36b, 3.3.37a, 3.3.37b, 3.3.40a, 3.3.40b, 3.3.46, 3.3.69, 3.3.9

Floodplain woodlands

Fringing woodlands

9.3.1, 9.3.12a, 9.3.12b, 9.3.13, 9.3.14a, 9.3.14b, 9.3.15a, 9.3.15b, 9.3.17a, 9.3.17b, 9.3.17c, 9.3.18, Grassy open forests, 13.11.3, 13.11.3a, 13.11.3b, 13.11.4, 13.11.6, 13.11.8, 13.11.8a, 13.12.10, 13.12.4, 13.12.8, 13.12.9, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.7

Grassy open forests

Lowland open forest

7.12.5h, 7.12.5i, 7.2.11h, 7.3.45f, 11.3.30b, 7.11.18a, 7.11.18b, 7.11.18c, 7.11.18d, 7.11.18e, 7.11.18f, 7.11.18g, 7.11.18h, 7.11.34, 7.11.43, 7.11.50b, 7.11.51c, 7.12.23a, 7.12.23b, 7.12.23c, 7.12.23d, 7.12.23e, 7.12.23f, 7.12.28b, 7.12.29c, 7.12.53b, 7.12.53c, 7.12.53g, 7.12.5a, 7.12.5b, 7.12.5c, 7.12.5d, 7.12.5e, 7.2.11g, 7.2.3a, 7.2.3b, 7.2.3c, 7.2.3d, 7.2.3e, 7.2.3g, 7.2.4a, 7.2.4b, 7.2.4c, 7.2.4d, 7.2.4e, 7.2.4f, 7.2.4i, 7.2.4j, 7.2.4n, 7.2.6a, 7.2.6c, 7.3.12a, 7.3.12b, 7.3.12c, 7.3.16c, 7.3.19b, 7.3.19c, 7.3.19d, 7.3.19e, 7.3.19f, 7.3.19h, 7.3.20a, 7.3.20b, 7.3.20c, 7.3.20d, 7.3.20e, 7.3.20f, 7.3.20h, 7.3.20i, 7.3.20j, 7.3.20l, 7.3.20m, 7.3.21c, 7.3.45a, 7.3.45c, 7.3.45d, 7.3.45e, 7.3.46, 7.3.47, 7.3.49c, 7.3.7a, 7.3.7b, 7.3.7c,

Open forests - dry grassy

7.11.16c, 7.11.21, 7.11.21a, 7.11.35a, 7.11.35b, 7.11.35c, 7.11.35d, 7.11.37a, 7.11.37b, 7.11.49, 7.11.51b, 7.12.24c, 7.12.25c, 7.12.25d, 7.12.30a, 7.12.30b, 7.12.30c, 7.12.34, 7.12.35, 7.12.51b, 7.12.53e, 7.12.55, 7.12.59, 7.12.61c, 7.12.62a, 7.12.62b, 7.12.63, 7.12.65d, 7.12.69a, 7.12.69b, 7.3.14, 7.3.14a, 7.3.14b, 7.3.19g, 7.3.21b, 7.3.44, 7.3.48a, 7.3.48b, 7.5.1b, 7.5.2d, 7.5.2e, 7.5.2f, 7.5.2g, 7.5.3a, 7.5.3b, 7.5.4b, 7.8.10a, 7.8.10b, 7.8.18a, 7.8.18b, 7.8.18c, 7.8.18d

Open forests - moist grassy

7.11.5g, 7.11.16a, 7.11.16b, 7.11.16d, 7.11.19a, 7.11.19b, 7.11.20, 7.11.31a, 7.11.31e, 7.11.32e, 7.11.33a, 7.11.33b, 7.11.33c, 7.11.45, 7.11.46, 7.11.47, 7.11.50a, 7.11.51, 7.11.51a, 7.11.5a, 7.11.5b, 7.11.5c, 7.11.5d, 7.11.5e, 7.11.5f, 7.12.24a, 7.12.24b, 7.12.25a, 7.12.25b, 7.12.27a, 7.12.27b, 7.12.27c, 7.12.28a, 7.12.29a, 7.12.29b, 7.12.29d, 7.12.33a, 7.12.33b, 7.12.52, 7.12.53, 7.12.53a, 7.12.53d, 7.12.56a, 7.12.61b, 7.3.13, 7.3.16a, 7.3.16b, 7.3.19a, 7.3.19i, 7.3.20k, 7.3.21a, 7.3.39a, 7.3.45b, 7.5.2a, 7.5.2b, 7.5.2c, 7.5.4a, 7.5.4c, 7.5.4d, 7.5.4e, 7.5.4f, 7.8.17a, 7.8.17b, 7.8.17c, 7.8.19, 7.8.7a, 7.8.8a, 7.8.8b

Open forests with limited ground fuel

13.11.5, 13.9.2

Open forests/woodlands - grassy

12.11.14, 12.11.20, 12.12.5, 12.12.7, 12.12.8, 12.3.10, 12.3.11, 12.3.3, 12.3.3a, 12.3.3b, 12.3.9, 12.5.2, 12.8.14, 12.8.14a, 12.8.14x1, 12.8.16, 12.8.17, 12.9-10.18

Vegetation Hazard Class 08. Acacia communities

Potential fuel load: 10 tonnes / ha (expert estimate)

Vegetation in this category will often feature a dense canopy and are somewhat self-protecting from mild to moderate fire. The hazard is largely confined to the near surface and surface fuels. This category includes acacia communities and woodlands alongside Brigalow, Blackwood and Mulga communities.


