

Clarence City Council

Bushfire Management Strategy

for Council Owned and Controlled Land

Revised

January 2017

Clarence City Council

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1. Clarence City Council Bushfire Management Policy

Clarence City Council Bushfire Management Policy (Adopted 2004)

In order to fulfil its responsibilities as a landowner, and in recognition of its community role in land management Clarence City Council will:

- Implement current recommended practices for bushfire risk management on all land under its control.
- Encourage all owners of private and public bushland areas within Clarence to implement current recommended practices for bushfire risk management.
- Meet all its statutory obligations for bushfire management.
- Educate the Clarence community regarding the risks from bushfires in collaboration with the Tasmania Fire Service (TFS).
- Consult with community and other stakeholders when planning bushfire management activities on Council managed land.
- Use planned burning as a management tool in areas to reduce bushfire risk, and maintain and enhance biodiversity.

2. Introduction

This Bushfire Management Strategy (BMS) has been prepared by Clarence City Council's Fire and Bushland Vegetation Management Team. It is the third revision and expansion of Clarence City Council's existing BMS which commenced in 1997.

This review builds on previous methodologies and principles as still valid, and is heavily influenced by a multi-agency approach, targeting areas for maximum risk reduction, utilising Geographic Information Systems (GIS) and increasing Council's Fire and Bushland Management Team's operational outputs.

Council's BMS has been developed to assist in delivering a holistic management approach to mitigating impacts from a low probability but high impact event to the municipality - bushfire. Not being able to predict such high impact events creates the need for resilience thinking.

The aim of this revision is to ensure that Council's bushfire management practices are based on current recommended practices for protecting life and assets from bushfires, and to maintain and enhance biodiversity within land managed by Council.

Council's BMS addresses bushfire management challenges that have arisen from the expansion of residential developments within bushland areas, community concerns at the potential threat of bushfire, on ground works and associated operational restraints, wider awareness of the ecological role of fire, and the statutory responsibilities of Local Governments in bushfire hazard management.

As of December 2015, approximately 78% of the Clarence municipality has been classified as bushfire-prone (see figure 3) under the *Clarence Interim Planning Scheme 2015*. Any future developments within mapped areas may require a Bushfire Risk Assessment and a Bushfire Hazard Management Plan.

Figure 2 – Fire and Bushland Management objectives

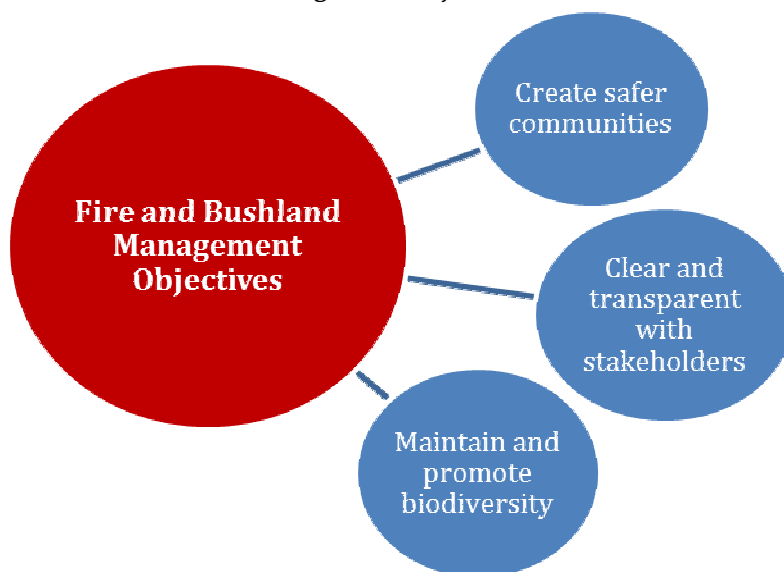
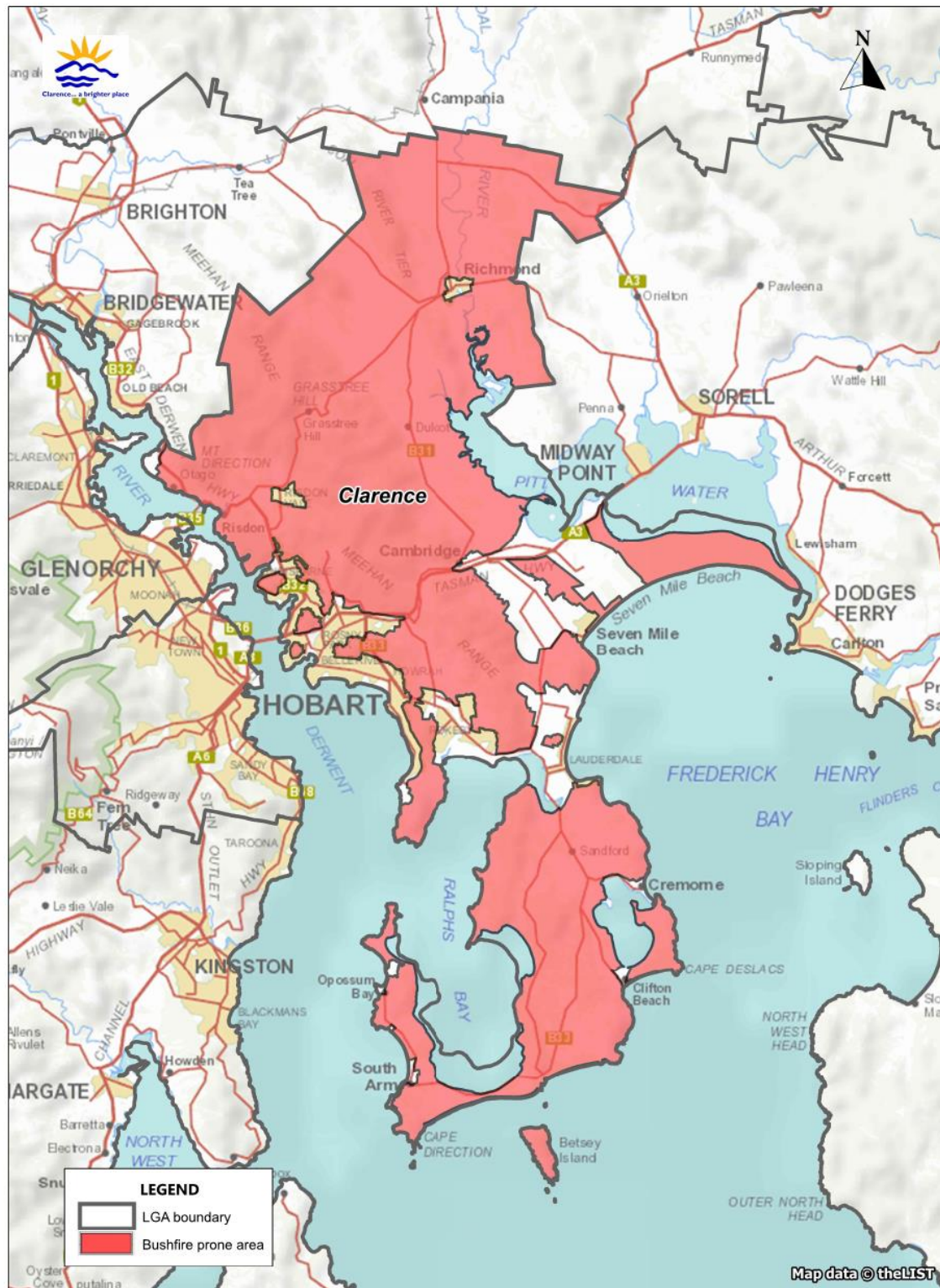


