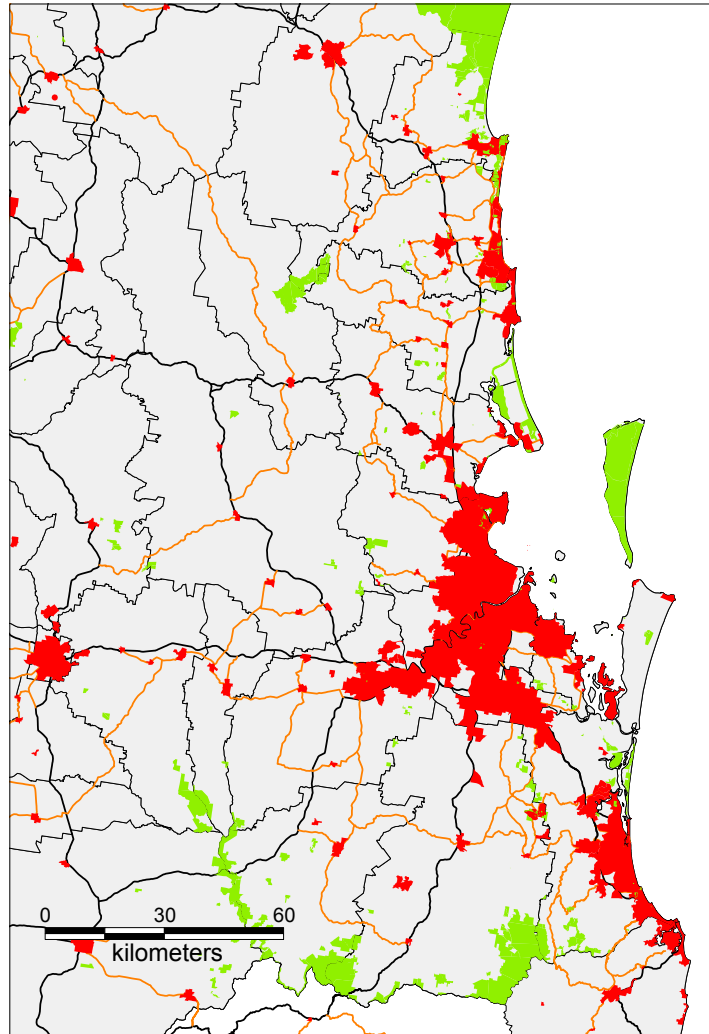


Southeast Queensland Fire and Biodiversity Consortium

Fire Management Strategic Manual



**Guidelines for planning and implementing a council or
shire wide fire management strategy**

**Developing a Fire Management Strategy
for Local Government Lands
STRATEGIC LEVEL
GUIDELINES AND PROCEDURES**

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The Southeast Queensland Fire and Biodiversity Consortium aims to gather and disseminate information on fire management practices that will support conservation of the region's biological diversity.

The project covers the area from Noosa Shire in the north to the New South Wales border, and from the islands of Moreton Bay to the Great Dividing Range in the west.

February 2002

Flowchart of Fire and Biodiversity Consortium Products

...where does this product sit in the big scheme of things?

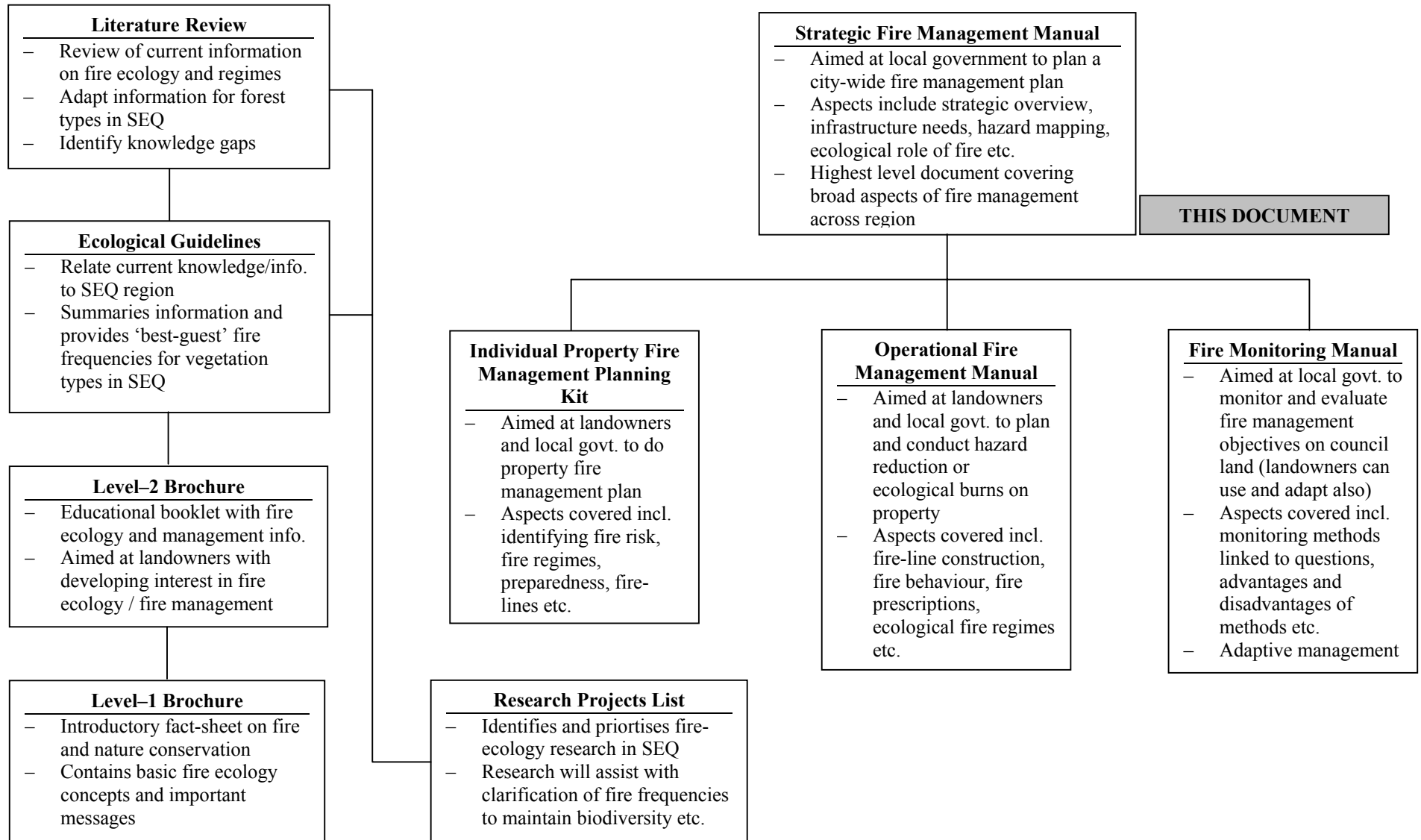


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Purpose of Strategic Fire Management Manual

The primary target group of the “Strategic Manual” is local government. This document assists local government authorities (LGA) who are planning a fire management plan or strategy for lands under their management. It may be useful to other land management agencies requiring a broad approach to fire management of large tracts of land reserved for conservation purposes. The document may also be useful to fire agencies, such as the Queensland Rural Fire Service which has a major role in fire management practices across all state and local government boundaries. For those local authorities which already have a fire management strategy for their region, it may provide some assistance for areas which will require review following the implementation of the fire management strategy.

The other key purpose of this manual (which is mentioned later in document) is that it provides a common approach to the development of fire management strategies for local authorities across SEQ and presents an opportunity to achieve better integration between local authorities, fire management authorities and landowners wrt fire management and biodiversity conservation?

The Manual presents a simple procedure for the preparation of a shire-wide fire management strategy. Considerations such as fire-risk mapping, building requirements in high fire-risk areas, Australian Standards, infrastructure provision, coordination and integration across agencies and authorities and the involvement of the community are addressed. Some examples of local authority responses to these considerations are included.

NOTE: The Australian Standard [AS3959-1999] ‘Construction of Buildings in Bushfire-Prone Areas’ is currently under review.

Potential Bushfire Hazard Area

One of the first provisions for any fire management strategy is the identification and mapping of areas with ‘potential’ or considerable bushfire risk. These are known as Potential Bushfire Hazard Areas (PBHA). The identification of areas with a “*potential*” bushfire risk does not mean the area will be under the perennial influence of bushfires, but that during the ‘fire-season’, which in southeast Queensland is between September–February, there are increased chances of bushfires (also known as wildfires) occurring. The recommended method of calculating bushfire risk is explained in more detail below.

As with most mapping exercises, the use of Geographic Information Systems [GIS] is crucial for bushfire hazard mapping. Consistency (with mapping) across local government boundaries is an important factor that has been absent in fire management strategies to date and is something to consider in the development of the fire management strategy.

Identification and consideration of PBHA should significantly influence local government decision-making with respect to the use and management of lands under its ownership/management. It is therefore, crucial to have the correct procedures in place to ensure that the identification of bushfire hazard areas is as accurate as possible.

What is HAZARD and what is RISK?

There needs to be some clarification on these two terms.

Hazard can be defined as “any situation or intrinsic property that has the *potential* to cause harm to people, property or the environment”, whereas

Risk is defined as “the *likelihood* of harm occurring from a hazard”.

In relation to fire, a ‘**bushfire prone area**’ can be defined (by the Australasian Fire Authorities Council) as “an area that can support a bushfire or is likely to be subject to bushfire attack”. Furthermore, “...for the purposes of implementing planning and building or public safety controls, a bushfire prone area is any area subject to attack by embers, radiation, direct flame or any combination, based on a 1 in 50 year bushfire scenario” (AFAC definition). According to Mark Webster (Fire Management Officer, Brisbane City Council) this can be interpreted as any vegetation (area) likely to burn under extreme bushfire conditions (expected to occur every 50 years) but does not exclude vegetation that burns under less extreme conditions or ‘normal’ fire years.

For some LGAs, such as Gold Coast City Council, they have mapped the hazard, using physical parameters such as vegetation, slope etc. whereas other LGAs such as Logan City Council have assessed the risk, by assessing the likelihood that bushfires will threaten life and property and the likely response time from emergency services. Therefore, it would be appropriate to use the term ‘bushfire prone area’ if there is an identifiable hazard (using the criteria below).

How do we calculate the bushfire hazard?

Calculating bushfire hazard will identify those lands owned or managed by LGA which are considered to be the greatest threat to life, property and (possibly) biodiversity values. As Marlow (2000) states, the many advantages identifying fire hazard (or as commonly referred to in this context as ‘potential bushfire hazard areas’) to include:

- influencing the location of fire lines, timing of prescription burns and other operational considerations
- as a useful tool by local-governments to assess development proposals within the area, and to minimise the risk of fire damage to future property owners
- as a useful tool by local-governments to *facilitate appropriate land use* in high-risk areas, using appropriate statutory (eg planning scheme) and non-statutory mechanism (voluntary conservation initiatives)

The majority of the information on ranking and loading-factors for bushfire hazard planning in this Manual draws upon “Bushfire Hazard Planning in Queensland” (DHLGP 1993). The use of this system will provide a level of consistency across the region (locally and regionally) to determine potential bushfire hazard. The guidelines themselves draw upon previous planning guidelines from the southern states, but with some minor changes to suit the tropical/sub-tropical climate and vegetation.

As noted in the guidelines, the possible disadvantages with using this system of mapping bushfire hazard is that the tropical/sub-tropical climate has a tendency to reduce the fuel ratings, fire frequency and fire history (DHLGP 1993). This results in the tendency to have reduced fire hazard ratings, which would possibly indicate the lower likelihood of highly destructive fires occurring more regularly. Moreover, as the guidelines state, “it does not reflect that “ordinary” or typical bushfires can be, in certain circumstances and conditions, difficult to manage” (DHLGP 1993). In these instances of “ordinary” fire risk, the guidelines advise that adequate precautions and planning be taken into account by local government. In these circumstances, it would be appropriate for the fire management authority to exercise some active fire management strategies (fire management plans, burn plans, prescribed burning regimes with consideration of biodiversity values etc.). Using a coordinated approach with other authorities will be extremely beneficial.

For some local governments (Gold Coast, Logan City, Noosa etc.) where potential bushfire hazards have been assessed an **additive rule** has been applied to the ranking of each characteristic. Subjective assessment of the total hazard rankings usually determine if an area is to be assigned a ‘low’, ‘medium’, or ‘high’ bushfire hazard rating.

Therefore, the equation is:

$$\text{PotentialBushfireHazard} = \text{SlopeRank} + \text{AspectRank} + \text{VegetationTypeRank} + \text{FireHistoryRank}$$

Discussed in detail below are the characteristics which are used to determine potential bushfire hazard. The rankings and scale associated with these characteristics are drawn from

the “*Bushfire Hazard Planning in Queensland*” guidelines by Queensland Department of Housing, Local Government Planning (DHLGP) (1993) and the Queensland Department Natural Resources “*Guide to Fire Management in Queensland*” (Marlow 2000), and has been used in fire management strategies such as Gold Coast City Council (1998).

DETERMINING POTENTIAL BUSHFIRE HAZARD

VEGETATION TYPE

The major influence on potential bushfire hazard is the type of vegetation. For many plant species and vegetation communities in Australia, fire is required, at some stage, for their survival and regeneration.