Photo: Goondiwindi, N Stephenson

Main localities

Extensive across inland Queensland from west of the ranges to the Channel Country, and inland parts of the Gulf and Cape York.

Main Fire Regime Groups:

Acacia communities; Acacia communities (exclude fire); Acacia communities (lancewood); Acacia communities (limit fire); Acacia woodlands; Acacia woodlands (grassy); Brigalow and blackwood communities; Brigalow communities; Mulga dominant communities

Regional Ecosystem Types

Acacia communities

10.10.1a, 10.10.1b, 10.10.2a, 10.10.2b, 10.10.2c, 10.10.2d, 10.3.17a, 10.3.17b, 10.3.19, 10.3.21, 10.3.25, 10.3.25x1, 10.3.25x2, 10.3.25x5, 10.3.26, 10.3.29a, 10.3.30, 10.3.4a, 10.3.4b, 10.3.4c, 10.3.4dx1, 10.4.4, 10.4.5, 10.4.5x1, 10.4.5x2, 10.4.6a, 10.4.6b, 10.4.7, 10.5.7a, 10.5.7ax1, 10.5.7b, 10.5.7c, 10.7.3a, 10.7.3b, 10.7.3c, 10.7.3d, 10.7.3e, 10.7.3ex1, 10.7.3f, 10.7.6, 10.7.6x1, 10.7.6x2, 10.9.1a, 10.9.1b, 10.9.1c, 10.9.1d, 10.9.1e, 10.9.1f, 10.9.2a, 10.9.2b, 10.9.2c, 10.9.2d, 10.9.2dx1, 10.9.2dx2, 10.9.6, 10.9.6x1, 10.9.8, 10.9.8x1, 11.10.3, 11.10.4, 11.10.4a, 11.10.4b, 11.10.4c, 11.10.4d, 11.11.1, 11.11.2, 11.12.16, 11.12.16a, 11.3.34, 11.4.12a, 11.5.13, 11.5.1a, 11.7.2, 11.8.5a, 2.10.5, 2.10.5a, 2.10.5x1, 2.10.5x2, 2.2.2b, 2.2.2c, 2.2.2x1, 2.3.18, 2.3.18b, 2.3.3c, 2.3.7, 2.3.7a, 2.3.7b, 2.3.7c, 2.5.2, 2.5.2x1, 2.7.1, 2.7.1x1, 2.7.1x2, 2.7.1x2b, 2.7.2, 2.7.2a, 2.7.2b, 2.7.2c, 2.7.2d, 2.7.2x1, 2.7.2x2, 2.7.2x2a, 2.7.2x2c, 2.7.2x2d, 2.7.2x3, 2.7.2x4, 2.9.1b, 2.9.1bx40, 2.9.1cx40, 2.9.4, 2.9.4a, 2.9.4ax40, 2.9.4b, 2.9.4c, 2.9.4d, 2.9.4dx40, 2.9.4e, 2.9.4f, 2.9.4x1, 2.9.4x1a, 2.9.4x1b, 2.9.5, 3.7.2, 5.3.10, 5.3.11, 5.3.9, 5.5.1, 5.5.2, 5.5.3, 5.5.4, 5.5.5, 5.5.6, 5.5.6a, 5.6.2, 5.6.3, 5.6.4, 5.6.4a, 5.7.1, 5.7.12, 5.7.13, 5.7.14, 5.7.2, 5.7.5, 5.7.6, 5.7.7, 5.7.7x1, 5.7.8, 5.9.1, 5.9.1x1, 5.9.2,

Acacia communities (exclude fire)

6.3.25, 6.3.6, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.7.14, 6.7.15, 6.9.2, 6.9.3, 6.9.4

Acacia communities (lancewood)

4.7.1

Acacia communities (limit fire)

6.3.22, 6.7.1, 6.7.13, 6.7.2, 6.7.7

Acacia woodlands

1.10.5, 1.11.2x2, 1.11.2x2a, 1.11.2x2b, 1.12.1x2, 1.3.4, 1.3.4x1, 1.5.6, 1.5.6x1, 1.5.6x2, 1.5.7a, 1.5.8, 1.5.8x1, 1.7.1e, 1.7.1g, 1.7.1x1, 1.7.1x2, 1.9.1x1, 1.9.1x4, 9.10.3a, 9.10.3b, 9.10.9, 9.11.28a, 9.11.28b, 9.11.28c, 9.11.30a, 9.11.30b, 9.12.30b, 9.12.36a, 9.12.36b, 9.12.37, 9.12.38a, 9.12.38b, 9.12.9, 9.3.23, 9.3.9, 9.4.3, 9.7.2a, 9.7.2b, 9.7.4, 9.8.6