Figure 3 – Municipal areas classified as bushfire-prone under the *Clarence Interim Planning Scheme 2015*

City of Clarence Bushfire Prone Areas Under CIPS 2015



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3. Recommendations

The review makes 10 recommendations as follows:

Recommendation 1

The permanent creation of a Technical Fire and Bushland Management Team position to provide specialised operational and technical advice to internal and external stakeholders.

Recommendation 2

- Advancement of Fire and Bushland Management Team's certified Tree Fallers from intermediate to advanced qualification.
- Develop advanced land management, and fire and ecology qualifications within Fire and Bushland Management Team.

Recommendation 3

- Replacement of 2wd Fire and Bushland Management Team's vehicle to 2 door 4wd Toyota Land Cruiser ute or similar.
- Future Fire and Bushland Management Team's vehicles to be replaced with 4wd Toyota Land Cruiser utes or similar.
- Permanent allocation of mud-terrain tyres on all Fire and Bushland Management Team's vehicles.
- Further investigation into procurement of dedicated 4wd Fire and Bushland Management Team water cart for planned burning with minimum 3000l water capacity.

Recommendation 4

Specialist plant and machinery operators are included in the Plant and Equipment section of the Multi Use Registrar to suit operational and legislative requirements.

Recommendation 5

Annual meetings held between Council's Fire and Bushland Management Team, Landcare and Coastcare groups to discuss relevant annual planned works.

Recommendation 6

During future developments of Bushfire Management Plans (BMPs) and Reserve Activity Plans (RAPs), Council's Fire and Bushland Management Team, Natural Resource Management and consultants are to be involved at consultation stage to alleviate conflicting recommendations.

Recommendation 7

Council's Fire and Bushland Management Team develop and implement a community awareness and education program structured on the 2016-2021 BMS.

Recommendation 8

- Council's Fire and Bushland Management Vegetation Monitoring Program (VMP) be further incorporated into Council's Fire Management GIS context.
- Expansion of the VMP to include threatened species.
- Future Development of VMP to be in consultation with the Threatened Species Section of Department of Primary Industries, Parks, Water and Environment (DPIPWE), and in accordance with any conditions attached to a permit to take threatened species.

Note: For successful implementation of recommendation 8, recommendation 1 is to be implemented prior.

Recommendation 9

Implement recommendation 1 to allow for accurate internal and external annual dataset sharing, and database management for Council's Fire and Bushland Management Team operations.

Recommendation 10

- Council with guidance from TFS to investigate a formalised additional vehicle escape route for residents living at Mt Rumney.
- Future subdivisions within and adjacent to Mt Rumney to consider allowing a vehicle escape route for residents living at Mt Rumney.
- Future BMS reviews undertaken internally by Council's Fire and Bushland Management Team.

4. Structure of the Bushfire Management Strategy

This third revision maintains the previous structure; an introductory strategy document, a set of best management practices guidelines (Appendix A), BMP's for individual reserves including a summary of community concerns and comments (Appendix B), a five year on-ground works schedule to assist with planning and budgeting (Appendix C), and a summary of comments document (Appendix D).

The BMS identifies all of Clarence City Council's statutory bushfire management responsibilities, sets overall objectives and confirms a policy framework, and outlines the practices, procedures and actions required to meet them. It also includes general information on bushfire management, details of the bushfire risk assessment process used in the reserve BMPs, including assumptions, methods and data sources, and a glossary of key terms.

The 'adaptive management' approach recommended in this strategy will help overcome the lack of information on the long-term responses of the vegetation to fire. During 2012 Council's Fire and Bushland Management Team established and annually re-assess a VMP specific to the treatments recommended under the BMS. This program will assist to provide long term data sets to support treatments or modify post evaluation (see section 6.1 and 8.11).