As the Ecological Guidelines have stated, different vegetation types will require different fire frequencies, which reflect their tendency to ‘carry’ or support a fire. For example, rainforests are not dependent on fire for regeneration and are much less likely to burn or contain plant species which have a high flammability, whereas eucalyptus woodlands, with many species requiring fire at some stage of its life cycle contains highly flammable species which requires a set fire frequency and regime. This level of dependence on fire is reflected in the scaling of these vegetation types. According to Marlow (2000) and DHLGP (1993) the different ratings that can be applied to vegetation associations are as follows:

Table 1: Vegetation type and associated hazard rating

VEGETATION / COMMUNITY	DANGER RATING	VEGETATION / COMMUNITY	DANGER RATING
Disturbed land (see Land Use)	–	Mulga	2–3
Freshwater	0	Heath	3
Mangroves	0	Dry sclerophyll forest (1)	3
Saltmarsh	1	Brigalow	2
Closed sedge land	1	Gidgee	2
Beach ridge	1	Ungrazed grasslands	3
Dune fields	1	Improved pasture	3–4
Spinifex	1	Pine plantations	3–4
Herb fields	1	Cypress pine	3–4
Rainforest	1	Wallum	4
Littoral	1	Dry sclerophyll forest (2) & (3)	4
Grazed grasslands	1	Dry sclerophyll forest (4)	5
Crops	1–3	Wet sclerophyll forest (5)	5

- (1) Eucalypt and Cape York ‘fire grasses’
- (2) Eucalypt and blade grass
- (3) Eucalypt and *Aristida bothriochloa*
- (4) Eucalypt and black speargrass
- (5) Tall Eucalypt (30m)

These are quite broad classifications for vegetation throughout Queensland. In some instances it will be required to provide more detailed descriptions of vegetation communities and provide ranking for these vegetation types. If this type of information is available, then they will need ranks that closely resembles the DHLGP (1993) Guidelines. This will require some work with experts to determine the rankings for the described vegetation types to best suit the Guidelines by DHLGP (1993). As an example of the level and typical complexity of information that can be represented, the following table lists the vegetation types occurring within the Gold Coast and the fire-danger ranks:

Table 2: More detailed vegetation community typing and hazard ratings

Vegetation Description	Danger Ranking	Vegetation Description	Danger Ranking
White Mahogany – Grey Gum – Queensland White Stringybark – Broad Leaved White Mahogany – Woodland/Open Forest Complex	4	Mixed exotic plantation	4
Brush Box – Moist Eucalypt Open Forest Complex (often with rainforest understorey)	5	Riverine	1
Pink Bloodwood – Narrow Leaved Red Gum &/or Scribbly Gum Woodland/Open Forest Complex	4	Foredune Complex	3
Spotted Gum & Ironbark Open Forest Complex	4	Mountain Heath/Shrubland	4
Blackbutt Woodland/Open Forest	4	Coastal Heath	4
Blue Gum – Grey Ironbark &/or Pink Bloodwood Woodland/Open Forest	4	Littoral Rainforest	1
Gum topped Box Open Forest	4	Sub-tropical to Warm Temperate Rainforest	1
Broad Leaved Paperbark – Blue Gum – Swamp Box Open Forest	4	Cool Temperate Rainforest	1
Broad Leaved Paperbark Open Forest	4	Headland Heath/Grasslands	2
Black Tea-tree dominated Woodland/Open Forest ± emergent Eucalypts	4	Urban Woodland	2
Swamp Oak/Broad leaved Paperbark Open Forest	3	Native plantation	4
Swamp Oak Open Forest	2	New England Blackbutt ± Tallowood ± Scribbly Gum Woodland to Open Forest Complex	5
Black She-Oak ± Acacia sp. Low Closed Shrubland to Open Forest	3	Coastal Woodland to Open Forest	4

(adapted from Gold Coast City Council 1998)

It has been argued that vegetation type should be given a higher weighting in the calculation of potential bushfire hazard (Gold Coast City Council 1998). This would better reflect the dominating influence of vegetation type on potential bushfire hazard. It would, however, deviate from the recommendations in the DHLGP (1993) Guidelines.

As Gold Coast City Council (1998) argued, the use of other models (with apparently different ranking systems) to demonstrate potential fire hazard yielded similar results to the current model. It should be noted also, that the determination of potential bushfire hazard using this method is only a guide, and not the most accurate measure, and its role is to serve as a ‘trigger’ which would ensure some of the issues related to bushfires are addressed in the development assessment process (Gold Coast City Council 1998).

It is therefore recommended that in the determination of bushfire hazard, the guidelines outlined by the DHLGP (1993) are followed, and where more detailed knowledge of the fire risk is required (in areas where there is a history of fire, or adjacent to larger bushland areas) more detailed information of vegetation types can be obtained.

SLOPE

It is generally well recognised that the slope of the landscape dramatically alters and affects fire behaviour and intensity. As a general rule, every 10° increase in slope, doubles the fire rates-of-spread (Gourley 2000). The following ranking scale (DHLGP 1993) is recommended:

Table 3: The effect of slope and its associated hazard rating

Percentage Slope	Description of Topography	Danger Rating
0 – 3	Gently undulating plains	1
3 – 10	Undulating	2
10 – 20	Rolling hills	3
20 – 30	Steep hills	4
>30	Gorges and mountains	5

LAND USE

The type of land-use was not considered in the DHLGP (1993) Guidelines. The updated Guide to Fire Management (Marlow 2000) rectified this by including land-use as a fire-danger. The categories are:

Table 4: The effect of land-use and its associated hazard rating

Land Use	Danger Rating
Vegetation (see above Vegetation/Community)	1
Open Space / Parkland	2
Urban / Housing	3
Dense / Uncleared	4
Industrial	5

The aspect of land-use has not been considered in previous calculations of hazard or risk. Industrial areas are placed with the highest danger rating because of its high stocks of flammable material etc. whereas vegetation has the lowest rank, as this is a separate factor in the calculation of fire hazard.

Marlow suggests one possible model for determining fire danger as:

$$\text{Fire Danger} = 100 \times \text{Vegetation} + 30 \times \text{Slope} + 20 \times \text{Land Use} + 10 \times \text{Aspect} + 5 \times \text{Roads}$$

Where: each variable has a possible range of 0 (very low) to 5 (very high) rating, equating to a danger rating range of between 160 and 800.

The final fire danger map may have seven classes of danger (**very low, low, medium low, medium, medium high, high, very high**).

Any model may need to be modified on the advice of experts with experience of local conditions by:

- incorporating past ignition sources and points (such as lightning strikes);
- including the knowledge of people who have coordinated or fought wildfires in the area;
- obtaining more detailed knowledge of the proximity of homes and businesses to vegetation (thereby allowing for buffer zones and other open space).

Land-use patterns have not been previously considered in the determination of fire hazard. It seems that it would be more useful for determining fire danger rating (much like McArthur's Fire Danger Meters). There remains some scope for the inclusion of land-use in the calculation of potential fire hazard and is worth consideration for LGA to include. This is particularly important in areas of housing development, and cultural heritage values (which have not been considered here in Marlow's (2000) categories).

ASPECT

The DHLGP (1993) Guidelines state that fire hazard associated with steepness is also closely associated to aspect. Aspect is defined as the direction that a side of the hill/slope is facing. Aspects that are exposed to the drying influences of winds are the most hazardous (Marlow 2000). Therefore, lands subject to westerly (and north-westerly) winds, that have been dried by the continental mass, are typically the most hazardous. In general, the placement of dwellings and other assets should be avoided on steep north-west facing slopes. Conversely, gentle south-facing slopes generally have an inherently lower fire hazard risk. The DHLGP (1993) recommends the following loading factors with the degree of fire risk with different aspects:

Table 5: The effect of aspect and its associated hazard rating

Aspect	Danger Rating
South, South-east	2
North-east, East, South-west	3
West	4
North, North-west	5

FIRE HISTORY

As Marlow (2000) mentions, fire history is sometimes not considered in the determination of fire-danger, because the data may not be entirely accurate, or because it is not independent of other factors such as vegetation type and land-use (eg roads). Anthropogenic factors such as arson also complicate the issue on determining fire history.

Some good recall of an area's fire history, however, does provide a good measure of the fire-proneness of the landscape, and areas experiencing frequent fire will, in broad terms, have vegetation species more adapted to fire. Fire history can then determine, on a broad scale, the usual path of fires, which can allow some insight into where suppression and management efforts need to be concentrated. Therefore, the recommended risk factors for fire-history are:

Table 6: The effect of fire history and its associated hazard rating

Frequency (Years)	Frequency (Descriptive)	Danger Rating
10 years	Rare	1
7–10	Occasional	2
4–6	Common	3
1–3	Frequent	4

Some LGA have not used fire-history ranks in the assessment of potential fire-hazard. This is most attributable to the lack of completeness of such data across the city (Gold Coast City Council 1998). In the example of the Gold Coast, it was decided that a constant rank (of 2) be applied across the city as it would: “provide a better indication of bushfire hazard from a strategic planning perspective...and reflects the (high) likelihood that some form of fire will occur over a longer period of time”. The use of a constant rank arose from the discussion that since all the characteristics within the assessment of potential fire-hazard are treated equally, fire history values will tend to change in the short-term (yearly) whereas other factors (eg slope) change over long periods of time (decades to centuries).

For fire-history data to be valuable, it needs to be both accurate and extend some time into past fire events. Where accurate fire-history information cannot be obtained, it is considered that the use of a constant ranking for fire-history is more suitable.

HAZARD RANKING

If the fire-history ranks are included (not recommended unless the data is very accurate, which is unlikely) the highest value possible for any one area is 19 (not including land-use). Otherwise, the use of a constant rank for fire history will provide a maximum additive score of 17 (not including land-use). Using the DHLGP (1993) Guidelines the rankings can be divided into three classes of potential fire hazard: Low, Medium and High Potential Bushfire Hazard

The most significant finding would be the classification of High Potential Bushfire Hazard areas. This would place severe limitations, possibly restrictions on the type of development allowable, and therefore, is quite crucial to be able to identify correctly. Even though the recommended guidelines do not provide recommendations where these classes should be allocated (ie the cut-off value indicating a medium or high hazard), Gold Coast City Council (1998) developed some general rules to use on the results of the mapping exercise to determine what areas are classed as Medium or High Potential Bushfire Hazard. These general rules would include:

- contained steep slopes greater than 20% (individual ranking of 4–5),
- contained highly flammable wet and dry eucalypt forest/woodlands (individual ranking of 4–5), and
- had moderate to high aspect ranks (individual ranking of 3–5)

These **triggers** would indicate a high potential bushfire hazard area, which is important to note especially for potential future development applications (discussed below).

Low Potential Bushfire Hazard areas are usually characterised with combined values totally less than 10, with Medium Potential Bushfire Hazard ranging from 10–14. There may be some need to make some slight adjustments to these cut-off values for each council when considering what areas to define as low, medium or high potential bushfire hazard areas. However, to maintain a level of consistency with this type of hazard assessment across the region, all councils should endeavour to retain this classification system. The Rural Fire Service Risk Management Unit also produces bushfire-hazard maps using the system and would be vital to involve them in discussions for assessing hazard. Furthermore, involving representatives from the rural fire brigades in the discussions is also important to provide some field-verification of the bushfire hazard mapping.

GROUND-TRUTHING / LOCAL EXPERIENCE

Mapping fire hazard is very reliant on the accuracy of the available information. It is impracticable to survey an entire region to determine the accuracy or precision of the potential fire hazard mapping. In some instances, there may be a misreporting of the potential fire hazard of a particular area, due to some adverse or extreme conditions, inaccurate vegetation community mapping, presence of very steep slopes are not mapped, or very good existing knowledge of fire history is lacking. In these cases, involving people with a good local knowledge of fire history is invaluable to accurately identify areas of high potential bushfire hazard. Such knowledge/history sources include: local Landcare and Bushcare groups, Queensland Parks and Wildlife Service, Queensland Rural Fire Service and DPI (Forestry) staff. Participation from these groups also infers ownership of the bushfire assessment strategy to local community groups.

For example, in meetings leading to the development of the Gold Coast Bushfire Management Strategy, staff from Springbrook National Park mentioned the misreporting of allocating a low or medium level bushfire hazard to the Eucalyptus complexes on the ridges of the National Park, not distinguishing between the wet-sclerophyll forest and the drier Eucalyptus or rainforest. Following discussions over the calculation of bushfire hazard, these areas were subsequently changed to a higher bushfire hazard risk rating.

This highlights the need for expert input from many agencies and authorities during the development of a fire management strategy, which is discussed in more detail in a later section.

THE ROLE OF THE RURAL FIRE SERVICE IN FIRE HAZARD MAPPING

The Rural Fire Service Risk Management Unit, through the Department of Emergency Services (DES) can assist local governments with bushfire risk mapping. *This service is provided free of charge to all local governments.* According to the Rural Fire Service, the framework for this risk assessment is in accordance to the Australian and New Zealand Standard for Risk Assessment [AS/NZS 4360:1995]. The maps made available from the Rural Fire Service have two main uses:

1. for local government to improve planning for building in bushfire prone areas, and by
2. local government and the Rural Fire Service, in addition to other measures (equipment, personnel etc.) determine the level of risk to individual Brigade areas.

This information can then determine the best way of managing that bushfire risk. In addition to the determination of bushfire risk/hazard, the Risk Management Unit can also record information about incidents attended by Brigades, information on volunteers and management information on the Brigade and the Fire Warden System.

At time of writing the contact person for obtaining the (free) bushfire hazard mapping for local government is:

Kerrie Purcell, GIS Manager
Rural Fire Service
Phone: 3247-8136
Email: Kpurcell@emergency.qld.gov.au

For most LGA this mapping has already been provided. It should be noted that this mapping is on a much coarser scale than is required in determining hazard (1:100000) using vegetation mapping available from the Queensland Herbarium. In particular, it should be noted that the vegetation mapped is remnant and not regrowth forest. Where possible, LGA should invest in more finer scale mapping, as Gold Coast City Council (1:25000 and now 1:20000) and Brisbane City Council have done. The costs of this finer scale will obviously depend upon the size of the LGA, but as an estimate, in 1997, Gold Coast City was remapped to a cost of approximately \$30000.

Development in Potential Bushfire Hazard Areas

Many local authorities consider this to be the primary focus or objective of a council-wide fire management strategy. Identifying areas of considerable bushfire risk or hazard should influence (or at the very minimum, trigger) some response or guideline to developmental requirements in that area. These guidelines should also include the restriction of any development¹.

The previous section described how bushfire hazard can be estimated through the addition of a number of characteristics that are relatively easily measured, though ground-truthing and expert advice on specific areas is always advantageous. After the region is described in accordance to its bushfire hazard – either ‘low’, ‘medium’ or ‘high’, then these will determine the type and level of response from the local authority. This is discussed in this section.

Levels of Potential Bushfire Hazard

This information is drawn from the Gold Coast City Council (1998) Bushfire Management Strategy.

Table 7: Potential bushfire hazards and associated response/triggering mechanisms

Low Potential Bushfire Hazard	<ul style="list-style-type: none">– potential hazard not sufficiently high to warrant special planning controls– the focus should be on providing advice to residents ensuring appropriate protection is available by providing fire-fighting infrastructure
Medium & High Potential Bushfire Hazard	<ul style="list-style-type: none">– these areas will require some planning control.– WHERE POSSIBLE – Development should be AVOIDED in High Potential Bushfire Hazard Areas.– For Medium Potential Bushfire Hazard Areas, development should be subject to a number of requirements which are directly aimed at mitigating potential bushfire hazard and protecting residents.– These requirements are covered below. They encompass various pieces of legislation, such as the Building Code of Australia (1996) and the Integrated Planning Act.– Provision of advice for protection and fire fighting is also required (as above).