Acacia woodlands (grassy)

4.3.21, 4.3.23, 4.3.8, 4.3.8d, 4.3.9, 4.5.1, 4.5.2, 4.5.3, 4.5.4, 4.5.4a, 4.5.6, 4.5.7, 4.5.9, 4.7.3, 4.7.4, 4.7.6, 4.9.10, 4.9.10a, 4.9.11, 4.9.13, 4.9.14, 4.9.14x1, 4.9.15, 4.9.16, 4.9.17

Brigalow and blackwood communities

10.3.1, 10.3.2a, 10.3.2b, 10.3.2bx1, 10.3.3a, 10.3.3b, 10.4.1, 10.4.1x1, 10.4.1x2, 10.4.1x3, 10.4.2, 10.4.3a, 10.4.3b, 10.9.3a, 10.9.3b, 10.9.3c,

Brigalow communities

11.11.13, 11.11.14, 11.11.16, 11.11.19, 11.12.21, 11.3.1, 11.3.16, 11.3.17, 11.3.1b, 11.3.1d, 11.3.5, 11.3.8, 11.4.10, 11.4.3, 11.4.3a, 11.4.3b, 11.4.5, 11.4.6, 11.4.7, 11.4.8, 11.4.9, 11.4.9a, 11.4.9b, 11.5.16, 11.7.1, 11.9.1, 11.9.10, 11.9.11, 11.9.5, 11.9.5a, 11.9.6, 12.12.26, 12.3.10a, 12.8.23, 12.9-10.6

Mulga dominant communities

6.12.1, 6.3.21, 6.5.1, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.15a, 6.5.16, 6.5.16a, 6.5.18, 6.5.2, 6.5.3, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.6.1, 6.6.1b, 6.7.10, 6.7.11, 6.7.12, 6.7.9

Vegetation Hazard Class 9. Coastal, fringing and dune communities

Potential fuel load: 8 tonnes / ha *(*expert estimate)

This category is generally restricted to coastal areas inland of foredunes, coastal swamp and rocky headland areas. It's a range of vegetation types from volatile high fuel load vegetation to self-protecting marginal rainforest or closed canopy communities. This Vegetation Hazard Class has been assigned a potential fuel load of 8 tonnes/ha based on expert estimate.

Main localities:

Scattered along the east coast, extensive areas in the coastal plains of the Gulf and Cape river systems. Examples – Bribie Island, Normanton, Doomadgee.

Main Fire Regime Groups:

Dune communities; Dune communities - fire-adapted; Dune communities - fire-sensitive; Dunes and coral cays; Fringing swamp she-oak communities; Rocky headland communities;

Regional Ecosystem Types:

Dune communities

2.2.1, B4

Dune communities - fire-adapted

8.2.12a, 8.2.12b, 8.2.13a, 8.2.7c, 8.2.8a, 8.2.8b, 8.2.8d, 8.2.8e

Dune communities - fire-sensitive

8.2.1, 8.2.10, 8.2.14a, 8.2.14b, 8.2.14c, 8.2.6a, 8.2.6b, 8.2.6x1a, 8.2.6x1c

Dunes and coral cays

3.2.11, 3.2.12, 3.2.13, 3.2.15a, 3.2.15b, 3.2.15x1, 3.2.17, 3.2.1a, 3.2.1b, 3.2.25, 3.2.28, 3.2.29, 3.2.2a, 3.2.2b, 3.2.31, 3.2.6a, 3.2.6b

Fringing swamp she-oak communities

12.1.1

Rocky headland communities

12.12.19, 12.12.19x1, 12.12.19x2, 12.12.19x3

Vegetation Hazard Class 10. Riparian and fringing communities

Potential fuel load: 8 tonnes / ha (expert estimate)

This category is wide-spread but localised to riparian communities, including western springs and fringing communities, foredune, saltpan and offshore island vegetation communities. It's a range of vegetation types from volatile high fuel load vegetation to self-protecting marginal rainforest or closed canopy communities.

Main localities

Widespread throughout Queensland, including the western rivers and Channel Country, coastal and island areas, Gold Coast, Stradbroke Island, Sunshine Coast.