Appended to this strategy are the following:

A) Best Management Practice Guidelines

These provide guidelines and procedures for the following bushfire management activities:

- fire trail construction
- fire trail inspection and maintenance
- trail closure and rehabilitation (for trails no longer required for bushfire management)
- foot track construction, inspection and maintenance (where used for bushfire management)
- creating a defensible space from bushfires
- maintaining defensible spaces
- planned burning
- weed control before and after burning
- coordinating bushfire management activities with other management activities
- recording fires
- recording bushfire management activities
- post fire recovery.

B) Reserve Bushfire Management Plans (BMPs)

This appendix contains revised BMPs for the following Clarence City Council reserves:

- Bedlam Walls Reserve
- Canopus-Centauri Bushland Reserve
- Glebe Hill Reserve (incorporating additional 3.4 hectares formerly 50 Minno Street, Howrah)
- Rokeby Hills Reserve (formerly Kuynah Bushland Reserve, incorporating Toorittya Bushland Reserve, and an additional 32 hectares of Public Open Space throughout Rokeby Hills)
- Lauderdale Wetlands Reserve
- Mortimer Bay Coastal Reserve
- Natone Hill Bush Park
- Pilchers Hill Reserve
- Roches Beach Coastal Reserve and Nowra Bushland Reserve
- Rosny Foreshore Reserve
- Rosny Hill Reserve
- Roscommon Reserve
- Seven Mile Beach Coastal Reserve
- Waverley Flora Park

New plans for the following reserve:

- Wiena Reserve

The four following reserves have had BMPs removed as they are either not bushfire-prone, managed vegetation, or the land is no longer managed by Council:

- Bellerive/Howrah Foreshore
- 45 and 45A Goodwins Road
- Gordons Hill Reserve
- Lauderdale Dunes

These plans recommend treatments for the use of fire as a management tool in each reserve for the next five years to:

- target area for maximum risk reduction
- reduce bushfire hazard to protect assets from bushfires
- maintain the long-term viability of the ecosystems in each reserve
- assist in the removal of weeds and the regeneration of degraded bushland.

The long-term effects of fire on the habitats of native flora and fauna in Australia are still imperfectly understood. However, available information on the fire ecology of plant communities, and indigenous flora and fauna species within Clarence City Council reserves has been incorporated into the BMPs. Where the required information has not been available, recommendations in the plans are based on a precautionary approach.

It must be noted that it will not be possible to prevent bushfires impacting land managed by Clarence City Council. On days of low-moderate Fire Danger Rating (FDR) suppression of small fires is possible, however on days of very high or above FDR fires will be unpredictable, uncontrollable and fast-moving, with potential to burn substantial areas of the reserves causing damage to assets, environmental values, and even loss of life. These fires may also impact adjoining land, further threatening life and assets. FDR ratings above severe occur in Tasmania around three times a year. Ratings above extreme have occurred only half a dozen times in Tasmania during the last 90 years. However, with the impact of climate change, the potential for such days is increasing (TFS, 2016).

The Australian Standard for Construction of buildings in bushfire-prone areas (AS:3959 - 2009) uses a FDR of 50 to determine the Bushfire Attack Level (BAL) for buildings that need to comply with the standard. An FDR of 50 is the boundary between Very High and Severe Fire Danger Rating.

The BMPs aim to mitigate impacts from bushfire by reducing and managing fuel loads and associated risks influencing ignitions and spread of fire within Council reserves, and in turn reduce the risk of loss of life, property or assets in and around the reserves.

Properties and assets adjacent to reserves will need to be maintained by owners as defensible spaces (section 8.3.1) as outlined in the TFS document *Bushfire Survival Plan 2015-16* or its most current successor.

C) 5 Year On-Ground Works Schedule

This appendix lists the on-ground works recommended in each reserve BMP during 2016-2021, along with the scheduling of the works and the approximate length or area covered. It is designed to assist implementation and budgeting of on-ground bushfire management activities.

D) Summary of Comments

This appendix summarises submissions on the draft revised Bushfire Management Strategy and reserve BMPs by the community and other stakeholders.

5. Review of the Previous Strategy

As part of this revision a review of the implementation of the previous strategy was undertaken; particularly the reserve BMPs.

The reviewed 2016-2021 BMPs have been derived from an operational approach, planning for future developments and sub-divisions, not just a “tick box” exercise. This approach has the key objective of creating a holistic end process.

The detailed results of the review are included in the revised BMPs, and are summarised below.

Establishment of full time Fire and Bushland Vegetation Management Team:

During 2012 Council established a permanent full time Fire and Bushland Vegetation Management Team. The team consists of a Co-ordinator, Works Officer and three Fire and Bushland Workers. This has allowed Council to meet requirements under the *Fire Service Act 1979* whilst: allowing continuity of treatments and programs, retainment of specialised municipal knowledge and experience previously lost through seasonal crew positions. For example annual maintenance programs of defensible spaces.

Table 1 – Annual operational deliverables by Council’s Fire and Bushland Management Team

Bushland managed	Approximately 1400 hectares
Defendable spaces maintained	Approximately 60 hectares
Area broadscale burnt though planned burning	Approximately 20 hectares
Area thinned and heap burnt	Approximately 15 hectares
Fire trail network managed	Approximately 300 kilometres

Crew:

Crew operational experience is at a high standard. The fulltime status has allowed continuity of annual work programs. Crew has sound knowledge of bushland reserves and annual maintenance programs. The current structure of Council’s Fire and Bushland Management Team could be strengthened by the permanent creation of a Technical Fire and Bushland Management position, reporting to the Fire and Bushland Vegetation Management Coordinator. The operational outputs would be maintained by a Fire and Bushland Vegetation Management Works Officer with two Fire and Bushland Vegetation Management Workers (this is the current temporary Fire and Bushland Management Team structure at time of review) i.e. The number of positions in the establishment would remain the same.