Development and Land-Use Planning Response

During the assessment of proposed developments in areas with medium or high potential bushfire hazard, it should be recognised that fire is just one issue in the broader planning context and should be considered along with other factors such as nature conservation values, scenic amenity, slope stability and engineering design (Gold Coast City Council 1998). The identification of potential high fire risk is still a significant factor, and local councils objectives should be to:

- **avoid** development in *high potential bushfire hazard areas* where ‘environmental constraints’ preclude necessary risk reduction measures such

¹ Under the proposed IPA scheme, restriction of development is not permitted, but is rather based upon performance-based criteria. It may be possible to provide a number of legitimate criteria such that development is economically unfeasible.

as clearing or provision of adequate access (for example, high conservation values, high scenic amenity, steep slopes, unstable soils etc.),

- ensure appropriate location and design of any developments in potential bushfire hazard areas,
- ensure compliance with relevant legislation for housing construction,
- consider the ecological role of fire where developments are proposed in or adjacent to natural areas, and
- provide support by providing fire fighting infrastructure and assistance to the Rural Fire Brigades

(adapted from Gold Coast City Council 1998)

Potential Bushfire Hazard and Planning Schemes

This document will not attempt to (directly) link the identification of potential bushfire hazard areas to the Integrated Development Assessment or Process specified under the Integrated Planning Act (IPA 1997). This is beyond the scope of the report. It will however, show how the identification of areas which are of significant potential bushfire hazard (ie medium to high) should act as a trigger that will then influence the proposed development. It is worth reiterating that all LGA have a Duty of Care to provide a safe environment for their residents and visitors.

It is therefore essential that bushfire hazard be addressed within any LGA planning schemes. Therefore, the objectives contained within a bushfire management strategy will need to be linked to the provisions in a planning scheme, and that all provisions be equally applied to ‘mitigate the impacts of bushfires in all potential bushfire hazard areas’ (Gold Coast City Council 1998). It is also vital to provide linkages with issues such as nature conservation, scenic amenity and provision of fire-fighting infrastructure etc.

Appropriate Subdivision Changes in High Potential Bushfire Hazard Areas

As outlined in Table 7 (previous page) development should be avoided in areas that have been identified as having a high potential bushfire hazard. In all medium and high potential bushfire hazard areas, there are requirements that LGA should adopt as part of their planning schemes to guarantee the best practices and processes are place to maximise the development’s fire management practices. It is worth noting that for any new building in a identified bushfire hazard area, **must** be constructed to be protected to reduce the chances of ignition against embers, burning debris, radiant heat and direct flame contact in accordance with AS3959-1999² in the event of a bushfire.

An excellent example of the range of appropriate development requirements from the “Guidelines for Meeting Development Requirements in Potential Bushfire Hazard Areas³” (this is attached in the Appendix). In this instance, Gold Coast City Council’s potential

² Australian Standard (AS3959-1999) is currently under review.

³ GCCC are currently developing a Bushfire Management Areas Code based on these guidelines for inclusion in its Draft IPA Planning Scheme.

bushfire hazard areas map is used as a trigger to ensure bushfire issues are addressed where the development is proposed in a potential bushfire hazard area. Naturally the level of potential bushfire hazard areas defined by the map would need to be confirmed by on-site based criteria. The following table summarises the requirements according to the level of potential bushfire hazard:

Table 8: Summary of Development Requirements in PBHAs

DEVELOPMENT REQUIREMENT	POTENTIAL BUSHFIRE HAZARD RATING		
	LOW	MEDIUM	HIGH
Appropriate land-use		*	✓
Submission of a Fire Management Plan		✓	✓
Appropriate subdivision design	*	✓	✓
Appropriate house site location		✓	✓
Provision of fire fighting infrastructure	✓	✓	✓
Input of Local Fire Brigade	✓	✓	✓
Appropriate building construction	*	✓	✓
Provision of adequate private water supplies	*	✓	✓
Appropriate clearing & landscaping	*	✓	✓
Improved community awareness	✓	✓	✓

Notes:

✓

* Advisory only.

Indicates those areas where development requirements apply. In HIGH PBHAs more stringent requirements are likely to exist in respect of subdivision design, house site location, provision of fire fighting infrastructure, building construction, provision of private water supplies, and clearing/landscaping.

Council may vary the above development requirements following determination of potential bushfire hazard at the site level. The requirements apply whenever development is proposed on sites which are either wholly or partly within areas identified as having a potential bushfire hazard.

(adapted from Gold Coast City Council 1999)

Submitting a fire-management-plan is particularly important (bold section). An important element of this is obtaining input from the local (rural/urban) fire brigade. One of the mechanisms that some local councils (Gold Coast City Council 1998) have used is that the Rural and Urban Fire Brigades are provided with an opportunity to comment on proposed developments in the city. In the lead up process to the development of the Gold Coast Bushfire Management Strategy, there was consistent and valuable involvement from the Rural and Urban Fire Brigades, which contributed to its success. Because many of the Fire Brigades contain staff and volunteers with a wealth of knowledge and experience, they will provide valuable advice on bushfire related aspects of the proposed development in areas where they would be required to attend should a bushfire threaten. It should be noted, that in the Rural Fire Brigade example, which is staffed mostly by volunteers, that in order to assist with the process, Brigades should be supplied with all relevant information on the proposal, and all required maps.

The Fire and Biodiversity Consortium has two products available that can assist with the development of a fire-management plan. The Individual Property Fire Management Planning Kit and the Operational Manual are documents that provide support to landowners with a balanced approach to fire management plans (including zoning areas for property protection and other areas for biodiversity conservation) and guidelines for planning and conducting burns for hazard reduction or for conservation purposes.

Development requirements, such as subsequent building design and construction, provision of fire-fighting infrastructure, site location, appropriate clearing and landscaping are covered in

DHLGP (1993) and is regulated by the **Australian Standard AS3959–1999** ‘Construction of Buildings in Bushfire Prone Areas’. These development requirements can be determined by the LGA to suit their specific circumstances.

This Strategic Manual will not repeat information from the Australian Standard or other accompanying documents, however it is vital that these are consulted (refer to ‘further reading’ list in References). For example, the use of ring-roads instead of cul-de-sacs and avoiding the location of housing on top of ridges are some of the requirements for all medium-high potential bushfire hazard areas. Equally as important, private landowners should provide adequate water supplies for fire-fighting capacities. This is covered later in another section.

Vegetation clearing and landscaping is extremely important. In the Individual Property Fire Management Planning Kit, we have taken a balanced approach to vegetation management. We have recognised that hazard reduction (which may involve clearing etc.) is necessary for areas immediately surrounding assets (house, plantation, roads etc.) but that other areas should be kept for conservation values. The use of appropriate landscaping and design will limit the degree of excessive clearing and hazard reduction operations, which will benefit biodiversity conservation purposes. Applying this strategy onto a larger scale for LGA will also achieve the same conservation values.

Development Planning Response on Council Owned/Managed Land

The previous section has discussed the response of local authorities with regards to the appropriate responses to development on private property. The issue of an appropriate response to (potential) development on council managed land is more complex. The implementation of the IPA in the region will most likely determine the appropriate response. At the time of writing, this is a process that is currently being examined and acted upon.

In most cases, the acquisition of land by local authorities is primarily for nature conservation purposes. Therefore, the primary objective is biodiversity conservation, where development is limited or prohibited. An audit of the current bushfire strategies by the Queensland Emergency Services (1994) stated that for local government, particularly those with large urban-rural interface areas, that Fire Management Officers be appointed to oversee and implement fire management planning and strategies in accordance with existing guidelines and regulations (such as Queensland Fire and Rescue Authority Act 1990 etc.). Brisbane City Council and Gold Coast City Council have appointed Fire Management Officers. This is highly recommended for other local authorities in the region.

In large areas of bushland, there will be a need for active fire management practices (prescribed burning regimes etc.) to reduce the risk of large wildfires risking life and property adjacent to these areas. This management of the land requires a zoning pattern, similar to the recently released “Planning for Bushfire Protection” (2001) by the NSW Rural Fire Service and the Consortium’s Individual Property Fire Management Planning Kit (2001).

Therefore it is recommended that in areas currently managed or owned by local authorities, that fire management plans be drafted and updated yearly for each parcel of land, and that Fire Management Officers be appointed to coordinate the fire management activities on this land.

The next section provides more detailed information of appropriate responses.

Fire Management Practices on Council Administered Land

The main purpose of this document is focussed on addressing issues in this chapter.

There is a legislative requirement (Common Law, and *Fire Services Act 1990* now the QFRA Act 1990 etc.) to ensure LGA, as owners and occupiers of land prevents fires from escaping their land and also to ensure the property is as safe as possible from fire. In addition, local authorities are “increasingly involved in ecological sustainable management of considerable tracts of land under their ownership” (Gold Coast City Council 1998). Fire management practices form just one of many other aspects in ecological sustainable management. Fire management practices must prevent loss of life or property and reduce the ‘human’ impacts of bushfires, but also to preserve and conserve the area’s biodiversity and ecological processes.

However, there are other legislative requirements (such as *Nature Conservation Act 1992*) which require local authorities to protect and conserve rare or threatened species or ecosystems. This fine balance between protection and conservation is difficult, but not impossible, to achieve (the Consortium has provided useful ecological fire regime information in the ‘Ecological Guidelines’). A coordinated effort is crucial for successful management of land across ownership boundaries.

Primary Objectives in Natural Area Management (in terms of fire management)

There are two prime objectives in natural area management:

1. *Conservation of biodiversity and ecological values*

More specifically, these would include aspects such as:

- the conservation of *existing* biodiversity,
- the conservation of rare or threatened species,
- the conservation of threatened ecosystems,
- providing suitable habitats (hollows etc.) for native fauna,
- to limit weed invasions / feral animal introduction,
- (fire-related) to maintain an ecologically appropriate fire-frequency depending on the vegetation type,
- (fire-related) to provide a mosaic of vegetated areas with varying time-since-fires to provide the maximum number of habitats to support plant and animal species, and
- (fire-related) to ensure variability in fire regimes, in terms of fire season, extent and intensity.

2. *Management for the protection of life and property*

More specifically, these would include aspects such as:

- to protect life and property from fire,
- to ensure culturally significant values are protected,
- to limit the fire risk for adjoining land/property,
- to minimise traffic disturbance or adverse impacts on air quality,
- to ensure suitable design/construction of buildings in designated medium-high potential bushfire hazard areas,

-
- to improve community awareness, involvement and liaison, and
 - to improve coordination with adjoining landowners

What are the Steps in Preparing a Fire Management Plan?

We have already covered some aspects of managing fire on council-administered land. A number of steps are required. These are:

1. Designation of council-administered land into low, medium and high potential bushfire hazard areas,
2. Identification of assets on land (including ecologically and culturally significant; native title etc.),
3. Identification of the location of fire-fighting infrastructure and identification of gaps in infrastructure,
4. Coordination with agencies responsible for managing adjoining lands to determine fire-management needs. Involve community representatives on development of fire management plan,
5. Development of a suitable fire-management plan to suit the objectives for that land and adjoining land (if appropriate),
6. Development of burn plans (if needed) with adjoining agencies (coordination) and design/implementation of appropriate monitoring programs, and
7. Review and adaptation of fire management plans (if required) following monitoring program

An adaptive management approach to fire management is crucial. Fire is an inherently ‘chaotic’ force and management plans will need to be flexible to incorporate events such as wildfires, droughts, land-use changes etc. The Fire and Biodiversity Consortium has encouraged the landscape perspective in relation to fire management. Fire management plans for individual land parcels and indeed local council’s development of a Strategic Manual, should encompass this broader principle.

What is Needed in a Fire-Management Plan?

According to Marlow (2000) an *integrated fire management plan* should contain the following elements:

Identification of aims, objectives and responsibilities

1. The participants in the fire management plan, their responsibilities and capabilities. This should include all agencies and individuals:
 - a responsible for large tracts of land in the area;
 - b with fire fighting responsibility and capability in the area
2. The aims (goals) of the fire management plan
3. The short-term objectives of the fire management plan (the planned implementation of these objectives is described in the fire management plan)
4. The long-term objectives of the fire management plan (objectives that have been identified, but no planning done on their implementation)

A description of the area and its fire management needs

1. A textural description of the area covered by the plan
2. A cadastral map, showing major built-up areas and roads and tracks significant in fire management
3. A land tenure/land use map
4. A map indicating the native title status.
5. A contour and drainage map (including surface water storage, such as dams and weirs)

6. A vegetation map
7. The current species composition of flora and fauna, their distribution and fire tolerance. (Nature Search 2000, local government atlases and other agencies may provide data. If necessary, conduct a low-cost biological survey using local conservationists or University volunteers trained in a particular survey method to supplement this information).
8. A map indicating the management zones – plantations, state forests, national parks, pastures/crops, built-up areas, urban/rural interface areas, etc.
9. The fire management objectives for each zone

A description of the behaviour of fire in the area

1. The effect of prevailing weather conditions in the different seasons (temperature, rainfall, humidity, wind speed and wind direction)
2. The effect of contours and drainage
3. A map indicating the fire history of the area
4. The effect of vegetation (including ground litter and flammable material on the trees), considering both the amount of fuel and its flammability
5. Estimation of the fire hazard
6. A fire hazard/risk/danger map, indicating fire-prone areas

Clarification of the problems to be addressed

1. The vulnerability of life and property, particularly on the urban-rural interface
2. The environmental impacts of the fire management regimes considered
3. A map showing the areas where special requirements need to be observed. The special requirements may be protection from fire, multi-stage burning, etc. The reasons may be:
 - a. environmental (the conservation of endangered species);
 - b. native title;
 - c. cultural (such as the conservation of aboriginal scar trees).
4. The intended future use of land (if applicable)
5. The fire management regime adopted for an area of Unallocated State Land (USL) to be developed as an industrial estate may well differ from the regime adopted for an area of USL to be transferred to National Park
6. Legal responsibilities (minimise risks to life and property on neighbouring land and the subsequent risk of legal liability, by minimising the potential of a fire escaping USL)

A prescribed burning plan

1. The strategies adopted (such as segregate all residences, commercial property, crops and pastures from wildfires in bordering bushland)
2. The rationale for the regimes adopted (the reasons for the locations of fire-breaks the reasons for the values given to the fire break parameters)
3. The agency responsible for the creation and/or maintenance of each fire break
4. The physical parameters (width and appearance) of each fire break
5. Maps of the locations of fire breaks
6. Procedures for the creation and maintenance of fire breaks

A plan for slashing of allotments

1. Identify each allotment concerned, the agency responsible for its maintenance and the maintenance schedule
2. Maps showing the location of the allotments

An overview of governmental regulation and control

1. The applicability of relevant legislation and by-laws/local laws to fire management
2. Present and requested requirements of local government planning
3. Present and requested requirements of developers in fire-prone areas
4. Present and requested requirements of residents in fire-prone areas

A programme for community education, consultation and liaison

1. Engage the cooperation of the local media to educate and involved the local community in the aims and effects of the prescribed burning regime
2. Invite public comment of the released draft and incorporate valid suggestions in the final version of the plan

NB: Marlow (2000) uses fire-breaks (which is a constructed track cleared to mineral earth). We prefer the term fire-lines which covers all types, and is a less restrictive term. Fire-lines are extensively covered in the Operational Manual.