Main Fire Regime Groups

Forblands and shrublands; Fringing, riparian and saltpan communities; Herbfields; Riparian; Riparian and fringing communities; Riparian, fringing and dune communities; Riparian, springs and fringing communities; Riparian, springs, fringing and dune communities; Springs

Regional Ecosystem Types

Forblands and shrublands

5.3.12, 5.3.12a, 5.3.12b, 5.3.13, 5.3.13a, 5.3.13b, 5.3.14, 5.3.15, 5.3.15a, 5.3.16, 5.3.16a, 5.3.16b, 5.3.17, 5.3.18, 5.3.18a, 5.3.18b, 5.3.19, 5.3.21, 5.3.22, 5.3.22a, 5.3.22b, 5.3.22c, 5.6.1, 5.7.11, 5.9.5,

Fringing, riparian and saltpan communities

6.3.1, 6.3.12, 6.3.13, 6.3.13a, 6.3.2, 6.3.24, 6.3.2a, 6.3.2b, 6.3.3, 6.3.5, 6.3.5a, 6.3.7, 6.3.9

Herbfields

4.3.12, 4.3.12c, 4.3.24

Riparian

12.3.7, 12.3.7a, 12.3.7b, 12.3.7c, 12.7.d

Riparian and fringing communities

13.3.1x1, 13.3.5, 4.3.1, 4.3.11, 4.3.11c, 4.3.2, 4.3.3, 4.3.3b, 4.3.4, 4.3.5

Riparian, fringing and dune communities

7.11.42a, 7.11.42b, 7.2.10a, 7.2.10b, 7.2.10d, 7.2.10e, 7.2.11d, 7.2.2a, 7.2.2g, 7.2.3f, 7.2.3i, 7.2.3j, 7.2.5a, 7.2.7a, 7.2.7b, 7.3.16d, 7.3.23a, 7.3.25b, 7.3.25c, 7.3.26a, 7.3.26b, 7.3.28a, 7.3.28b, 7.3.28c, 7.3.28d, 7.3.49a, 7.3.49b

Riparian, springs and fringing communities

1.3.2, 1.3.6x1, 1.3.6x2, 1.3.7, 1.3.7a, 1.3.7b, 1.3.7c, 1.3.7d, 1.3.7e, 1.3.8, 1.3.9, 10.3.12a, 10.3.12b, 10.3.13a, 10.3.13b, 10.3.14a, 10.3.14ax1, 10.3.14b, 10.3.14c, 10.3.14d, 10.3.14e, 10.3.14f, 10.3.14g, 10.3.14h, 10.3.14i, 10.3.14j, 10.3.16a, 10.3.16b, 10.3.16c, 10.3.16d, 10.3.16e, 10.3.16f, 10.3.22a, 10.3.22b, 10.3.22c, 10.3.22d, 10.3.22f, 10.3.23a, 10.3.23b, 10.3.23c, 10.3.23d, 10.3.24, 10.3.31a, 10.7.13, 10.7.13x1, 10.9.7

Riparian, springs, fringing and dune communities

11.2.2, 11.2.2a, 11.2.2b, 11.2.3, 11.3.15, 11.3.15a, 11.3.25, 11.3.25a, 11.3.25b, 11.3.25c, 11.3.25d, 11.3.25e, 11.3.25f, 11.3.25g, 11.3.3a, 11.3.4a

Springs

2.10.8, 2.3.33x1, 2.3.33x2, 2.3.39, 4.3.22, 9.10.2

Vegetation Hazard Class 11. Native grasslands, sedgelands and balds

Potential fuel load: 5 tonnes / ha (expert estimate)

This category incorporates native Mitchell grasslands, Spinifex grasslands, sedgelands and balds. It consists generally native (or exotic) grass fuel with limited scattered other fuels, prone to lower intensity but very rapidly spreading fires.

 

Photo: P Leeson

Main localities

Mt Isa / Cloncurry, Gulf Country, Darling Downs, Goondiwindi.

Fire Regime Groups

Grasslands; Grasslands - poorer soils; Grasslands and balds; Grasslands and sedgelands; Grasslands of the coastal slopes; Mitchell grasslands; Permanent lakes and lagoons; Saw sedge or bulkaru sedgelands; Sedgeland of volcanic lakes; Sedgelands; Spinifex grasslands; Tussock grasslands; Upland grasslands; Upland sedgelands and fernlands; Wetland grasslands; Wetland sedgelands and fernlands

Regional Ecosystem Types

Grasslands

10.3.7a, 10.3.7b, 10.3.8a, 10.3.8b, 10.4.8, 10.4.8x1, 10.4.8x2, 10.4.8x3, 3.12.29, 3.12.30, 3.12.31, 3.12.31x1, 3.12.31x1a, 3.12.31x2a, 3.12.31x2b, 3.3.34, 3.3.44, 3.3.56, 3.3.56a, 3.3.56b, 3.3.56c, 3.3.57, 3.3.58, 3.3.60a, 3.3.61a, 3.3.61b, 3.3.62, 3.5.29, 3.5.30, 3.5.30x1, 3.8.4a, 3.8.4b, 3.9.5, 3.9.7, 3.9.8a, 3.9.8b, 8.12.13, 8.12.13a, 8.12.13b, 8.3.12, 12.8.27