Recommendation 1

The permanent creation of a Technical Fire and Bushland Management Team position to provide specialised operational and technical advice to internal and external stakeholders.

Training:

Crew skills are at a good standard to meet operational requirements at time of review. Succession planning is in place and will continue thorough out duration of revised strategy. Advancement of certified Tree Fallers from intermediate to advanced qualifications is recommended, in addition developing advanced land management, and fire and ecology qualifications within work group. Challenges are ongoing in resourcing specialised fire management training.

Recommendation 2

- Advancement of Fire and Bushland Management Team's certified Tree Fallers from intermediate to advanced qualification.
- Develop advanced land management, and fire and ecology qualifications within Council's Fire and Bushland Management Team.

Fire and Bushland Management Vehicles:

- 1) At time of review Fire and Bushland Management Team are allocated three vehicles:

- 2 door 4wd firefighting vehicle (Co-ordinator)
- 2 door 2wd vehicle (Works Officer)
- 4 door 4wd firefighting vehicle (Fire Crew)

Until 2015 Fire and Bushland Management Team was allocated only two vehicles (co-ordinator and crew vehicle), this created gross vehicle mass (GVM) weight restrictions for the crew vehicle. On a daily basis the crew vehicle would have four members, associated personal protective equipment, equipment and a permanent 500kg fire fighting tanker. The one crew vehicle allocation also reduced operational outputs through not being able to be split and complete multiple tasks at a given time.

The third vehicle (Works Officer) was allocated in 2015 and now enables Fire and Bushland Management to maximise operational outputs. The weight restriction also has been alleviated through splitting the crew and equipment between the Crew and Works Officer vehicles.

- 2) Majority of operational work is in bushland reserves which post rain and during winter become slippery. Recommend permanent allocation of mud terrain tyres to all Fire and Bushland Management Team vehicles.

Recommend 2wd vehicle be replaced with 4wd vehicle.

- 3) Low range gear ratio on current 4wd vehicles is not appropriate for operational use, being too high geared. When working in steep bushland areas with a 500kg fire fighting unit a lower gear ratio (similar to that in Toyota Land Cruisers) is more suited for controlling vehicles traction down fire trails.

Recommend future Fire and Bushland Management Team vehicle replacements are 4wd Toyota Land Cruiser utes or similar as low range gear ratios more suitable for operational requirements.

The resource sharing of Council's Civil Construction water cart truck for planned burning poses operational restraints. Currently Fire and Bushland Management Team provide very limited notice for requirement of water cart to Civil Construction.

This is due to associated planned burning weather restraints. This creates flow on disruptions to Civil Constructions planned work programs.

Recommend when possible, Fire and Bushland Management Team notify Civil Construction of intent to burn dependant on weather.

Recommend further investigation into procurement of dedicated 4wd Fire and Bushland Management Team water cart for planned burning with minimum 3000l water capacity.

Recommendation 3

- Replacement of 2wd Fire and Bushland Management Team's vehicle to 2 door 4wd Toyota Land Cruiser ute or similar.
- Future Fire and Bushland Management Team's vehicles to be replaced with 4wd Toyota Land Cruiser utes or similar.
- Permanent allocation of mud-terrain tyres on all Fire and Bushland Management Team's vehicles.
- Further investigation into procurement of dedicated 4wd Fire and Bushland Management Team water cart for planned burning with minimum 3000l water capacity.

Contracted Plant and Machinery

With the constant expansion of bushfire-prone areas managed by Council's Fire and Bushland Management Team (see table 1), operational restraints arose with maintaining defensible spaces during fire permit periods, and meeting legislative requirements. A posi track Bobcat with front deck slasher and excavator with drum mulcher is now contracted annually during the fire permit period as required to complete the annual slashing program on time.

Council's operational Fire and Bushland Management Team also runs an annual brushcutting program for defensible spaces.

Recommendation 4

Specialist plant and machinery operators are included in the Plant and Equipment section of the Multi Use Registrar to suit operational and legislative requirements.

Defendable Spaces:

At time of review Fire and Bushland Management Team annually manage approximately 60 hectares of defensible spaces to current TFS guidelines. Ongoing annual maintenance is required and occurring. Operational restraints towards maintenance and establishment of defensible spaces are evident, works programs are based on a relative risk ranking.

The BMS review has identified areas requiring re-establishment of defensible spaces; these have been outlined in Appendix C.

Revegetation planting occurred in some defensible spaces by Landcare Groups and adjacent land owners. This, in most circumstances, makes the defensible spaces non-compliant with guidelines and maintenance more costly. Annual meetings and information sessions with stakeholders in targeted areas should alleviate reoccurrences.

Recommendation 5

Annual meetings held between Council's Fire and Bushland Management Team, Landcare and Coastcare groups to discuss relevant annual planned works.

Fire Trails:

All fire trails included in BMPs have had regular inspections with maintenance implemented as specified on an operational needs basis. Signposting of all fire trails was recommended during the previous BMS, this has since been re-evaluated and only those fire trails identified as strategic under the Hobart Fire Protection Plan (noted in BMPs) will be signposted. This will allow for less confusion when navigating larger bushland reserves, as strategic fire trails are the main access routes.

During 2015 and 2016 an extensive upgrade and establishment program was implemented.