Marlow (2000) recommends cooperation with other agencies with responsibilities in fire management in the area and inviting comment from the local community. The plan will include all the elements listed above. Certainly all the aspects covered by Marlow (2000) would make an excellent strategic fire management plan for a large reserve (which is essentially a single fire management plan on a much larger scale). There is one aspect which Marlow (2000) does not cover in sufficient detail – ecological fire regimes, which is essential to maintain biodiversity. Not all fire management plans will need to cover the extensive aspects listed by Marlow (2000) but should try to address each issue as extensively as possible. The Gold Coast City Council (1998) Bushfire Management Strategy suggests that the following information should be included in a fire management plan: for a given parcel of land:

-
- Site location
 - Site area
 - Land tenure
 - List of adjoining owners
 - Land use
 - Land cover
 - Topography
 - Rainfall statistics
 - Temperature (yearly)
 - Predominant wind direction
 - Slope
 - Aspect
 - Vegetation type and fuel type
 - Fire history
 - Location of access tracks
 - Location of fire-lines
 - Location of existing fire infrastructure (watering points etc.)
 - Location of natural or cultural assets (historic buildings, sites of Aboriginal cultural heritage value, habitats for significant flora or fauna species, or vegetation communities with specific fire needs – eg protection from unplanned fires etc.)
 - Location of severity of potential bushfire hazard areas following site assessment
 - Detailed list of fire management objectives, including proposed (ecological) fire regimes for vegetation types
 - Fuel (and other hazard) reduction procedures, including timing, target areas, reduction methods (which may not use fire) – but for prescribed burning, then the intensity, frequency, ecological requirements, safety considerations and agencies/staff responsible are all required
 - Procedures for monitoring the ecological impacts of fuel-reduction measures
 - Fire-line maintenance procedures
 - Smoke management guidelines
 - Administering staff and responsibilities
 - Staff training and equipment requirements including maintenance requirements
 - Bushfire emergency response procedures
 - Strategies for improved community awareness and involvement
-

(adapted from Gold Coast City Council 1998)

ISSUES TO BE CONSIDERED WHEN DEVELOPING THE PLAN

- **Monitoring and Adaptive Management in Fire Management Plans**

This is one requirement of any fire management plan that should not be underestimated or neglected. Adaptive management through the use of current knowledge and new information is needed to be able to effectively manage fire in both a landscape context and where there is the integration with human occupation requiring managers to consider the life/property and biodiversity aspects. This will be covered in more detailed in a later section, but there must be some inclusion on monitoring and evaluation program/strategy included in all fire management plans, which will provide the essential information for conducting better on-ground fire management to meet set objectives.

- **The Coordinated Approach to Fire Management**

Developing an integrated fire management plan, incorporating the above principles, can be a very complex process. From personal experience, it took well over two years of regular monthly meetings and discussions and a number of working-groups to help develop and write the Gold Coast Bushfire Management Strategy (1998). This highlighted the complexity of a (politically and environmentally) sensitive issue, but also the level of involvement that was needed from the number of agencies involved in the development of a strategy covering this broad scope. The success of the Strategy can be attributed to the commitment of the representatives of other fire management agencies and the Gold Coast City Council.

It is vital that in the preparation of a strategic fire-management strategy for local authorities that other agencies (QFRS, QPWS, DPI, EPA etc.) are consulted and invited. This is discussed in more detail in the next section.

- **Ecologically Appropriate Fire-Regimes in Southeast Queensland**

The Fire and Biodiversity Consortium has extensively covered the importance of fire in the Australian landscape in other publications (Watson 2001, Tran and Wild 2000). There is no need to repeat this information, however it is worthwhile summarising the recommended fire-regimes for the different vegetation community types occurring in the southeast Queensland region. To reiterate one of our key messages: “*Different vegetation types will require different fire frequencies*”. The other key messages for biodiversity conservation are that: *variability* in fire regimes is essential and that we should consider conservation within a *landscape* context. As we mentioned above, ecological fire regimes have not been extensively covered in the development of an integrated fire management plan from a city-wide perspective (notable exceptions include the Gold Coast City Council Bushfire Management Strategy). Ecological fire regimes are vital attributes in any fire-management plan, whether this is for local reserves and conservation areas, or considering the entire LGA. This is particularly significant information to include if an objective is the planning for ecological burning to conserve biodiversity.

In the table below, recommended fire-intervals for vegetation types are summarised. It is highly recommended that strategic planners and managers become familiar with the Fire and Biodiversity Consortium’s publication ‘*The Role and Use of Fire for Biodiversity Conservation in South-east Queensland: Fire Management Guidelines Derived from Ecological Research*’ (Watson 2001) to gain a better understanding of the concepts of fire

ecology and the role of fire in the Australian environment. Copies of this and other Fire and Biodiversity Consortium products are listed at the end of the document with relevant contact details.

Table 9: Suggested Fire Intervals for Vegetation Types in SEQ

VEGETATION COMMUNITY TYPE	SUGGESTED FIRE INTERVALS
Rainforest	Fire exclusion
Wet-Sclerophyll Forest	20–100+ years
Dry Sclerophyll Forest & Woodlands	3–6 years (<i>grassy</i> understorey) 7–25 years (<i>shrubby</i> understorey)
Heathlands	7–20 years (coastal heath) 15–50 years (rocky heath)
<i>Melaleuca quinquenervia</i> (Paperbark) woodlands	15–30 years

Adapted from Watson (2001)

In addition to the suggested fire-intervals, the important ideals of variability (varying the fire season, intensities, and extent) and creating mosaics (different areas with differing times-since-fire) in the landscape are also required, to maximise biodiversity. These concepts are also extensively covered in our other materials, and is recommended reading for planning and developing an integrated fire management strategy.

- **Managing Fuel Loads**

One of the main purposes of a fire management plan is managing fuel loads in an area (council-owned land) to reduce fire risk and to assist with suppression of wildfires, preventing them becoming larger conflagrations and endangering life and property. Reduction of fire risk through fuel-reduction and management does not guarantee bushfires will not occur in these areas, it only reduces the *risk*. With a fire-tolerant and adapted landscape, there is an inevitability for bushfires to be experienced in the Australian bush. From an ecological perspective, wildfire, regardless of extent is part of the natural process, and these events require to be factored into a fire management strategy.

Fuel management can be achieved through the use of fire (termed hazard reduction burning or prescribed burning) or known mechanical means (eg slashing etc.). In practical terms the choice of fuel management method is very much dependent upon the size and extent of natural areas under LGA control. Ultimately, LGA, much like other agencies with land management responsibilities will need to protect life and property in their area from the risks of fire. As emphasised in the Individual Property Fire Management Planning Kit, the Fire and Biodiversity Consortium endorses the holistic approach of focussing on hazard reduction (through prescribed fire or other means) in higher risk areas (around assets etc.) and on biodiversity conservation for the remainder of the area.

The Operational Fire Management Manual covers in some considerable detail the requirements and recommended guidelines of each fuel reduction method. This document should be consulted and will assist in outlining the best hazard reduction method to meet the objectives in the fire-management plan.

- **What is the Role of Local Councils in Wildfire Situations?**

In southeast Queensland, there is a multitude of responses from LGA in meeting their duty-of-care in relation to fire preparedness. This relates not only to wildfire suppression but also

to more daily routines such as hazard reduction, training, infrastructure etc. This topic is the focus of the next chapter, but in general it is inappropriate for any local authority to assume control during a wildfire event. Under the Fire Services Act this is the responsibility of the Department of Emergency Services (Rural or Urban Brigades) to control wildfires. Councils can provide support through supply of equipment and resources, which may include personnel.

Even though LGA are the ‘core’ agency when it comes to the management of their own land, and this does include fire management, (if possible, with the appropriately trained personnel) it could assume the coordinating role for fire-suppression of large fire events and incorporate the assistance of the Rural and Urban Fire Service, Queensland Parks and Wildlife Service and the Department of Primary Industries. Otherwise, the Department of Emergency Services (Rural or Urban) will be the main coordinator of any suppression event. Indeed the recommendations from the DHLGP (1994) scoping paper certainly highlighted the need to appoint Fire Management Officers (into local government) to oversee and guide the implementation of fire management guidelines in accordance to the Queensland Fire Service (now Emergency Services). Councils such as Gold Coast and Brisbane have implemented this type of system.

- **Does Your Council Require an On–Ground Fire Fighting Capacity?**

This is a very difficult topic to address, particularly when councils in southeast Queensland differ markedly in their ability to support an active fire fighting capacity.

Ideally, it would be advantageous for a LGA to have officers who are appropriately trained in fire-suppression. There are a number of national accreditation agencies in southeast Queensland who provide courses on various aspects (from fire-suppression to incident-management). Having officers who are properly trained in both fire-suppression and in fire-ecology, would assist the local authority to convey their fire management objectives and plans more receptively to their community.

Some LGA, like Brisbane City Council have up to 80 trained personnel, with a number of purpose-equipped ‘slip-on’ units and other larger capacity trucks for fire-fighting purposes. Other LGA have much smaller numbers of trained staff and vehicles. The key here is to have *some fire fighting capacity available*. Whether this entails providing financial support to the fire brigades that service the area or in having an actual on-ground support role during suppression events is dependent upon the resources and objectives of the local authority. The Interdepartmental Committee on Bushfires (by DHLGP 1994) recommendations on bushfires concluded (Recommendation No.37) “LGA should appoint Fire Management Officers to implement and oversee fire management planning ...”. Appointing Officers to oversee fire management and the set-up of a coordinated network between the LGA and other land management agencies would be of enormous benefit for the region.

We would highly recommend and endorse the training of council staff (eg bushland management and parks officers etc.) to be able to assist other agencies during wildfire suppression or hazard reduction events. Even if the LGA does not have specifically designed fire-fighting equipment and other types of infrastructure, the minimum requirement would be to have the proper fittings (hoses/clamps) to support Rural Fire Service appliances.

To be able to perform and conduct hazard reduction, a local authority will need at least 4–5 fully trained staff to do these duties. Redland Shire Council is an excellent example of how a small on-ground team, in conjunction with the local rural and urban fire brigades can work effectively in coordinating and conducting hazard reduction and fire suppression activities.

Having a dedicated team will also allow for the important *monitoring and evaluation* component of fire management that is always required to gauge the effectiveness of any objectives of a fire management plan.

The other minimum infrastructure requirements for LGA would be: 2–3 vehicles with fire fighting equipment (ie slip-on unit), fittings to support Rural Fire Service equipment, and effective, compatible communications equipment. The advantage of having trained staff is the ability to perform and conduct hazard reduction burns, but they can also serve a community awareness and educational aspect.

Issues to be considered by the LGA include: having staff outside ‘business hours’ for fire-suppression activities; ensuring staff have appropriate training and maintenance of equipment etc. Each council should address separately as they are beyond the capacities of this document to fully explore. Certainly, there are many advantages for this: **training and relevant experience [fighting fires] equals competence**, (Mark Webster Bushfire Management Officer Brisbane City Council pers. comm.).

- **Monitoring and Evaluation — What are the Requirements?**

In recent times, there has been a move towards *adaptive* management, which is particularly relevant to fire management. Adaptive management is a term to describe the process where an active feedback mechanism is used where the outcomes of recent management plans help improve future management procedures. Fires, as an inherently ‘uncontrollable’ force will never burn and travel as we have intended...the best we can do is plan for events and make good estimations on how fires ‘behave’. Effective monitoring and evaluation of fires, both planned and wildfire, are the only means to determine the effect of fire and its impacts on the landscape. What is required is an effective reporting system which links back to the fire management plan, so alterations can be made (if required) to better achieve the objectives the next time around.

What is needed? This depends upon the objectives of the fire management plan. If your overall strategy is the reduction of fire risk, then the plan should be suited to meet this objective...conversely, if the objective is to meet some ecological objective, an understanding of ecological fire regimes is required to plan for variable fire intervals to maximise biodiversity. The Fire and Biodiversity Consortium has a wealth of material to assist with these issues. The Monitoring Manual will provide a number of methods to suit these different objectives. We highly recommend this document for use in monitoring and evaluation. For effective feedback to optimise fire management planning strategies, there should be a list of **triggers** that will inform council staff that some criteria is not being met and changes are required. Both the Fire and Biodiversity Consortium’s publications “Operational Fire Management Manual” and the “Fire Monitoring Manual” offer some advice on what characteristics to use as triggering mechanisms.

To undertake this effectively, it is **crucial** to have properly trained staff to assist with monitoring and evaluation. Similar to other agencies where resources and time-availability are limited, the first item that is usually discarded is that of monitoring/evaluation. This severely hampers the effectiveness of management plans when there is no feedback available to monitor the implementation of the burn strategy. The other advantage of having appropriate staff is the opportunity to conduct monitoring in areas post-fire. Human-caused fires are a regular influence on many parks and conservation areas under the control of local government. Maintaining dedicated fire-management staff, or an incorporation of these into

bushland officer's duties, will assist with monitoring programs and increasing community awareness and presence to assist with these events. The Fire and Biodiversity Consortium's "Fire Monitoring Manual" also contains a number of useful techniques to assess and monitor an area post-fire (in addition to many other techniques). This document should accompany this Strategic Manual.

Coordination of Agencies Involved in Fire Management

Fire management is an aspect of land management that all agencies must consider. Regardless of the current or future proposed land-uses, fire is a factor that must be considered along with other natural forces such as floods, cyclones, droughts etc.

It would therefore, be appropriate to coordinate fire management planning with the other agencies to achieve the desired outcomes without having to cover the same ground or repeat planning and implementation procedures, thereby wasting valuable time and resources. In the development of any council-wide fire management strategy, all major land-use agencies should be invited to comment and contribute to the strategy, offer coordinated approaches to fire management and to actively participate in local council's fire management practices.