Grasslands - poorer soils

8.10.1d, 8.11.9, 8.11.9b,

Grasslands and balds

12.8.15,

Grasslands and sedgelands

2.2.2a, 2.2.2e, 2.3.1, 2.3.12, 2.3.12x4, 2.3.16, 2.3.1a, 2.3.1b, 2.3.1c, 2.3.1e, 2.3.1x2a, 2.3.1x2b, 2.3.1x2c, 2.3.1x30, 2.3.1x31, 2.3.1x51, 2.3.2, 2.3.3, 2.3.32, 2.3.32x11, 2.3.34, 2.3.34x31, 2.3.34x32, 2.3.38, 2.3.3a, 2.3.3ax40, 2.3.3b, 2.3.3x40, 2.3.4, 2.3.4a, 2.3.4x40, 2.3.4x41, 2.3.4x41a, 2.3.4x42, 2.3.4x43, 2.3.4x44, 2.3.4x50, 2.9.1, 2.9.1a, 2.9.1ax40, 2.9.1ax42, 2.9.1ax43, 2.9.1ax44, 2.9.1x91, 2.9.2, 2.9.3b, 2.9.3d, 8.11.9a, G17

Grasslands of the coastal slopes

7.11.21b, 7.11.34c, 7.11.39a, 7.11.39b, 7.11.39c, 7.12.54f, 7.12.56b, 7.3.19j

Mitchell grasslands

1.3.1, 1.3.1x1, 1.5.6a, 1.9.1, 1.9.1b, 4.3.13, 4.3.14, 4.3.15, 4.3.16, 4.3.17, 4.3.17a, 4.3.18, 4.3.19, 4.3.20, 4.4.1, 4.4.1a, 4.4.1b, 4.4.1x3, 4.4.1x4, 4.4.2, 4.9.1, 4.9.19, 4.9.1a, 4.9.2, 4.9.20, 4.9.4, 4.9.4x1, 4.9.5, 4.9.5a, 4.9.6, 4.9.7, 4.9.7a, 4.9.8, 4.9.8a, 4.9.9, C32, G17

Permanent lakes and lagoons

3.2.27, 3.2.27a, 3.2.27b, 3.3.66a, 3.3.66b, 3.3.66x1a, 3.3.66x1b

Saw sedge or bulkaru sedgelands

3.2.33, 3.3.63, 3.3.64, 3.3.64a, 3.3.64b, 3.3.65

Sedgeland of volcanic lakes

7.3.2, 7.3.33a

Sedgelands

13.3.6, 8.2.9, 8.3.14, 8.3.4

Spinifex grasslands

11.5.14, 11.5.6, 5.6.5, 5.6.6, 5.6.6a, 5.6.6b, 5.6.7, 5.6.8, 5.7.3, 5.7.4, 6.6.2,

Tussock grasslands

11.11.17, 11.12.16d, 11.12.16x1, 11.12.1c, 11.3.20, 11.3.21, 11.3.24, 11.3.31, 11.4.11, 11.4.4, 11.8.11, 11.9.12, 11.9.3, 11.9.3a, 5.7.9, 5.9.3, 5.9.3a, 5.9.3x1, 5.9.4, 6.3.14, 6.3.15, 6.7.17

Upland grasslands

7.12.29e, 7.12.29f, 7.8.7b, 7.8.7c

Upland sedgelands and fernlands

7.11.1f, 7.11.29c, 7.11.40c, 7.11.40g, 7.11.40h, 7.12.37f, 7.12.37g, 7.12.64e, 7.12.67, 7.3.39b, 7.3.39c, 7.3.39d

Wetland grasslands

7.3.1a, 7.3.1b, 7.3.32a, 7.3.32b, 7.3.32c

Wetland sedgelands and fernlands

7.2.9c, 7.3.1c, 7.3.29a, 7.3.29b, 7.3.30, 7.3.31

Vegetation Hazard Class 12. Mixture of rural classes – mainly grasslands

Potential fuel load: 5 tonnes / ha (expert estimate)

This category incorporates unmanaged exotic and native grass fuels with scattered trees and sparse regrowth trees and shrubby vegetation.

Photo: Killarney, Southern Downs, G Pitstock & L Hilton

Major mapping inputs

QLUMP V7 (DSITIA)

Vegetation Hazard Class 13. Cropping and horticulture

Potential fuel load: 5 tonnes / ha (expert estimate)

This vegetation will generally produce low fuel areas but can include transient high fuel or volatile examples such as sugar cane, cereals and cotton.

Photo: P Leeson

Main localities

Wide spread – coastal plains, Darling Downs, Maranoa, Burnett, Goondiwindi, Bowen, Theodore irrigation area, Emerald irrigation area, Lockyer Valley.

Main Types:

Cropping; Perennial horticulture; Seasonal horticulture; Irrigated cropping; Irrigated perennial horticulture; Irrigated seasonal horticulture

Land use types

3.3.0 Cropping

3.3.1 Cereals, 3.3.2 Beverage and spice crops, 3.3.3 Hay and silage, 3.3.4 Oil seeds, 3.3.5 Sugar, 3.3.6 Cotton, 3.3.7 Alkaloid poppies, 3.3.8 Pulses,

3.4.0 Perennial horticulture

3.4.1 Tree fruits, 3.4.2 Oleaginous fruits, 3.4.3 Tree nuts, 3.4.4 Vine fruits, 3.4.5 Shrub nuts, fruits and berries, 3.4.6 Perennial flowers and bulbs, 3.4.7 Perennial vegetables and herbs, 3.4.8 Citrus, 3.4.9 Grapes