At time of review the fire trail network within the strategy is of high standard. The amended Glebe Hill Reserve and Rokeby Hills Reserve polygons (since 2016 Council acquirement of additional land) will need upgrade/maintenance to meet most current operational requirements to manage defensible spaces, manage weed populations and allow access for the TFS. Council's Fire and Bushland Management Team is seeking written approval as specified in respective Conservation Covenants at time of strategy review.

Prior to the establishment of Council's Fire Management GIS context (developed during 2013), very limited data was available to identify formalised fire trail networks on Council land.

The most current fire trail data has been included during the review and will be shared, in addition with reviewed BMPs, with all Council staff to clearly delineate fire trail networks within BMPs.

Bushfires:

Since the last strategy revision in 2011 there has been no large destructive bushfires to impact any reserves covered by BMPs. During March 2013, approximately 500 hectares of dry sclerophyll forest burnt throughout the Meehan Ranges originating from Downhams Road, Risdon Vale. The fire did not directly impact Pilchers Hill Reserve; however reestablishment and establishment of containment lines did occur in sections of Vegetation Management Unit (VMU) 7.

Natone Hill Bush Park, Waverley Flora Park, Nowra Bushland Reserve, Seven Mile Beach Coastal Reserve all experienced bushfires less than 1 hectare during the last review. There have been no reports of damage to assets in, or adjoining reserves included in the BMS due to bushfires.

Planned Burning:

53 planned broadscale burns were conducted during the previous BMS by Council's Fire and Bushland Management Team covering approximately 136 hectares (see Table 3 and 4). No planned burns escaped, nor were any assets damaged by the planned burns. In addition approximately 40 hectares annually of bushland underwent planned burning utilising the heap burning regime (thinning vegetation and burning in bonfires). All historical planned burns and bushfire records have been updated on Council's Fire Management GIS context during the review process. In addition, Council's Fire and Bushland Management Team have developed a new Operational Burn Plan form (document stating how each planned burn will be undertaken, including special values, lighting techniques etc.) during the BMS review.

Management of Council managed land:

Management of Council managed land needs to be better coordinated and communicated to all stakeholders to avoid conflicting management approaches including:

- Community groups (official and unofficial) planting trees and shrubs in areas that are identified as defensible spaces and fire trails in BMPs.
- Council Operations Groups (Fire and Bushland Management Team, and Parks and Community Facilities Team) arriving at locations identified in annual works programs to conduct maintenance to find work has been outsourced to contractors.
- Design of management plans such as RAPs and BMPs needs to have holistic management approach. For example RAPs previously have recommend landscaping of reserve entrances which contradicts fire trail standards specified within respective BMPs.
- The community awareness and education program recommended in the previous two strategies has not been implemented. This has strongly influenced the unsuccessful implementation of recommendations within BMPs, ongoing associated remedial expenses, and frustrations between stakeholders.

The community awareness and education program needs to be based on a holistic management approach, with all stakeholders internal and external to Council working as a collaborative as opposed to "we do our bit, and you do your bit". This will pose challenges as most stakeholders will have different opinions and beliefs on most suitable practices.

To remedy previous implementation failures, ownership of this task should be given. It is recommended Council's Fire and Bushland Vegetation Management Works Officer be assigned to co-ordinate this community awareness and education program.

This program also emphasises the operational need to create a permanent Technical Fire and Bushland Management position, so required actions such as this within the BMS can be successfully implemented and managed.

Recommendation 6

During future developments of BMPs and RAPs, Council's Fire and Bushland Management Team, Natural Resource Management, and consultants are to be involved at consultation stage to alleviate conflicting recommendations.

Recommendation 7

Fire and Bushland Management Team develop and implement a community awareness and education program structured on the 2016-2021 BMS.

Weed management:

Pre and post planned burn weed management has been implemented throughout the municipality in VMUs that have undergone planned burning. Ongoing monitoring and maintenance will be required respectively throughout the duration of the revised BMS, and continued for VMUs scheduled for planned burning throughout the revised BMS.

Additionally areas not treated by fire with large weed communities have been targeted.

Most areas targeted have experienced significant reduction in coverage; however some areas require further treatment and have been identified in respective BMPs.

Many weed control efforts have been coordinated across Council with contractors, work for the dole programs and Landcare groups providing significant support to ongoing maintenance.

Vegetation Monitoring:

During 2012 Council's Fire and Bushland Management Team established a VMP. The objective of this program is to gain datasets on treatments applied by Council's Fire and Bushland Management Team towards vegetation and soil health within bushland managed by Council.

These datasets assist in long term monitoring of effectiveness of prescribed treatments, and also satisfying requirements as outlined in permits to take threatened plants for vegetation management from DPIPWE.

The program includes: pre and post burn photo point monitoring, flora surveys, basic soil health and overall vegetation condition.

As at June 2016 the program incorporates 22 monitoring sites, with an additional 10 recommended for establishment pre 2021.

The future expansion on the monitoring program should include threatened species and be developed in consultation with the Threatened Species Section of the DPIPWE. It should also be in accordance with any conditions attached to a permit to take threatened species.

The permanent creation of a Technical Fire and Bushland Management position will allow for the implementation of a more formalised and effective program. NRM South will be undertaking a case study of Council's Fire and Bushland Management VMP during 2016.

Recommendation 8

- Fire and Bushland Management Vegetation Monitoring Program (VMP) be furthered incorporated into Council's Fire Management GIS context.
- Expansion of the VMP to include threatened species.
- Future Development to be in consultation with the Threatened Species Section of Department of Primary Industries, Parks, Water and Environment (DPIPWE), and in accordance with any conditions attached to a permit to take threatened species.

Note: For successful implementation of recommendation 8, recommendation 1 is to be implemented prior.