Given the limited resources available to all agencies, coordination is mutually beneficial and provides avenues to present balanced views and objectives of land management (ie protection and conservation). In the development of the Gold Coast Bushfire Management Strategy (1998) the table below summarises the range of land-agencies and their specific fire management responsibilities was produced, which has been adapted below:

AGENCY	TYPE OF RESPONSIBILITY		GOVERNING LEGISLATION
	FIRE RISK REDUCTION	FIRE FIGHTING	
Queensland Fire and Rescue Authority	<ul style="list-style-type: none"> Public awareness & education Require landowner to reduce fire risk on property Appoints Fire Warden to issue "Permit to Light" system Coordinates staff training and supplying fire fighting equipment 	<ul style="list-style-type: none"> Receives all '000' calls during fire emergencies and coordinates response 	<ul style="list-style-type: none"> Queensland Fire and Rescue Authority Act (1990) or the QFRA Act (1990)
Local Rural Fire Brigades	<ul style="list-style-type: none"> Risk reduction and fire-line maintenance Staff training and maintenance of equipment 	<ul style="list-style-type: none"> Fire control during fire emergencies on all land in Rural Fire Brigade areas excluding State Forests and National Parks 	<ul style="list-style-type: none"> QFRA Act (1990) Workplace Health and Safety Act (WHS) (1995)
Local Urban Fire Brigades	<ul style="list-style-type: none"> Staff training and maintenance of equipment 	<ul style="list-style-type: none"> Fire control during fire emergencies on all land in Urban Fire Brigade areas excluding State Forests and National Parks 	<ul style="list-style-type: none"> QFRA Act (1990) Workplace Health and Safety Act (WHS) (1995)
Local Council Authority	<ul style="list-style-type: none"> Risk reduction on council land Consideration of potential bushfire hazard during land-use planning and development within council Determination of appropriate methods 	<ul style="list-style-type: none"> Can vary – from provision of equipment and infrastructure through to active fire suppression force during fire emergencies on council owned land 	<ul style="list-style-type: none"> QFRA Act (1990) Section 67 and 68 Building Act (1975) Environment Protection Act (1995) Integrated Planning Act (1997) Local Government Act (1993) Council Local Laws

AGENCY	TYPE OF RESPONSIBILITY		GOVERNING LEGISLATION
	FIRE RISK REDUCTION	FIRE FIGHTING	
	<ul style="list-style-type: none"> for disposal of vegetation cleared for development ▪ Issuing notices to property owners to clear overgrown vegetation ▪ Public awareness and education 		<ul style="list-style-type: none"> etc ▪ Workplace Health and Safety Act (WHS) (1995)
Queensland Parks and Wildlife Service	<ul style="list-style-type: none"> ▪ Risk reduction and maintenance of fire lines on QPWS land ▪ Staff training and maintenance of equipment ▪ Community awareness and education 	<ul style="list-style-type: none"> ▪ Fire control agency during fire emergencies on National Parks and other Protected Areas 	<ul style="list-style-type: none"> ▪ Nature Conservation Act (1992) ▪ Environment Protection and Biodiversity Conservation Act (1999) ▪ Workplace Health and Safety Act (WHS) (1995) ▪ QFRA Act (1990) ▪ Regional Forestry Agreement (2000)
Queensland Department of Primary Industries (Forestry)	<ul style="list-style-type: none"> ▪ Risk reduction and maintenance of fire lines on State Forest land ▪ Staff training and maintenance of equipment 	<ul style="list-style-type: none"> ▪ Fire control agency during fire emergencies on and within 3 km of State Forests 	<ul style="list-style-type: none"> ▪ Forestry Act (1959) ▪ QFRA Act (1990) ▪ Workplace Health and Safety Act (WHS) (1995)
Commonwealth Department of Defence	<ul style="list-style-type: none"> ▪ Risk reduction and maintenance of fire lines on Dept. Defence land ▪ Staff training and maintenance of equipment 	<ul style="list-style-type: none"> ▪ Fire control agency during fire emergencies on land contained within Dept. Defence land 	<ul style="list-style-type: none"> ▪ Workplace Health and Safety Act (WHS) (1995)
State Emergency Services		<ul style="list-style-type: none"> ▪ Provision of support services during fire emergencies 	<ul style="list-style-type: none"> ▪ State Counter Disaster Organisation Act (1975) ▪ Workplace Health and Safety Act (WHS) (1995)
Queensland Police Service		<ul style="list-style-type: none"> ▪ Coordination of evacuation procedures and maintenance of law and order during fire emergencies 	<ul style="list-style-type: none"> ▪ Public Safety Preservation Act (1986) ▪ Workplace Health and Safety Act (WHS) (1995)
Queensland Ambulance Service		<ul style="list-style-type: none"> ▪ Provision of medical assistance 	<ul style="list-style-type: none"> ▪ Workplace Health and Safety Act (WHS) (1995)
Queensland Department of Main Roads / Telstra / Energex	<ul style="list-style-type: none"> ▪ Risk reduction on land administered by each authority (eg powerline easements, road reserves etc.) 	<ul style="list-style-type: none"> ▪ Provision of assistance with infrastructure services during fire emergencies 	<ul style="list-style-type: none"> ▪ Workplace Health and Safety Act (WHS) (1995)
Property Owners	<ul style="list-style-type: none"> ▪ Ensure property is as safe as possible from fire 	<ul style="list-style-type: none"> ▪ Take all reasonable procedures to extinguish/control fire on property and to report its location/existence 	<ul style="list-style-type: none"> ▪ QFRA Act (1990) ▪ Workplace Health and Safety Act (WHS) (1995)

NB: Relevant new legislation added where appropriate

During past major fire events in the region (September/October 2000, September 1994, September/October 1982 etc.) all of the agencies described were involved. Despite each agencies specific responsibilities, there is a need for a strong degree of coordination between the agencies for efficient, effective and safe responses to fire in the region to facilitate both effective fire suppression responses and integrated comprehensive fire preparedness through the development of fire strategies. Coordination can be achieved in a number of aspects:

1. *Involvement and Participation in Development of LGA Fire Management Strategy*

Representatives should be given the opportunity to attend meetings to discuss the various aspects required in a city/shire-wide fire management strategy. This will be mutually beneficial to all agencies involved in fire management. The Gold Coast City Council Bushfire Management Strategy (1998) was successful due mainly to the commitment of council officers and the cohesive working group that was involved. All agencies mentioned above (including many others, such as University, helicopter services etc.) were actively involved in the process.

This is the largest single advantage of local council officers developing a fire strategy as opposed to contracting these duties to an outside source. The ability to coordinate the many fire management agencies together to discuss a council-wide fire strategy cannot be understated.

2. *Coordinating Fuel (Fire Risk) Reduction Measures*

In the development of a council fire management strategy, coordination with other agencies provides a unique opportunity for incorporating the fuel reduction measures/strategies of other adjoining agencies into council's own objectives. This is considered absolutely essential! These would include coordination with the QFRS, QPWS, DPI (Forestry) and Department of Main Roads etc. Council can assist with better planning (which may involve regulating building/development in potential bushfire prone areas), improving management of council land, encouraging landowners to undertake appropriate fire management (using the Individual Property Fire Management Planning Kit), community awareness and education (discussed in the next section), and enforce by-laws to assist with fire management strategies.

3. *Coordinating Provision and Maintenance of Fire-Fighting Equipment*

It is highly recommended that local authorities devote and commit resources to supplying a minimum fire-fighting infrastructure for their land. This will vary according to the extent of council-administered land.

If the provision of on-ground staff and equipment is beyond the capacities or does not meet the objectives of the LGA, then providing support to the local Rural Fire Brigades is highly recommended. This could come in many forms, from direct provision of equipment, hoses and fittings, water tankers, or communications equipment etc. Supplementing the support given to the brigades from the QFRS will empower local fire brigades with more ownership and vital moral support during fire fighting or reduction events. In Gold Coast City, this LGA administers the Rural Fire Levies assisting with the provision of equipment and resources during fire events and provides cash contributions from general revenue.

4. Coordinating Fire-Fighting Personnel

We have previously reported on this issue, and it is recommended that LGA provide some support of this idea. The advantages of this have been highlighted. Furthermore, there is also the advantage that they can provide a wealth of local knowledge when there is a suppression event. The ability also to provide comprehensive maps and possibly a fire history of the area will be invaluable to assisting with suppression. Coupling this local knowledge and information systems with appropriate training makes local authorities and useful and essential element in any incident control system.

Community Awareness – Resources and Options

One essential element strategy that LGA should adopt is the provision of adequate educational information on fires and its impacts on the landscape. This is of particular relevance to those elements of the community directly affected by management of the particular land parcel, including adjoining neighbours.

The Fire and Biodiversity Consortium has a wealth of materials aimed at different target audiences ranging from introductory-level information on fire ecology to detailed in-depth discussions on fire-ecology research and its implications on this region. The full list of available products is included at the end of this document.

In addition to these excellent resource materials, there are a number of products from other agencies that would be very useful and make great companion documents, to provide a balanced view on fire and nature conservation and impacts for humans. In particular, the Queensland Fire and Rescue Service (through the Rural Fire Service) has, for many years, produced a number of quality documents about preparation for the fire season, prescribed burning, house design and siting etc. that all assist with increasing community awareness of fires.

The contact person at the Rural Fire Service for more information on the products available is:

Tania Phillips
Community Awareness Officer – Rural Fire Service
Email: tphillip@emergency.qld.gov.au
Phone: 3247 8126

The Rural Fire Service can also assist with ‘open-days’ and information events to increase community awareness of the (voluntary) jobs that they do, which helps enforce the message about fires and the preparation required for the upcoming fire season and to learn a healthy respect for fires and its natural occurrence.

Importantly, one ‘ingredient’ that would be worthwhile implementing is the smaller community group aspect of fire management. In Victoria, an extremely successful initiative called ‘Community Fireguard’ has helped small communities such as neighbours work together on fire issues. Ownership and empowerment of fire issues through Community Fireguard has helped enormously with increasing awareness and preparation from participants. The following website from the Country Fire Authority in Victoria outlines the procedures and initiatives of Community Firegaurd (<http://www.cfa.vic.gov.au/boura.htm>).

In addition to the excellent resources from the Rural Fire Service, Queensland Parks and Wildlife Service have a select number of materials on fire and fire ecology which may be useful to use or adapt for local council conservation areas. Unless the primary objective is specifically to increase community awareness of fire education, information on fire should be included and incorporated into other educational products to provide an overall view of the processes that occur in the landscape, of which fire forms one (of many) natural disturbances.

The remainder of this chapter, focuses on the type of information available and strategies that are available for local councils to help increase community awareness and how to provide a balanced view of fire in the landscape.

The recent fires in southeast Queensland (late 2000, and in 1994 etc.) and the more recent bushfires in New South Wales (2001/2002) has reignited public interest in fires. Along with this, there is widespread interest from the media and much '*misinformation* can be broadcast. Irrespective of whether fires have occurred recently, LGA should make (useful) information readily and easily accessible to the public to provide guidelines and suggestions to help landowners who live in potential bushfire hazard areas to be fully prepared for the fire season.

In this chapter, we will outline the various types of community awareness and educational programs, methods of distribution and future directions which are available for use by LGA.

Currently Available Materials: Pamphlets, Booklets and Information Sheets

There is a bibliography of materials covering a number of topics associated with fire located at the end of the document. This is recommended reading.

Fire is a management issue that covers the entire Australian continent. With this in mind, there already exists a wealth of information that is available on bushfires, preparations, building in fire prone areas, landscaping etc. and on fire ecology and biodiversity conservation.

Most of this information is available through pamphlets, booklets and information sheets by leading fire authorities in each state or territory. Some of the information pertinent to this region has already been discussed above. Whilst recognising there are a number of excellent publications from many sources, there is sometimes a lack of relevant information on fire ecology and fire regimes, especially for southeast Queensland. The Fire and Biodiversity Consortium has produced a number of useful products on fire ecology and nature conservation. There are also planning kits (Individual Property Fire Management Planning Kit) and manuals (Operational and Monitoring) which are all useful products that assist with increasing community awareness and education for landowners. Some (eg "*the introductory brochure on fire and nature conservation*") has been used to promote local council's fire management plans and burn strategies (in mailouts to residents in Brisbane City Council etc.) and the Individual Property Fire Management Planning Kits have been used extensively throughout the region.

One excellent idea that is highly recommended, is the production of a brochure that clearly states each authority and their responsibilities for separate areas of fire management within the local city boundaries (adapted from Gold Coast City Council 1998). This should be prepared with representatives from the QFRS and the Rural Fire Brigades with contact details for further information enquiries.

Local councils should also embark on an information gathering campaign to determine the level of fire preparedness amongst its residents. Those living in potential bushfire hazard areas should be surveyed – to provide a baseline of data that can help guide future education and community awareness programs.

As the Gold Coast City Council (1998) discusses, there are a number of fire issues that can be addressed with an educational campaign, including:

- reduction of fuel around the house and garden,
- housing and landscaping design and methods of construction,
- maintenance of property/bushland boundaries,

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- smoke alarms,
 - household water supply,
 - ‘what to do’ as the fire approaches,
 - personal protective equipment,
 - fire-fighting equipment,
 - what to do if caught outside in a fire,
 - the role of the Rural Fire Brigade,
 - the Permit to Light system, and
 - what to do once the fire-front passes

The majority of this type of information can be gathered from the Department of Emergency Services, Rural Fire Service (contact person listed in previous section). Some issues that Gold Coast City Council (1998) highlighted that could be addressed by council included:

- the ecological role/effects of fire,
- the Rural Fire Services Levy,
- Council’s Statutory Notices – Reduction of Fuel, and
- The agencies responsible for fire management within the City.

The Fire and Biodiversity Consortium has produced some materials which already addresses these issues. The Ecological Guidelines and Literature Review provide extensive and comprehensive information on the ecological role of fire, and we have a number of documents which can assist landowners prepare their property for bushfires (the Individual Property Fire Management Planning Kit and the Operational Manual).

The Rural Fire Service will have organised many fire-awareness and prevention events before the fire-season. Local councils should assist and support these events. Local forums and workshops on fire and fire ecology should be organised and workshops to assist landowners with the Individual Property Fire Management Planning Kit have been exceptionally well received and should be encouraged and increased.

How Can Local Councils Assist Residents Adjacent to Large Areas of Bushland?

Residents living near large tracts of bushland can be particularly affected by fire management strategies, in terms of smoke, air quality and risk of fire escape. These residents should be specifically targeted with education and an awareness campaign to inform them about the reasons behind certain management guidelines and ways they can help reduce fire risk to their properties. The use of the Fire and Biodiversity Consortium’s Individual Property Fire Management Planning Kit and Operational Manual will assist greatly with this process. In addition, the use of fire-ecology information will also give residents an appreciation of the natural systems and environments responses to fire.

Encouragement to join the local rural fire brigade will also help increase the fire awareness of local residents and assist with fire management practices.

Informing New Residents

For new residents moving into areas which have been identified as potential bushfire hazard areas, local authorities should provide an information package to go with the rates notices (or something similar) informing them of the property and their increase fire risk. Appropriate contact details of rural fire brigades, and information on fire risk reduction, fire ecology should also be provided. Housing design and location, landscaping and siting issues can also be presented. Useful reminders (fridge magnets, stickers etc.) may be appropriate as well.