3.5.0 Seasonal horticulture

3.5.1 Seasonal fruits, 3.5.2 Seasonal nuts, 3.5.3 Seasonal flowers and bulbs, 3.5.4 Seasonal vegetables and herbs,

4.3.0 Irrigated cropping

4.3.1 Irrigated cereals, 4.3.2 Irrigated beverage and spice crops, 4.3.3 Irrigated hay and silage, 4.3.4 Irrigated oil seeds, 4.3.5 Irrigated sugar, 4.3.6 Irrigated cotton, 4.3.7 Irrigated alkaloid poppies, 4.3.8 Irrigated pulses, 4.3.9 Irrigated rice

4.4.0 Irrigated perennial horticulture

4.4.1 Irrigated tree fruits, 4.4.2 Irrigated oleaginous fruits, 4.4.3 Irrigated tree nuts, 4.4.4 Irrigated vine fruits, 4.4.5 Irrigated shrub nuts, fruits and berries, 4.4.6 Irrigated perennial flowers and bulbs, 4.4.7 Irrigated perennial vegetables and herbs, 4.4.8 Irrigated citrus, 4.4.9 Irrigated grapes,

4.5.0 Irrigated seasonal horticulture

4.5.1 Irrigated seasonal fruits, 4.5.2 Irrigated seasonal nuts, 4.5.3 Irrigated seasonal flowers and bulbs, 4.5.4 Irrigated seasonal vegetables and herbs, 4.5.5 Irrigated turf farming

Major mapping inputs

QLUMP V7 (DSITIA)

Vegetation Hazard Class 14. Dry vine forest and vine thickets

Potential fuel load: 5 tonnes / ha (available) (expert estimate)

Vegetation generally consists of closed communities with high biomass; however it is generally self-protecting and non-flammable unless there is weed incursion such as lantana.

Photo: Mt French National Park, Scenic Rim, A Myes

Main localities

Restricted distribution. Examples include Boyne Valley, Great Basalt Wall NP Charters Towers, 40 Mile Scrub.

Fire Regime Groups

Dry vine forests; Vine thickets;

Regional Ecosystem Types

Dry vine forests

12.11.11, 12.11.12, 12.11.13, 12.11.4, 12.12.13, 12.12.17, 12.12.18, 12.5.13, 12.8.13, 12.8.21, 12.8.21x1, 12.8.22, 12.9-10.15, 12.9-10.16

Vine thickets

1.9.4a, 13.11.7a, 2.2.2f, 2.9.3c, 9.11.31, 9.11.8a, 9.11.8b, 9.11.9, 9.12.34, 9.12.43a, 9.12.43b, 9.12.8a, 9.12.8b, 9.5.2, 9.8.3, 9.8.7

Vegetation Hazard Class 15. Hoop plantations

Potential fuel load: 5 tonnes / ha (available) (expert estimate)

Generally on ex-rainforest sites where it develops wet (mesic) rainforest understorey, and is therefore non-flammable and self-protecting. However, young plantations and off site plantations, or lantana infestations, can be flammable.

Photo: P Leeson

Main localities

Restricted to mainly Mary Valley and Yarraman areas, also Mt Mee (Brisbane), Kalpowar (Monto), Danbulla (Atherton) and scattered farm lot plantations.

Main Fire Regime Groups

Plantations

Major mapping inputs

HQPlantations; Regional Ecosystem V6.1 (DSITIA)

Vegetation Hazard Class 16. Mixture of urban classes

Potential fuel load: 5 tonnes / ha (expert estimate)

The fuel available in urban areas is present in a variety of readily combustible materials and sparse vegetation.


Photo: Unknown

Examples of localities:

Brisbane, Gold Coast, Sunshine Coast, Ipswich, Toowoomba, Bundaberg, Townsville, Rockhampton, Roma, Atherton

Major mapping inputs:

Queensland Land Use Mapping QLUMP urban residential areas

Main Types:

Intensive horticulture; Intensive animal husbandry; Manufacturing and industrial; Residential and farm infrastructure; Services; Utilities; Transport and communication; Mining and Waste Treatment; Waste treatment and disposal

Land use types

5.1.0 Intensive horticulture

5.1.1 Shadehouses, 5.1.2 Glasshouses, 5.1.3 Glasshouses (hydroponic),

5.2.0 Intensive animal husbandry

5.2.4 Poultry farms, 5.2.5 Piggeries, 5.2.6 Aquaculture

5.3.0 Manufacturing and industrial

5.3.1 General purpose factory , 5.3.2 Food processing factory, 5.3.3 Major industrial complex, 5.3.4 Bulk grain storage, 5.3.5 Abattoirs, 5.3.6 Oil refinery, 5.3.7 Sawmill, 5.3.8 Abandoned manufacturing and industrial

5.4.0 Residential and farm infrastructure

5.4.1 Urban residential, 5.4.2 Rural residential and agriculture, 5.4.3 Rural residential without agriculture, 5.4.4 Remote communities, 5.5.5 Research facilities