Geographic Information System (GIS):

During 2013 Council's Fire and Bushland Management Team in conjunction with Council's GIS Systems Asset Officer established an extensive Fire Management GIS Context. This context is updated multiple times annually and designed as a central repository for Council's Fire and Bushland Asset Management. Datasets from this context are shared annually with the TFS Fuel Reduction Unit, Natural Values Atlas, and The Land Information System Tasmania (the LIST).

The annual process of gathering, compiling, storing and sharing data specific to annual operational works programs within Council's Fire and Bushland Management Team is time consuming, and requires analysing and documenting all aspects from planning to implementation. This includes obtaining and storing DPIPWE permits, Conservation Covenant authorities, pre and post burn monitoring, ignition dates, location and dimensions of defendable spaces, and polygons of VMUs burnt.

Microsoft Excel and Project are used to store these datasets within Council's Fire and Bushland Management Team. The continuity of gathering accurate annual datasets is a priority, external stakeholders such as TFS, DPIPWE, fire and ecological consultants, and Bushfire Hazard Practitioners require the most current data to develop operational advice and prepare reports. Council's Fire and Bushland Management Team also use this data to audit the effectiveness of treatments at each BMS review.

The requirement of database management, and sharing of datasets, emphasises the need to create a permanent Technical Fire and Bushland Management position.

Recommendation 9

Implement recommendation 1 to allow for accurate internal and external annual dataset sharing, and database management for Council's Fire and Bushland Management Team operations.

Planning for future:

- The revised Rokeby Hills Reserve BMP incorporates 32 hectares of Public Open Space (POS) acquired by Council in 2016. This revision has been based on an adaptive management approach considering future subdivisions on adjacent privately owned land; some fire trail alignment has been designed to double as defensible spaces reducing management costs and ecological impact.
- Areas throughout the municipality such as Mt Rumney have limited escape routes for residents in event of bushfire. Future subdivisions should take this into consideration, or an existing route should be investigated and formalised by Council and TFS.
- Recommend all future BMS reviews be undertaken internally by Council's Fire and Bushland Management Team.

Recommendation 10

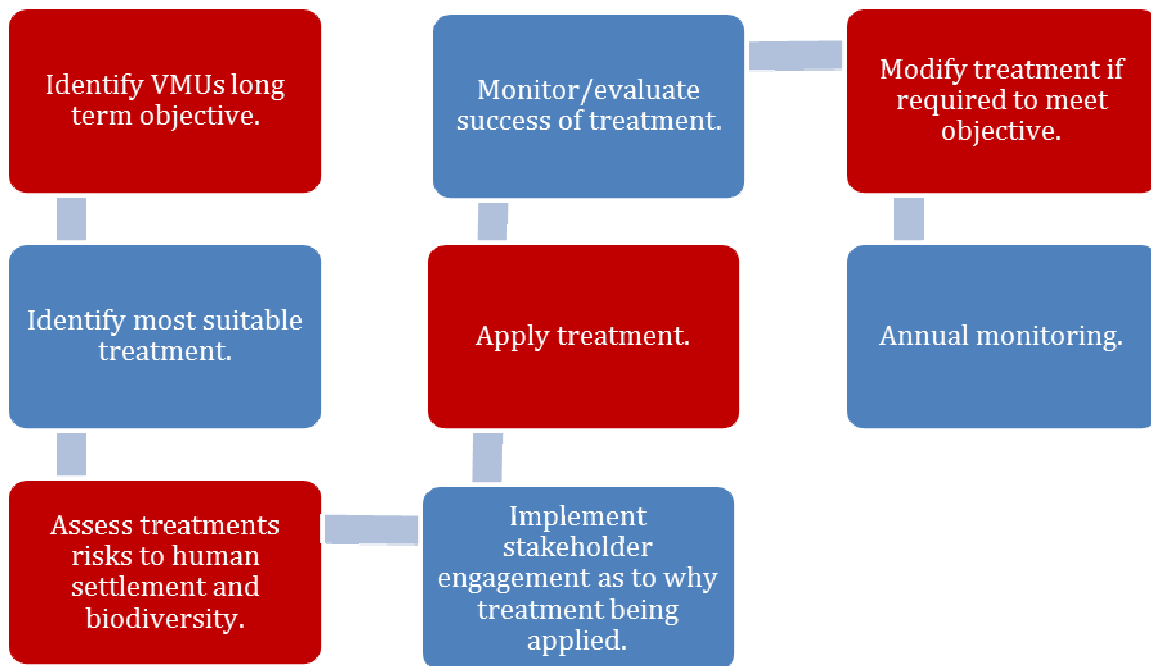
- Council with guidance from TFS to investigate a formalised additional vehicle escape route for residents living at Mt Rumney.
- Future subdivisions within and adjacent to Mt Rumney to consider allowing a vehicle escape route for residents living at Mt Rumney.
- Future BMS reviews undertaken internally by Council's Fire and Bushland Management Team.

6. Bushfire Management Strategy (BMS)

The BMS has been reviewed using an adaptive management approach based on 4 key objectives: Preparedness, Mitigation, Response and Recovery.

6.1 Adaptive Management Approach

- To help overcome the lack of information on the long-term responses of indigenous vegetation to fire, and ensure BMPs are improved each time they are revised, Council's BMPs will adopt the principles of adaptive management (figure 4). This will include a monitoring and evaluation component which will provide the information required to progressively refine the BMPs to ensure they are achieving their desired outcomes (see section 8.11).
- Council's Fire and Bushland Management Team will annually gather datasets sufficient to monitor the effectiveness of prescribed regimes and treatments within BMPs. These datasets will be moderated by Council's Fire and Bushland Vegetation Management Works Officer within Council's Fire Management GIS context (see section 8.12.2). This will include details of all bushfires and planned burns, assets at risk, fire trail networks, defensible spaces, and VMP sites.
- Council will consult with a broad spectrum of stakeholders during the preparation and revision of BMPs.
- Council will review its BMS and associated BMPs and management procedures (MP) every five years (see section 8.13.1) to ensure they contain the latest information on; conservation significant flora and fauna, most current suitable prescribed burning regimes, required defensible spaces, fuel types and characteristics, VMU regimes and TFS guidelines.