How Can Information Have Lasting Continual Impact?

This is very difficult to achieve, but it can be accomplished. We do not have to produce some new scheme or program to achieve this...

In the southern states, which are more prone to regular bushfires, the most widely successful community awareness initiative is Community Fireguard. As the Victorian Country Fire Authority (CFA) initiative states “Community Fireguard recognises that on days of extreme wildfire danger suppression capabilities are limited and Country Fire Authority (CFA) cannot guarantee protection to each property. On such occasions the key to community safety is the preparedness and response of the residents threatened. By promoting the development of wildfire survival strategies by communities at greatest risk, Community Fireguard promises to significantly reduce the vulnerability of these residents”.

The benefits of **Community Fireguard** are:

- eases responsibility on Rural Fire Brigades by creating a better informed community,
- increases community involvement in, and knowledge of, Rural Fire Brigades,
- forms community networks enabling members with bushfire knowledge to take responsibility for others, thereby allowing Rural Fire Brigades to concentrate on fire suppression activities,
- assists in creating a community that can be more easily defended from bushfires, saving properties and potentially community and Rural Fire Service lives, and
- reinforces development of strategies relevant to local community and local conditions.

Experience from other states that have implemented this type of scheme shows that for the local region, the following issues need to be addressed:

- plans should be developed in coordination with local Rural Fire Brigades and other emergency services and coordination bodies to prevent overlap and confusion, and
- the community, not the brigades, must be in charge of the program and groups. This ensures community responsibility and ownership to develop the plan and it not seen as someone’s else responsibility. This is based on the premise that in life/property threatening situations, people are more likely to follow plans that they have developed themselves.

(modified and adapted from Gold Coast City Council 1998)

Other Forms of Educational Information & Community Awareness

1. *Fire Season Declaration and Fire Danger Rating Signs*

Fire Wardens calculate the daily fire danger as part of their responsibility for issuing the ‘Permit to Light’ system which operates in southeast Queensland. These permanent fixtures (usually beside major roads) assists in raising community awareness and is a reminder of the need for property management to reduce fire risk.

Local councils need to work with local fire brigades to determine areas where further signs are required and contribute to costs where appropriate. In addition to the daily fire danger index (ranking from low, moderate, high to extreme) additional information could also include: contact number for the local Rural Fire Brigade, use of ‘000’ to report all

emergencies, use of 'Permit to Light' system and requirements, and a removable sign indicating 'Total Fire Ban' days.

2. *Inclusion of Information Into Tourist Brochures and Directories*

Tourist locations and businesses offering accommodation in areas with a potential bushfire hazard, should be required to include information about bushfires and procedures to follow if bushfires occur. This would only need to be included prior to and during the fire season.

3. *Information for the Internet*

Increasingly, more information is widely distributed over the Internet. This is an excellent form to portray information in a useful manner on fire-ecology and other information on fire-preparedness. The biggest benefits of the Internet is: accessibility and ease of use, easily updateable and access to the most currently available information.

The Fire and Biodiversity Consortium will have a website hosted by Griffith University.

Materials, information brochures, 'how to' brochures etc. can all be easily placed on the Internet. Quite possibly, in the near future, information on Fire Danger Indices, Drought Index and other indicators of 'fire-risk' can be accessed through the Internet.

4. *Workshops and Information Days*

Following on from the use of workshops with the Individual Property Fire Management Planning Kit, there could be additional workshops to discuss bushfire behaviour, fire ecology and other matters of interest.

5. *Continued Support to Other Fire Management Agencies*

This is probably the most important means of increasing awareness amongst the community. Coordination goes beyond the need to organise fire management strategies but also to work with other agencies, namely the Rural Fire Brigades in education and other awareness programs. The Rural Fire Service has a number of different programs targeted to different age-groups to get the message across about fire.

Fire-Fighting Infrastructure in Potential Bushfire Hazard Areas

The provision of fire-fighting infrastructure differs amongst many councils in the SEQ region. The following sections will provide some guidance about what processes are required in the assessment of current fire-fighting infrastructure for a local authority and what minimum requirements are needed. Some examples of other local authorities responses to fire-fighting infrastructure are provided for reference.

Fire-fighting infrastructure ranges from fire-lines, access trails, provision of water supplies, through to equipment such as fire trucks/appliances, associated equipment, communications and protective clothing. The Gold Coast Bushfire Management Strategy (1998) stated "...as the agency responsible for land use planning and development within the city, local councils can have a **positive influence** over the availability of major fire-fighting infrastructure...in potential bushfire hazard areas". LGA have a responsibility to assist the Rural Fire Service (and associated Brigades) with appropriate infrastructure, an organization which is the primary (predominantly voluntary) agency for fire management throughout SEQ.

What Fire-Fighting Infrastructure is a Local Authority's Responsible for?

Local authorities will differ markedly in their capacity to provide and maintain fire-fighting infrastructure.

In preparation for a strategic approach to fire management, however LGA should undertake a regular review of infrastructure requirements and capacity. Specifically:

Instigate Review of Current Infrastructure

At the very minimum, local authorities should review current fire-fighting infrastructure (as outlined above) as required (usually every two–three years, especially following a 'busy' fire season) to inform and provide as reliable and easily updateable map of all infrastructure to fire brigades and other fire management agencies. This is done by reviewing:

1. Current Water Supplies

Water supplies can vary from smaller sources (such as water tanks, swimming pools, creeks, farm dams etc.) too much larger sources (such as dedicated tanks, and large dams etc.). These are all valuable supplies of water and useful to identify. There are a number of factors to consider during the identification of suitable water supplies/sources. These should include: size and nature of supply, access (safety/distance) to supply, amount of serviceable area with supply.

For 'natural' supplies, such as creeks and dams – it may be useful to include a 'reliability' rating, which would be particularly useful in drought periods (usually when fires are more prevalent). This could also be linked to rainfall (if possible).

2. Existing Fire-lines/Access Trails

Fire-lines and other access trails provide the avenues for fire management procedures and activities. These fire-lines will differ in terms of grading and accessibility for

vehicles and other fire-fighting equipment. It is necessary to determine the type, level and standard of existing fire-lines. Existing fire-lines can then be extended (if required) or rehabilitated to maximise access but also to preserve biodiversity conservation values.

Planning for the Provision of Future Requirements

3. Future Water Requirements

LGA cannot ask property owners in areas of existing development to increase water capacities to assist with fire-fighting capacities, though this is perhaps something that can be recommended. However, local authorities can provide additional water supplies on public land where it is deemed necessary. This obviously requires the input of local Rural Fire Brigades to identify special need areas – which also helps with the coordinated approach to fire management. An agreement between the LGA and the relevant fire brigade would be required to guide the ongoing maintenance of these additional water supplies.

In areas of new development, where residents opt to live in designated medium-high fire risk areas, the LGA can require that adequate water supplies are provided as part of the development approval and authority should remind landowners that they are solely responsible for the provision of adequate water supplies for bushfire protection. In practical terms, this may include tanks with fittings appropriate for Rural Fire Service vehicles, swimming pools etc. The costs of these infrastructure requirements would be at the owner's expense. Identifying appropriate water sources (and access etc.) for landowners is outlined in the Individual Property Fire Management Planning Kit and the GCCC "Guidelines for Meeting Development Requirements in Potential Bushfire Hazard Areas" (see Appendix).

4. Provision of Fire-Lines

Fire-lines form a vital ingredient in fire-fighting infrastructure. The location and construction of fire-lines is extensively covered in the Operational Manual and will not be revisited in this document.

Where possible, all natural fire-lines should be used. These can include creeklines, less-flammable vegetation or existing infrastructure, such as roads. Limiting the construction (and maintenance) of additional fire-lines is not only resource intensive, but potentially detrimental to biodiversity conservation values (in terms of erosion and weed infestation).

In areas of existing development – local authorities can assist only through the construction of fire-lines on public lands. Private landowners can be encouraged to identify and construct fire-lines with the assistance of the Fire and Biodiversity Consortium's 'Individual Property Fire Management Planning Kit' and the 'Operational Manual'. These documents should be provided (with appropriate assistance from local authority) to landowners living in potential bushfire hazard areas.

In areas of new developments – LGA should require developments proposed to identify the location of and construct fire-lines as part of any new development proposals. This should be at the cost of the developer/development. Again, the use of existing fire-lines without the need to construct more fire-lines is highly recommended. As previously mentioned, Rural Fire Brigades should be invited to

comment on any proposed development in designated bushfire hazard areas, and this is an opportune time for the Brigades to outline where the fire-lines will be most effective and useful. In keeping with the Individual Property Fire Management Planning Kit and Operational Manual, biodiversity aspects should not be forgotten, and where possible, fire-lines should be constructed with due care not to increase chances of erosion, weeds etc. The Operational Manual provides comprehensive information on the construction standards of fire-lines. Even though the Operation Manual is a Consortium product that assists landowners to plan, conduct and implement fuel reduction/ecological burning, the section on fire-lines can be applied to larger council-owned land.

For fire-lines to remain effective, they will require maintenance. The use of existing fire-lines, whether natural or constructed is beneficial not only in terms of ecological values, but also for resourcing purposes for local authorities. The LGA and private landowners should consider the implications of constructing fire-lines with the view for much longer term maintenance. On public land where they are responsible for land management, LGA may be required to coordinate these maintenance schedules with the other relevant agencies such as Queensland Parks and Wildlife Service, Department of Primary Industries, and other councils.

Involving community-groups in ongoing maintenance of fire-lines will not only impart ownership for fire-fighting infrastructure but will also increase community awareness of the fire-risk hazards and response times etc. This is highly recommended. If community involvement requires some on-ground aspect, then there will need to be appropriately trained coordinators to oversee this type of maintenance. However, it is envisaged that community groups assist local authorities with regular visits to council-land and advise local authorities if/when maintenance is required, or where some existing tracks may be rehabilitated etc. There are certainly some community groups who will wish to have a more active role in fire management of council-owned land. It is apparent that there will need to be some coordination and cooperation needed to achieve maximum output.

Support for the Rural Fire Service

There is no question that the Rural Fire Service, through its numerous Brigades performs the most vital and significant role in fire management in Queensland. The Rural Fire Service is largely a volunteer organisation which receives most of its funding from the State Government. Some LGA also administer a Rural Fire Levy (paid by property owners). Community donations and contributions and grants from local authorities are other sources of financial support.

State government funding to Rural Fire Brigades can fluctuate on a yearly basis. This highlights the need for local authorities to review and assess their support for the Brigade on a yearly basis. Without this type of additional, yet vital, support, many local brigades would not be able to function effectively. One possible option would be to link the level of support to the level of service required by the community. This has been identified by the Rural Fire Service's Brigade Classification System. This classification system classes each brigade according to the minimum amount of equipment required by the brigade to service the level of risk in their area. Maintaining an equipment level above the minimum is always recommended, though not always achieved, but this provides a basis to build upon.

During fire-suppression activities, LGA (whatever their own fire-fighting capabilities) should support brigades with either in-kind support (eg provision of tankers, supplies, other equipment etc.) or assist (where possible) with staff for fire-suppression activities. Many local authorities have differing responses to their own fire-fighting capacities.

Support for the Rural Fire Service and Brigades also assists with community awareness and education. Increasing awareness (and preparedness) among the residents provides a positive influence and reduces the reliance on the brigades. This is discussed in more detail in the previous section.

Implementing the Strategy

After the Gold Coast Bushfire Management Strategy (1998) was compared and adopted, Gold Coast City Council established an Bushfire Management and Coordination Group which meets regularly (once every 6 weeks) to discuss any issues associated with the implementation of the bushfire strategy. This is the crucial next step in the process of formulating and instigating a LGA-wide fire management strategy. This document also follows the recommendations of the Interdepartmental Committee on Bushfires (DHLGP 1994), where it stated, LGA needed to appoint Fire Management Officers dedicated to the implementation process. This is highly recommended for all LGA with a bushfire management strategy or in the process of completing one. It also keeps the people and organisations with an interest in fire management involved and committed to the process.

Who Should be Involved on this Committee?

Membership onto the committee should be limited to:

- Representatives of LGA (including the Fire Management Officer)
- Representatives of the local Urban and Rural Fire Brigade (Department of Emergency Services)
- Representative of Property/Development Industry
- Representative of Insurance Industry
- Representatives of other land management agencies adjoining the LGA (this could include: QPWS, DPI–Forestry, Department of Defence, and other LGAs).
- Representative of University or other research institution

All of these members have an active role in the implementation process of any LGA-wide fire management strategy, whether it affects fire-suppression operations, developmental pressures and impacts to commercial and biodiversity interests of state agencies etc. By forming this type of committee to oversee the implementation of the strategy will ensure ongoing coordination and cooperation with the LGA.

Community groups should also be invited to be involved in the implementation process. Proposed burn plans, fire management plans, and other material must be made available. There have been many instances where a breakdown in communication can lead to misunderstandings, especially in relation to fire management of conservation areas. Ensuring that the information is disseminated to community groups will be crucial to ensure acceptance by the community.

When should LGA Review the Fire Management Strategy?

For many LGA in the region, there exists no city or shire wide fire management strategy. Some are actively in the process of completing a fire management strategy (eg Caloundra Shire Council). Review of the fire management strategy will vary between LGA, but given the possible impacts of fire on the landscape, some review is required on an annual basis. It is not feasible to review the entire fire management strategy on an annual basis, however some aspects of the strategy will require constant review. In particular, these would include

elements involving development in potential bushfire hazard areas (or bushfire prone areas) and fire management plans for conservation areas (in light of most recent fire season).

The complete fire management strategy should be reviewed every 5–7 years.

In other states, such as Victoria and New South Wales where fire management plans exist; there is a commitment for review at a minimum period of 5 years. From a state government perspective, ecological fire regimes are only now been considered and implemented (Victoria's Department of Natural Resources and Environment uses a 5-year review period). This will be a useful timeframe to review the fire management strategy, particularly with the implementation of new legislation directly affecting LGA (such as IPA, RFA etc.).

Conclusions and Recommendations

This document has covered the essential elements required for the preparation of a city or shire-wide fire management strategy. Ensuring the proper management of land that is being acquired by many local authorities is a challenging and resource intensive initiative, which can be hampered with many difficulties.

Developing a fire-management strategy can be an exhausting responsibility but as emphasised by other materials produced by the Fire and Biodiversity Consortium, appropriate planning will make this process much easier. The key for a successful and useful management strategy is *coordination*. Coordination between agencies, coordination between landowners and coordination in the implementation of such as a strategy will ensure protection of life and property and also conservation of biodiversity.