5.5.0 Services

5.5.1 Commercial services, 5.5.2 Public services, 5.5.3 Recreation and culture, 5.5.4 Defence facilities – urban, 5.5.5 Research facilities

5.6.0 Utilities

5.6.1 Fuel powered electricity generation, 5.6.2 Hydro electricity generation, 5.6.4 electricity substations and transmission, 5.6.5 Gas treatment, storage and transmission, 5.6.6 Water extraction and transmission

5.7.0 Transport and communication

5.7.1 Airports/aerodromes, 5.7.2 Roads, 5.7.3 Railways, 5.7.4 Ports and water transport, 5.7.5 Navigation and communication

5.8.0 Mining

5.8.1 Mines, 5.8.2 Quarries, 5.8.3 Tailings, 5.8.4 Extractive industry not in use

5.9.0 Waste treatment and disposal

5.9.1 Effluent pond, 5.9.2 Landfill, 5.9.3 Solid garbage, 5.9.4 Incinerators, 5.9.5 Sewage/sewerage

Vegetation Hazard Class 17. Rainforest

Potential fuel load: 1 tonnes / ha (available) (expert estimate)

Non-flammable, however can carry mild surface fire in very dry conditions; self-protecting but can be subject to some incursion from severe fires adjacent.


Photo: P Leeson

Main localities

East Coast lowlands and ranges in high rainfall areas, primarily Border Ranges, Mary Valley, Fraser Island (Central Station) Eungella / Mackay / Proserpine, Wet tropics from Townsville to Cooktown.

Main Fire Regime Groups

Beach scrubs; Rainforest and vine thickets; Rainforests

Regional Ecosystem Types

Beach scrubs

8.2.2, 8.2.5

Rainforest and vine thickets

11.10.8, 11.11.18, 11.11.21, 11.11.5, 11.11.5a, 11.12.12, 11.12.4, 11.12.4a, 11.12.7, 11.3.11, 11.3.11x1, 11.4.1, 11.5.15, 11.8.13, 11.8.3, 11.8.6, 11.9.14, 11.9.4, 11.9.4a, 11.9.4c, 11.9.8,

Rainforests

12.11.1, 12.11.10, 12.12.1, 12.12.16, 12.2.1, 12.2.2, 12.2.3, 12.3.1, 12.8.18, 12.8.3, 12.8.4, 12.8.5, 12.8.6, 12.8.7, 3.10.1, 3.10.1a, 3.10.2a, 3.10.2b, 3.10.5a, 3.10.5b, 3.11.1x1a, 3.11.1x1b, 3.11.2a, 3.11.2b, 3.11.3, 3.11.3x1, 3.12.2, 3.12.20, 3.12.21a, 3.12.21b, 3.12.33a, 3.12.33b, 3.12.34a, 3.12.34c, 3.12.35a, 3.12.35b, 3.12.35c, 3.12.35d, 3.12.35e, 3.12.35f, 3.12.36a, 3.12.36b, 3.12.36x3, 3.12.3a, 3.12.3b, 3.12.3c, 3.12.4a, 3.12.4b, 3.12.5, 3.12.6, 3.3.1a, 3.3.1b, 3.3.1c, 3.3.2a, 3.3.2b, 3.3.38, 3.3.38a, 3.3.39, 3.3.4, 3.3.5a, 3.3.5b, 3.3.5c, 3.3.6, 3.3.68, 3.5.20, 3.5.3, 3.5.32, 3.5.3x1, 3.5.4, 3.5.4x1, 3.5.4x2, 3.5.4x3, 3.5.4x4, 3.5.4x5, 3.7.1, 3.7.1x1a, 3.7.1x1b, 3.7.1x2, 3.8.2a, 3.8.2b, 3.8.5a, 3.8.5b, 3.8.5c, 3.8.5d, 3.8.5e, 7.1.3b, 7.1.4b, 7.11.10a, 7.11.12a, 7.11.12b, 7.11.12c, 7.11.12d, 7.11.12f, 7.11.13, 7.11.1a, 7.11.1b, 7.11.1c, 7.11.1d, 7.11.1e, 7.11.1g, 7.11.23a, 7.11.23b, 7.11.24a, 7.11.24b, 7.11.24c, 7.11.24d, 7.11.24e, 7.11.24f, 7.11.24g, 7.11.24h, 7.11.25a, 7.11.25b, 7.11.27a, 7.11.27b, 7.11.28, 7.11.29a, 7.11.29b, 7.11.29d, 7.11.2a, 7.11.2b, 7.11.2c, 7.11.2d, 7.11.3, 7.11.30, 7.11.3a, 7.11.3b, 7.11.40e, 7.11.40f, 7.11.7a, 7.11.7b, 7.11.7c, 7.11.7d, 7.11.7e, 7.11.8a, 7.11.8b, 7.11.8c, 7.12.10a, 7.12.10b, 7.12.10c, 7.12.11a, 7.12.11b, 7.12.11c, 7.12.11d, 7.12.12a, 7.12.12b, 7.12.13, 7.12.16a, 7.12.16b, 7.12.16c, 7.12.17, 7.12.19a, 7.12.19b, 7.12.19c, 7.12.19d, 7.12.1a, 7.12.1b, 7.12.1c, 7.12.1d, 7.12.1e, 7.12.20, 7.12.2a, 7.12.2b, 7.12.2c, 7.12.2d, 7.12.2e, 7.12.38b, 7.12.38c, 7.12.39a, 7.12.39b, 7.12.40a, 7.12.40b, 7.12.40c, 7.12.40d, 7.12.40e, 7.12.42a, 7.12.42b, 7.12.43, 7.12.44, 7.12.45, 7.12.46a, 7.12.46b, 7.12.47a, 7.12.47b, 7.12.48, 7.12.49, 7.12.50, 7.12.68, 7.12.6a, 7.12.6b, 7.12.7a, 7.12.7b, 7.12.7c, 7.12.7d, 7.12.9, 7.2.1a, 7.2.1b, 7.2.1c, 7.2.1d, 7.2.1e, 7.2.1f, 7.2.1g, 7.2.1h, 7.2.1i, 7.2.2b, 7.2.2c, 7.2.2e, 7.2.2f, 7.2.2h, 7.2.6b, 7.3.10a, 7.3.10b, 7.3.10c, 7.3.10d, 7.3.10e, 7.3.10f, 7.3.10g, 7.3.17, 7.3.20g, 7.3.23b, 7.3.23c, 7.3.36a, 7.3.36b, 7.3.36c, 7.3.37, 7.3.38, 7.3.3a, 7.3.3b, 7.3.3c, 7.3.4, 7.8.11a, 7.8.11b, 7.8.12, 7.8.13, 7.8.14, 7.8.1a, 7.8.1b, 7.8.1c, 7.8.2a, 7.8.2b, 7.8.2c, 7.8.3a, 7.8.3b, 7.8.4a, 7.8.4b, 7.8.4c, 7.8.4d, 8.11.11, 8.11.2, 8.11.2x1a, 8.11.2x1b, 8.12.11, 8.12.11a, 8.12.11c, 8.12.16, 8.12.17a, 8.12.17b, 8.12.17c, 8.12.18, 8.12.19, 8.12.1a, 8.12.1b, 8.12.2, 8.12.28, 8.12.30, 8.12.3a, 8.12.3b, 8.12.3c, 8.3.10, 8.3.1a, 8.3.1b, 8.3.9, 8.8.1a, 8.8.1b