Figure 4 – Council’s adaptive approach

Note: This cycle is repeated until the management actions being applied are producing the desired results.

6.2 Preparedness

- BMPs will be developed for areas of bushfire-prone vegetation managed by Council that require a formalised management plan to prepare and reduce the threat of bushfire to assets at risk, or utilise fire for ecosystem management through a formalised planned burning regime. BMPs will identify the most effective options to reduce risks such as establishment and maintenance of defensible spaces, fire trail alignment, and planned burning. BMPs will be reviewed at a maximum five year interval, and must be integrated into all future or revised RAPs.

It should be noted that BMPs are not operations plans and do not deal directly with “Response” to bushfires. Operational procedures are dealt with in various documents prepared by the TFS and other emergency services.

- Council will seek partnerships with key stakeholders to plan and implement multi-tenure BMPs, particularly in areas with regionally significant vegetation communities.
- A five year planned burning program is developed at time of each BMS review. This will incorporate annual burning programs based on the requirements of VMUs within BMPs, and Council managed land not covered by a BMP, requiring planned burning for risk reduction or ecosystem management.

- The use of planned burning on Clarence City Council managed land will be carried out in accordance with the bushfire management objectives outlined in each BMP. Where no BMP exists, Council's Fire and Bushland Vegetation Management Co-ordinator shall be responsible for implementing the most suitable treatments to meet the sites bushfire management objectives.
- Council will advise the municipality biannually (prior to autumn and spring) through printed newspaper and social media of each year's planned burning programs. Directly adjoining residents to areas that will be impacted by planned burns will be additionally notified in writing at a minimum one day prior to conducting the burn, by means of letter box dropping a written notification.
- Fire hazard abatement notices for private property will be issued during the fire permit period.
- Council's Fire and Bushland Management Team will be consulted prior to all bushland regeneration and replanting projects within an area managed by a BMP. This will alleviate an increase in the bushfire risk to public and private assets, or compromise the effectiveness of defensible spaces, fuel breaks, fire trails and other measures maintained for the control of bushfires.
- Council will ensure that where possible new subdivisions adjoining Council managed land in bushfire-prone areas incorporate defensible spaces to TFS guidelines, and AS:3959-2009 within the lots.
- Council's Fire and Bushland Management Team should be notified during the planning stages of new subdivisions directly adjacent to Council managed land managed by a BMP. This will allow for the most suitable and economical treatments of bushfire risks on Council managed land. Such future subdivisions may have been factored into BMP designs.

6.3 Mitigation

Council will implement risk mitigation strategies on Council managed land to reduce the likelihood of adverse impacts from fire through:

- Areas of bushfire-prone vegetation under Council's control not covered under a BMP that have potential to impact assets (such as road reserves, defensible spaces and easements) will be maintained in a reduced fuel state during the fire permit period. Council acknowledge some areas where such maintenance would adversely affect conservation significant flora will be managed in a reduced fuel state post seed setting period when possible.
- Establishment and maintenance of fuel breaks and defensible spaces as per current industry guidelines. Where possible fire trail alignment will traverse defensible spaces to reduce ecological impact and maintenance costs.

- Establishment and annual maintenance of fire trails will be undertaken to Tasmanian Parks and Wildlife *Fire Management Infrastructure Categories and Standards Asset Services January 2009 (V3)* as specified in MP1. Fire trails will be strategically designed and located to be utilised for bushfire mitigation treatments.
- Conduct broadscale planned fuel reduction burning as scheduled in Council's 5 year planned burn program. If during the annual fire permit period, planned burning will be carried out according to any conditions on a "Permit to Burn" issued by the TFS. Where broadscale planned fuel reduction burning is not an acceptable treatment, mechanical treatment or heap burning should be utilised as a risk reduction treatment (may not be scheduled in 5 year planned burn program).
- The local TFS brigades will be encouraged to become familiar with bushland reserves managed by Council in their areas, particularly the locations of entry points, fire trails, water points, assets at risk, defensible spaces and fuel breaks (see section 8.8).
- Council recognises the importance of regular communication internally between work groups in addition between fire management agencies, landowners and the community at large in raising public awareness of bushfire risks and management issues and treatments. This will include:
 - Consultation with the TFS Fuel Reduction Unit during establishment of 5 year planned burning program
 - Council representation at Hobart Fire Management Area Committee meetings
 - Consultation with landowners and residents adjoining bushland reserves and interested community groups during development and review of BMPs
 - Distribution of information on bushfire safety in collaboration with the TFS
 - Notifying the public, particularly adjoining residents, of planned burns carried out by Council
 - Ensuring the Clarence community is aware of Council's BMS, specifically individual BMPs, and defensible space objectives and treatments.

6.4 Response

- The TFS will be immediately informed by Council's Fire and Bushland Management Team, of any bushfires in Council reserves detected by Council employees or reported to Council. As an interim measure until the arrival of the fire service, Council's Fire and Bushland Management will carry out any measures to contain the fire which are within their capabilities (skills, experience, and available resources) and can be carried out safely.