The Strategy Fire Management Manual offers some guidance to planning and other regulations to ensure local councils meet their objectives for providing solutions to fire management on council-owned land. These have included:

- Determining the level of potential bushfire hazard within the LGA
- Aspects involved with the development in potential bushfire hazard areas
- Fire management practices required in LGA
 - Requirements needed in fire management plans
 - Ecological fire regimes
- Coordination between land management agencies involved in fire management
- Community and educational awareness of fire management
- Provision of fire-fighting infrastructure within the LGA

There is a strong emphasis on the need for coordination between the agencies involved in land management. Ensuring ongoing cooperation is tantamount to the successful implementation of any fire management strategy. This cooperation will permit the sharing of resources and reduce the impacts economically and environmentally. There are many requirements that this document has outlined that is required in the preparation of a fire management strategy for the LGA, but there is underestimating the value of such a strategy. An integrated and coordinated approach that this document assists in preparing will help save lives and property and ensure the protection of biodiversity and the environment. There has been extensive use of the Gold Coast Bushfire Management Strategy, and this should be considered a working example of what is required. The Fire and Biodiversity Consortium has a number of very useful materials which will also assist with the preparation of a fire management strategy. This type of strategy needs to be viewed in the longer term and as such will require determination and resolve from the LGA for this type of strategy to be useful and help to preserve biodiversity in the region. Ongoing commitment of time and resources will ensure all the objectives outlined in the fire management strategy are met.

Implementation of the measures in this strategy will be ongoing and will require review. It is anticipated that all fire management strategies be reviewed every 5 years, which will provide an opportunity to review the implementation of the strategy, and to update the strategy with new research.

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<http://www.dnr.qld.gov.au/resourcenet/land/landservices/stateland/statelandpubs.html>

Further Reading

- Australian Standard [AS3959–1999] ‘*Construction of buildings in bushfire-prone areas*’. Standards Australia. 33 pp. ISBN 0733730493
- Anon. 1997. *Bushfire Prone Areas: Siting and Design of Residential Buildings*. Queensland Department of Local Government and Planning and the Queensland Fire and Rescue Authority. 34 pp. ISBN 0724279385
- Anon. 1998. *Bushfire Hazard Planning in Queensland*. Queensland Fire and Rescue Authority. 24 pp. Reference – RF-105-HAZ-5/98
- Anon. 1999. *Protecting Your Home Against Bushfire Attack*. Queensland Department of Communication and Information, Local Government and Planning and the Queensland Fire and Rescue Authority. 14 pp. ISBN 0724275541

Consortium publications

The SEQ Fire and Biodiversity Consortium has produced a suite of materials to support land managers and those who work with them. Materials completed, or nearing completion as of February 2002 include:

A comprehensive literature review

Tran, C. and C. Wild. 2000. *A Review of Current Knowledge and Literature to Assist in Determining Ecologically Sustainable Fire Regimes for the Southeast Queensland Region*. 106pp.

A database of fire ecology literature

Tran, C. 2000. *CD-Rom of Fire Regime Literature*.

A database of SEQ fire research and monitoring projects

Tran, C. and P. Maidens. 2000. *Southeast Queensland Fire and Biodiversity Research Studies Database*.

Ecological guidelines, for professionals who want a moderately in-depth summary of the management implications of the fire ecology literature

Watson, P. 2001. *The Role and Use of Fire for Biodiversity Conservation in South-east Queensland: Fire Management Guidelines Derived from Ecological Research*. 49pp.

A list of potential research projects

List of potential fire ecology research projects and contacts. 16pp.

An introductory fact sheet for private landholders and the general public (Level-1 brochure)

Watson, P. 2001. *Fire and Nature Conservation in Southeast Queensland: an Introduction*. 4pp.

A more comprehensive fact sheet for landholders and community group members (Level-2 brochure)

Watson, P. and Tran, C. 2001. *Fire in Bushland Conservation*. 20 pp. ISBN 0958071403.

A fact sheet for Land for Wildlife landholders, produced in conjunction with Land for Wildlife

Moran, C. and Watson, P. 2000. *Fire as a Wildlife Habitat Management Tool*. Land for Wildlife Note No. 14. Land for Wildlife Program Southeast Queensland. 8pp.

A kit to assist landholders develop a fire management plan for their property

Individual Property Fire Management Planning Kit: Balancing Fire Safety with Conservation of Bushland Plants and Animals. 41pp.

A manual to assist local government and landowners plan and conduct hazard reduction/ecological burning for their property

Tran, C. 2002. *Best Practice Fire Management Manual – Operational Level: Guidelines and Procedures*. 100 pp.

A manual to assist local government plan and develop a fire management strategy for council-administered land [THIS DOCUMENT]

Tran, C. and Peacock, C. 2002. *Best Practice Fire Management Manual–Strategic Level: Guidelines and Procedures*. 35 pp.

A manual to assist local government officers with various methodologies that can be used to monitor and evaluate fire management of council-owned land.

Fire Monitoring Manual: Methods and Decision Matrices. 2002.

Copies of these materials can be obtained from the Southeast Queensland Regional Bushcare Facilitator, Queensland Parks and Wildlife Service, phone (07) 3202-0223.

GUIDELINES
for meeting
DEVELOPMENT REQUIREMENTS
in
POTENTIAL BUSHFIRE HAZARD AREAS



GOLD COAST CITY COUNCIL

AUGUST 1999

These guidelines are provided to assist development proponents to meet Council's development requirements where they propose to undertake development in potential bush fire hazard areas of the City.

They relate to development that is proposed on sites either wholly or partly within areas of the City identified as having high, medium and low potential bush fire hazard.

The material has been drawn from the Gold Coast City Bushfire Management Strategy, April 1998.

The guidelines are applicable until the review of the Planning Scheme is completed.

1.0 What are Potential Bush Fire Hazard Areas?

Potential Bushfire Hazard Areas (PBHAs) are those areas of the City that Council has identified as being subject to potential bushfire hazard on the basis of their vegetation type and topography.

Their location is indicated on the Gold Coast City Potential Bushfire Hazard Map that is held by Council. It should be noted that the Map has been prepared on a City-wide scale and as such is indicative. In all cases, a more detailed site-specific assessment should be undertaken to determine the actual level of potential bushfire hazard on a given site.

2.0 What does this mean for Development?

The Map indicates areas of High, Medium and Low potential bushfire hazard. Council's Bushfire Management Strategy defines the outcomes sought for development in each of these areas:

HIGH PBHAs: Wherever possible, development in these areas should be avoided or, if approved, subject to conditions which aim to mitigate potential bushfire hazard.

MEDIUM PBHAs: Development in these areas is likely to be subject to a number of requirements aimed at mitigating potential bushfire hazard and protecting the safety of residents.

LOW PBHAs: These areas do not warrant special planning controls. Rather the focus is on ensuring community awareness and providing advice to residents. The strategy seeks to ensure that appropriate protection is available through appropriate fire fighting infrastructure.

3.0 What are the Development Requirements?

In order to achieve these above, Council has defined a number of requirements that development proposals are required to meet. The following table summarises the requirements for high, medium and low potential bush fire hazard areas.

TABLE 1: Summary of Development Requirements in PBHAs

DEVELOPMENT REQUIREMENT	POTENTIAL BUSHFIRE HAZARD RATING		
	LOW	MEDIUM	HIGH
Appropriate land-use		*	✓
Submission of a Fire Management Plan		✓	✓
Appropriate subdivision design	*	✓	✓
Appropriate house site location		✓	✓
Provision of fire fighting infrastructure	✓	✓	✓
Input of Local Fire Brigade	✓	✓	✓
Appropriate building construction	*	✓	✓
Provision of adequate private water supplies	*	✓	✓
Appropriate clearing & landscaping	*	✓	✓
Improved community awareness	✓	✓	✓

Notes: * Advisory only.

- ✓ Indicates those areas where development requirements apply. In HIGH PBHAs more stringent requirements are likely to exist in respect of subdivision design, house site location, provision of fire fighting infrastructure, building construction, provision of private water supplies, and clearing/landscaping.

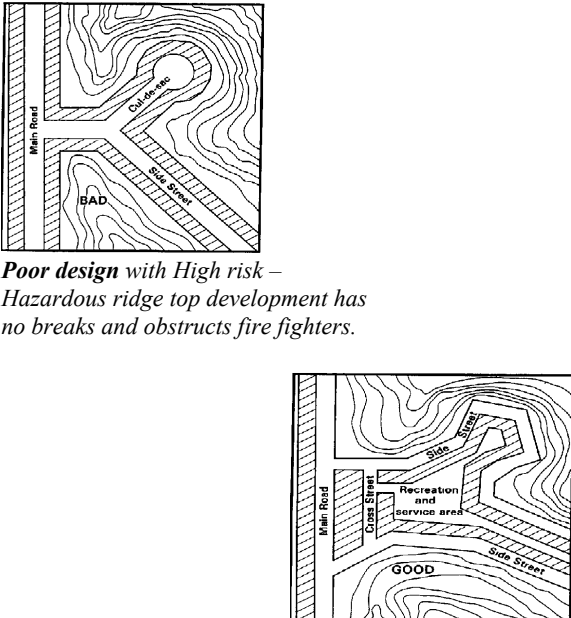
Council may vary the above development requirements following determination of potential bushfire hazard at the site level. The requirements apply whenever development is proposed on sites which are either wholly or partly within areas identified as having a potential bushfire hazard.

A checklist based on this table is also provided at the end of this document for your use

4.0 Detailed Development Requirements

The following table provides more detail on each of the requirements outlined above. It also provides acceptable solutions.

TABLE 2: Summary of Development Requirements in PBHAs

1	Development Requirement	2	Possible solutions
1	<i>Land Use</i>		
1.1	Land use types are to avoid placing a high concentration of people in PBHAs.	1.1.1	High density forms of development such as ecotourism lodges, hospitals, educational institutions, retirement villages, etc. should not be located within HIGH PBHAs.
2	<i>Street and Road Layout</i>		
2.1	The street and road layout of developments must designed so as to mitigate any potential bushfire hazard by ensuring adequate access and egress for fire fighting and other emergency vehicles and the evacuation of residents in the event of an emergency	2.1.1	<p>Street and road layout are to be kept simple:</p> <p>(a) In HIGH PBHA, cul-de-sacs are to be avoided unless they can be justified having regard to the specific circumstances of the site. Instead, all roads should be through roads (see Figure 1).</p> <p>Figure 1: Preferred Road Layout in High and Medium Potential Bushfire Hazard Areas (Source: Adapted from QDHLGP (1993) <i>Bushfire Hazard Planning in Queensland</i>)</p>  <p>Poor design with High risk – <i>Hazardous ridge top development has no breaks and obstructs fire fighters.</i></p> <p>Better design - Ring road system provides a fire break and access for fire fighters while reducing the need for further vegetation clearing to reduce bushfire hazard.</p> <p>(b) In MEDIUM PBHAs cul-de-sacs may only be used where it can be demonstrated that alternative access can be provided during an emergency event (eg: an unconstructed but formed road reserve linking the cul-de-sac to other through roads).</p>

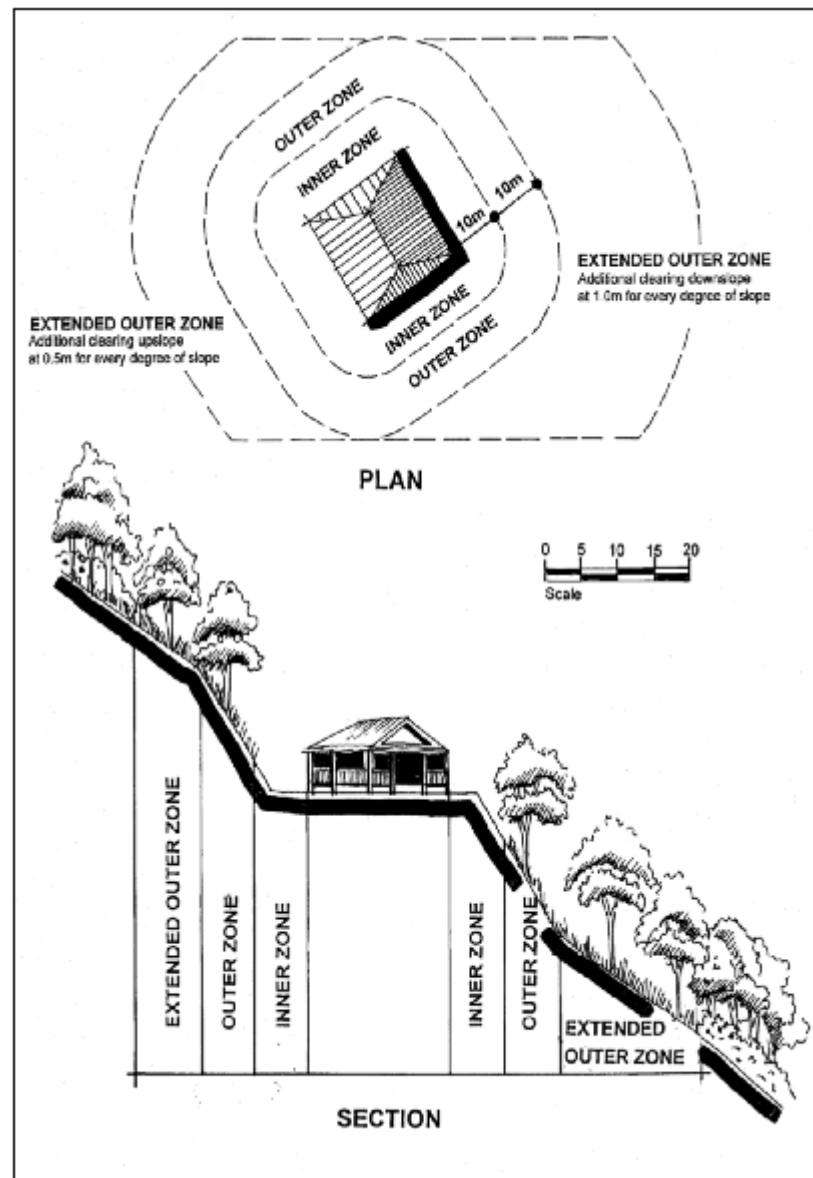
	<p>(c) In LOW PBHAs, cul-de-sacs could be used subject to appropriate consideration of access and safety issues.</p> <p>2.1.2 Perimeter roads should be included where the proposed development lies adjacent to any HIGH PBHAs to provide a low maintenance fire trail/break and reduce the need for further vegetation clearing (also see fire fighting infrastructure requirements below).</p>
3 <i>Allotment Layout</i>	
3.1 Allotment Layout of developments must designed so as to mitigate any potential bushfire hazard by ensuring that allotments are located so as to reduce fire risk	<p>3.1.1 Allotments should be located so as to avoid HIGH PBHAs wherever possible. Where this is not possible, allotments should not be contained wholly within HIGH PBHAs to provide safer sites for houses.</p> <p>3.1.2 Where possible, development should be clustered and located in those areas which have a lower potential bushfire hazard (eg: on lower slopes which are south or east facing).</p>
4 <i>Location of House Sites</i>	
4.1 Location of house sites must designed so as to mitigate any potential bushfire hazard by ensuring that houses are located so as to reduce fire risk	<p>4.1.1 Where development is proposed in HIGH and MEDIUM PBHAs, the location of house sites will be clearly identified on the proposed Plan of Development (POD)</p> <p>4.1.2 Buildings are to be located in existing cleared areas, wherever possible, to avoid the need for further vegetation clearing to reduce bushfire hazard. Houses will be located so as to reduce fire risk in accordance with the guidelines provided in "Bushfire Prone Areas - Siting and Design of Residential Buildings". Where possible, they should be located on the lower south and east facing slopes of hills away from the most likely direction of a fire front or on a flat site at the base of the slope and at appropriate distances from bushland. Steep north or south facing slopes should be avoided (see Figure 2)</p> <p>Figure 2: Preferred House Site Location in High and Medium Potential Bushfire Hazard Areas (Source: Adapted from QDHLGP (1993) <i>Bushfire Hazard Planning in Queensland</i>)</p> <p>HOUSE SITES NUMBERED IN ORDER OF DEGREE OF FIRE SAFETY</p>