Vegetation Hazard Class 18. Mangroves and saltmarshes

Potential fuel load: 1 tonnes / ha (available) (expert estimate)

Vegetation in this category is generally non-flammable and receives regular inundation.


Photo: P Leeson

Main localities

Coastal tidal areas. Examples - Bay Islands, Sandy Strait, Hinchinbrook Island, Shoalwater Bay Military Reserve, Cape York and Gulf river estuaries.

Fire Regime Groups:

Mangroves; Mangroves and saltmarshes; Saltmarshes; Saltpans

Regional Ecosystem Types

Mangroves

11.1.4, 11.1.4a, 11.1.4b, 11.1.4c, 11.1.4d, 12.1.3, 2.1.2, 2.1.3, 2.1.3b, 2.3.1x1, 7.1.1, 7.1.3c, 7.1.4a, 7.1.4c, 7.1.4d, 8.1.1, A1

Mangroves and saltmarshes

3.1.1a, 3.1.1b, 3.1.1c, 3.1.2a, 3.1.2b, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.2.24, 3.2.26, 3.2.30, 3.2.32

Saltmarshes

12.1.2, 12.3.8, 2.1.4, 7.1.2a, 7.1.2b, 8.1.2, 8.1.3, 8.1.4, 8.1.5, 8.10.1c, A3

Saltpans

11.1.1, 11.1.2, 11.1.2a, 11.1.2b, 11.1.3, 11.1.3a

Vegetation Hazard Class 19. Sparse ground cover

Potential fuel load (expert estimate): 1 tonnes / ha

Including gibber plains, sand dunes, deserts, eroded or exposed soil.

Main localities

Extensive in the Channel Country and North-West. Examples - Boulia / Dajarra / Middleton, Eromanga/Windorah/Birdsville, Simpson Desert and Diamantina National Park. Sand dunes on coastal islands such as Fraser Island, Moreton Island, Stradbroke Island.

Major mapping inputs:

Mean ground cover 1980-2011 (DSITIA) < 50%

Vegetation Hazard Class 20. Water bodies

Potential fuel load: 0 tonnes / ha (expert estimate)

Rivers, lakes, reservoirs or watercourses wider than 25m were deemed to be permanent waterbodies.

Photo: P Leeson

Examples of localities

Wivenhoe Dam, Burdekin Dam, Brisbane River, Burdekin River

Major mapping inputs:

Waterbody identification occurred using a waterbody dataset held by the Public Safety Business Agency and water bodies identified in Regional Ecosystems mapping.

Sources of the data are DNRM and DSITIA.

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