5	<i>Built Form and Safe Design</i>	
5.1	The building style and construction methods used for development in PBHAs must be responsive to the constraints imposed by such hazards.	5.1.1 Proposed buildings which are to be located in PBHAs are to be designed and constructed consistent with the objectives and intent of the Gold Coast City Council Bushfire Management Strategy.
5.2	Buildings in HIGH and MEDIUM PBHAs should be designed and constructed to reduce fire risk.	5.1.2 Further guidance on designing and constructing houses in PBHAs can be gained from the publications listed in Section 9.0 below.
6	<i>Bushfire Management Infrastructure</i>	
6.1	Fire fighting infrastructure must be provided where development is proposed in HIGH and MEDIUM PBHAs to mitigate fire risk and assist Rural Fire Brigades. Such infrastructure should include: (a) sufficient water (consisting of a combination of public and private supplies) for fire fighting purposes; and (b) fire trails/breaks to provide access for fire fighters and equipment to areas of bushland where no alternative access exists	<p><i>Water Supply</i></p> <p>6.1.1 Where alternative public water supplies (eg: fire hydrants, public water storages, permanent waterways, etc) do not exist, water tanks will be provided on public land within the development. These tanks are to be readily accessible to Rural Fire Brigades and meet the following specifications:</p> <p>(a) volume of at least 22,500 litres;</p> <p>(b) pre-cast concrete construction; and</p> <p>(c) fitted with a 50 mm male camlock.</p> <p>6.1.2 In areas of the City where there is a reticulated water supply scheme, water is to be supplied to individual properties at the pressures specified in the Gold Coast City Land Development Guidelines.</p> <p>6.1.3 In areas without reticulated water supply and which have a HIGH and MEDIUM PBHA, individual property owners should provide sufficient water to protect their property from fire. This should be determined at building works approval stage and may be provided as:</p> <p>(a) a separate tank fitted with standard Rural Fire Brigade fittings; or</p> <p>(b) a reserve section in the bottom part of the main water supply tank fitted with standard Rural Fire Brigade fittings; or</p> <p>(c) a swimming pool, provided it is installed immediately upon construction of the home;</p> <p>where the volume of water for fire fighting purposes is at least 5,000 litres and the supply can be readily accessed at all times by fire fighting vehicles.</p> <p>Any separate domestic water supply tanks are to be fitted with standard Rural Fire Brigades fittings to provide an additional emergency water supply.</p> <p><i>Fire Trails/Breaks</i></p>

	<p>6.2 In PBHAs, fire trails/breaks will be provided at appropriate locations in accordance with the guidelines provided below</p> <p>(a) Wherever possible, development designs will incorporate perimeter roads constructed between the boundary of the allotments and the adjacent bushland. The road reserve will have a minimum cleared width of 20 metres and contain a constructed road width of 6 metres constructed to at least an all-weather standard.</p> <p>(b) Where rough terrain and high ecological values prevent the incorporation of perimeter roads in development design, a fire trail/break is to be located as close as possible to those boundaries of building blocks which adjoin bushland or otherwise as topography allows</p> <ul style="list-style-type: none"> • All fire trails/breaks should be located, constructed and maintained with due regard for landscape and ecological values and, as far as practicable, so as not result in soil disturbance and erosion. • Wherever possible, fire trails/breaks are to be located on public land to facilitate access for Rural Fire Brigades. Where it is not possible to locate fire trails/breaks on public land for reasons such as steep topography or disturbance of ecological communities, they should be constructed on private land and an access easement granted in favour of Council and Rural Fire Brigades. • To minimise the cost of maintenance, fire trails/breaks are to be properly constructed and consideration given to multiple uses (eg: pedestrian and cycling access) where they are to be located on public land. • The fire trails/breaks will have a minimum cleared width of 6 metres, a minimum formed width of 4 metres, and a maximum gradient of 16% (1 in 6) with adequate drainage so as not to result in soil erosion; • The fire trails/breaks will have vehicular access at each end and link to either the City's existing fire trails/breaks or roads to provide for the safe access of fire fighters or evacuation of residents. If such connectivity is not possible, places for fire fighting vehicles to turn around are to be provided by constructing a turning circle, or, in areas limited by physical constraints, "T" or "Y" shaped turning bay; • The fire trails/breaks will provide areas for vehicles to pass or turn at intervals of not more than 400 metres and with a maximum grade of 5% (1 in 20). <p>(c) Where rough terrain and or significant ecological values prevent the construction of such a fire trail/break, provision should be made for at least a narrow track which may only be suitable for four-wheel drive or pedestrian access from which backburning can be undertaken.</p>
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		(d) Where properties abut Public Land not administered by Council (eg: State Forests, National Parks, and Canungra Land Warfare Centre), the developer should liaise with the relevant land manager to determine their requirements in relation to the construction of fire trail/breaks or buffers.
7	<i>Vegetation Clearing and Landscaping</i>	
7.1	Where required, clearing and landscaping should be undertaken to mitigate fire risk and in a manner which minimises ecological impact.	<p>7.1.1 Where a Fire Management Plan is required to be prepared, clearing and landscaping are to be undertaken in accordance with the recommendations made in that plan.</p> <p>7.1.2 Where a Fire Management Plan is not required, clearing may only be undertaken in accordance with the provisions of Council's Local Law No. 6 (Vegetation Management) to reduce the threat to life and property from fires. The area of maximum permitted clearing for this purpose under the Local Law is:</p> <ul style="list-style-type: none"> (a) removal of protected vegetation within 10m of a dwelling house (Inner Zone); and (b) selective removal of protected vegetation in order to thin the canopy or remove understorey vegetation (including any branches less than 2 m above ground level) for a further 10 metres (Outer Zone); and (c) where the dwelling house is situated on a sloping site, a further increase in the Outer Zone to a maximum of 1 metre for every degree of slope, downslope of the dwelling house and to a maximum of half a metre for every degree of slope, upslope of the dwelling house (see Figure 3). <p>7.1.3 The Local Law prescribes the maximum amount of clearing permitted for fire protection without a formal application. A property owner may decide to undertake less clearing having regard to issues such as soil erosion and the use of alternative measures such as landscaping with fire retardant species.</p>

Figure 3: Area of Maximum Permitted Clearing for Bushfire Hazard Mitigation under Council's Local Law No. 6 (Vegetation Management)



8.0	<i>Conservation Values</i>	
8.1	Avoid any negative impact on environmental values such as high nature conservation values, high scenic amenity, steep slopes, unstable soils, etc.	<p data-bbox="769 1742 1455 1933">8.1.1 Each of the bushfire mitigation measures proposed as part of the development should be assessed for its potential impact on environmental values (eg: nature conservation values, scenic amenity, slope stability, etc.) and the development design amended as required.</p> <p data-bbox="769 1955 1455 2076">8.1.2 Where development is proposed in or adjacent to natural bushland areas, the proposed land use should not result in higher fire frequencies in fire sensitive communities and small reserves.</p>

	<p>8.1.3 Development in less populated areas of the City are to incorporate appropriate risk reduction measures to provide protection from unplanned fires and avoid the need for regular prescribed burns.</p> <p>8.1.4 Fire management issues are to be considered during the designation of open space and park areas.</p> <p>8.1.5 Ongoing maintenance requirements for fire management should be clearly stated in any Fire Management Plan.</p> <p>8.1.6 Where development is proposed on land adjacent to Council reserves, National Parks, State Forests or other reserves managed for conservation, consultation should occur with the relevant land manager regarding fire management as it effects conservation values on that reserve.</p>
9.0	<i>Advice to New Residents</i>
9.1	<p>New residents should be informed about the potential bushfire hazards present on their site, their responsibility for fire management and the measures available for ongoing fire hazard mitigation.</p> <p>9.1.1 Measures for the education of buyers and advice on any ongoing maintenance or management programs should be addressed in the Fire Management Plan.</p> <p>9.1.2 A copy of the Bush Fire Management Plan should be provided to each residence for the information of occupants.</p>

5.0 Do you need to prepare a Bush Fire Management Plan?

If a site-based assessment (see 6.0 (b) below) confirms that your proposed site is located wholly or partly within a HIGH and/or MEDIUM PBHAs, you are required to submit a Bush Fire Management Plan.

If a site-based assessment confirms that your proposed site is located wholly or partly with a LOW PBHA, you should indicate in your application how you have addressed each of the relevant issues (see Table 1).

6.0 What should be included in a Bush Fire Management Plan?

The plan should:

- (a) be prepared by a suitably qualified consultant in consultation with relevant stakeholders (eg: Rural and/or Urban Fire Brigades, land managers of adjacent reserves, etc.);
- (b) identify the location and severity of potential bushfire hazard using **site-based assessment**. This assessment should be based on detailed data collected at the local level and take into account factors such as vegetation type, slope, aspect, and fire history (if available). This assessment should also address on and off site hazard implications of the development;
- (c) address the issues outlined in Table 2 of Section 4.0 above;

- (d) recommend remedial measures such as specific features of the development design (eg: land-use type and road and allotment layout), proposed water storage and fire trails / breaks, recommended the standard of building construction, clearing and landscaping, education of buyers and advice on any necessary ongoing maintenance programs; and
- (e) clearly state any ecological impact of the chosen mitigation measures and the measures taken to avoid / minimise this impact.

7.0 What Level of Detail is Required?

The above points outline the minimum requirements for the preparation of a Bush Fire Management Plan. However, it is recognised that some issues may not be applicable to some sites and that the detail with which issues are to be addressed may vary between sites in response to site specific characteristics.

If your application must be followed by another application before any works can be commenced on the site (eg: a Material Change of Use followed by a Reconfiguration of a Lot Application), Council may allow the detailed design responses to be dealt with at that later application stage.

However, Council will still require the submission of a Bush Fire Management Plan at the initial stage (ie: as part of the Material Change of Use Application). In this instance, the Plan should:

- meet the requirements of sections 6.0 (a) and 6.0 (b) above; and
- state the **proposed responses** to each of the issues listed in Table 2 of Section 4.0.

The applicant would then be required to submit a more detailed Bush Fire Management Plan addressing each of the identified issues in detail and in accordance with Section 6.0 above when preparing the later application.

8.0 Who Should Be Consulted During the Preparation of the Plan?

- 3.1 Local Fire Brigades must be consulted during the preparation of any Bush Fire Management Plan that is to be included as part of the development application. Evidence of such consultation may be required in support of a development application
- 3.2 Where development is proposed on land adjacent to Council reserves, National Parks, State Forests or other reserves managed for conservation, consultation should occur with the relevant land manager regarding bushfire management as it effects conservation values on that reserve

9.0 Need Further Information?

For further information about assessing the level of potential bushfire hazard, refer to

- Gold Coast City Bushfire Management Strategy (Gold Coast City Council, April 1998)
- Bushfire Hazard Planning in Queensland (Qld. Dept. of Housing Local Govt. & Planning, 1993).

For further guidance on siting and design of residential buildings in Bushfire Prone Areas, refer to the publications:

- Bushfire Prone Areas – Siting and Design of Residential Buildings (Qld. Dept. of Housing Local Government & Planning, 1995) and
- Building in Bushfire Prone Areas – Information and Advice (Standards Australia & CSIRO, 1993).

If you have any further questions or require clarification, contact Gold Coast Council's Bush Fire Management Officer:

Mr Peter Berg
CARRARA DEPOT
Eastlake St
CARRARA QLD 4211

Gold Coast City Council
PO Box 5042
Gold Coast Mail Centre

Ph: (07) 5582 8569
Mobile: 0414 180371
Email: pberg@goldcoast.qld.gov.au

BUSH FIRE MANAGEMENT ISSUES CHECKLIST

The following table is provided to ensure that you have met all of the development requirements that are relevant to the level of potential bush fire hazard on your proposed development site.

DEVELOPMENT REQUIREMENT	POTENTIAL BUSHFIRE HAZARD RATING					
	LOW		MEDIUM		HIGH	
	Reqd	Addressed	Reqd	Addressed	Reqd	Addressed
Appropriate land-use			*		✓	
Submission of a Fire Management Plan			✓		✓	
Appropriate subdivision design	*		✓		✓	
Appropriate house site location			✓		✓	
Provision of fire fighting infrastructure	✓		✓		✓	
Input of Local Fire Brigade	✓		✓		✓	
Appropriate building construction	*		✓		✓	
Provision of adequate private water supplies	*		✓		✓	
Appropriate clearing & landscaping	*		✓		✓	
Improved community / resident awareness & education	✓		✓		✓	

BUSH FIRE MANAGEMENT ISSUES CHECKLIST

The following table is provided to ensure that you have met all of the development requirements that are relevant to the level of potential bush fire hazard on your proposed development site.

DEVELOPMENT REQUIREMENT	POTENTIAL BUSHFIRE HAZARD RATING					
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Appropriate subdivision design	*		✓		✓	
Appropriate house site location			✓		✓	
Provision of fire fighting infrastructure	✓		✓		✓	
Input of Local Fire Brigade	✓		✓		✓	
Appropriate building construction	*		✓		✓	
Provision of adequate private water supplies	*		✓		✓	
Appropriate clearing & landscaping	*		✓		✓	
Improved community awareness	✓		✓		✓	