- Suppression efforts will, where possible, endeavour to minimise the spread of any fire occurring on Council land, and to contain fires within the boundaries of the VMU in which it occurs.
- Council will supply the TFS with any information it has that would assist fire suppression operations in its reserves, and minimise the risk of adverse impacts to assets.
- Council will supply the TFS with any suitable resources it has available that can assist with the suppression of bushfires in Council reserves.
- Local TFS brigades and other emergency services will be supplied with keys to gates in all Council reserves.

6.5 Recovery

- All Council bushland areas impacted by fire (planned burns or bushfires) will be closed to the public until they are inspected and declared safe by Council's Fire and Bushland Management Team.
- Temporary fire control lines will be either upgraded to meet current standards as specified in MP1 of Council's Best Management Practice Guidelines, or rehabilitated where they are likely to be an erosion hazard as specified in MP3 of Council's Best Management Practice Guidelines.
- Planned burns will be coordinated with pre and post burn weed management.
- Post-fire weed control will be carried out on areas affected by bushfire.
- Council managed land impacted by bushfire or treated with planned burning containing VMP plot, will have the plot assessed no earlier than two weeks post fire, and no longer than six weeks post fire.

6.6 Municipal Fire History

6.6.1 Bushfire History

Developing an understanding of bushfire history throughout the Clarence municipality is an important element in designing the most suitable treatments for vegetation and defendable spaces to mitigate impacts to human settlements whilst maintaining biodiversity. Much of the vegetation throughout Clarence is dry sclerophyll and has a low fire sensitivity which indicates that it is highly fire adapted and a single fire will generally not adversely affect biodiversity. Though repeated fires at intervals of less than ten years may cause long-term changes in floristics and vegetation structure (Pyrke & Marsden-Smedley 2005). The moderate to high flammability rating of the native bushland throughout the municipality indicates that the vegetation will burn readily when fuels are dry but may be too moist to burn for long periods during winter. Table 2 shows significant fires that have previously impacted the municipality. Individual BMPs discuss localised less significant fires.

Table 2 – Municipal bushfire history (1967-2013)

Year:	Location:	Approximate Area (hectares):	Impact to human settlements:
1967	Greater Hobart	264, 270	62 Deaths
1993	Coal Valley/Richmond	2400	0
2006	Meehan Range	800	0
2013	Risdon Vale/Meehan Ranges/Richmond/Cambridge	500	0

6.6.2 Planned Burn History 1984-2015

Planned burning commenced within Clarence from the mid 1960's. It was characterised by a less formalised program targeted at reducing fuel loads through burning ridgelines and areas with high fuel loads in a "tenure blind" approach (L Cripps 2016, pers. comm., February). Documented planned burning within Clarence started in the mid 1980's.

Effective planned burning programs provide a mosaic of VMUs at multi stages of recovery from fire, and can provide a short term (less than 5 year post planned burn) reduction in bushfire intensity and threat to treated areas.

The planned burning adopted within this BMS builds on the previous strategies' ecological burning structure, with an emphasis on targeting areas for maximum risk reduction through an increase in fuel reduction burning.

Table 3 - Municipal planned burns conducted (1984-2015)

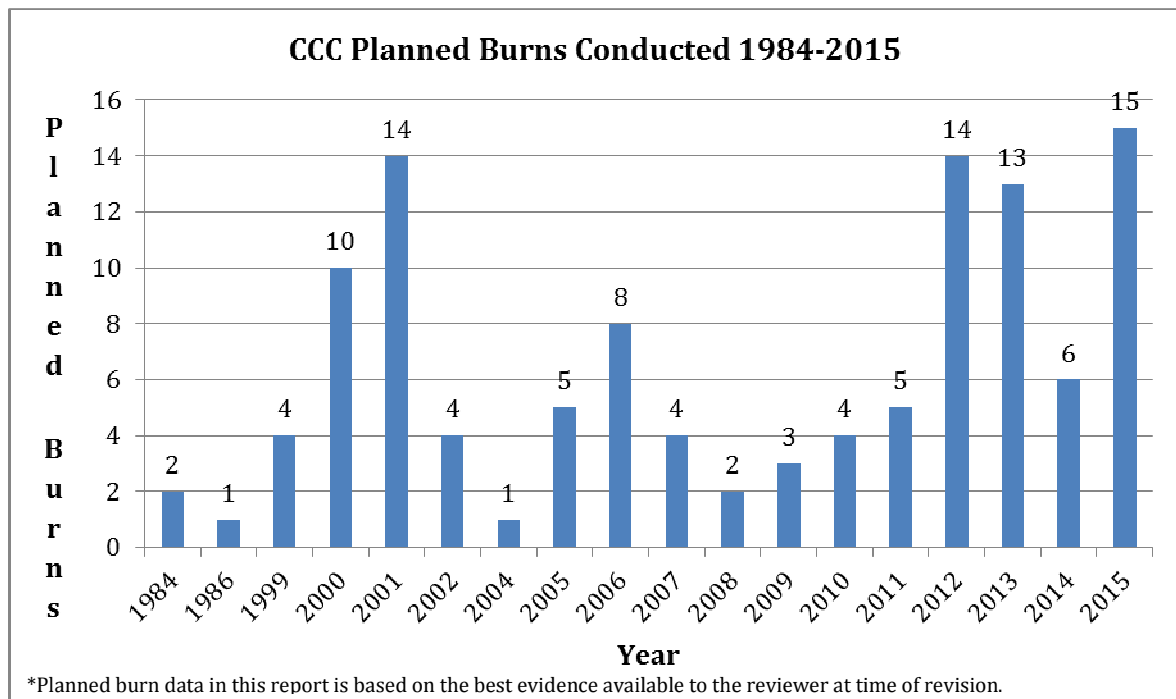
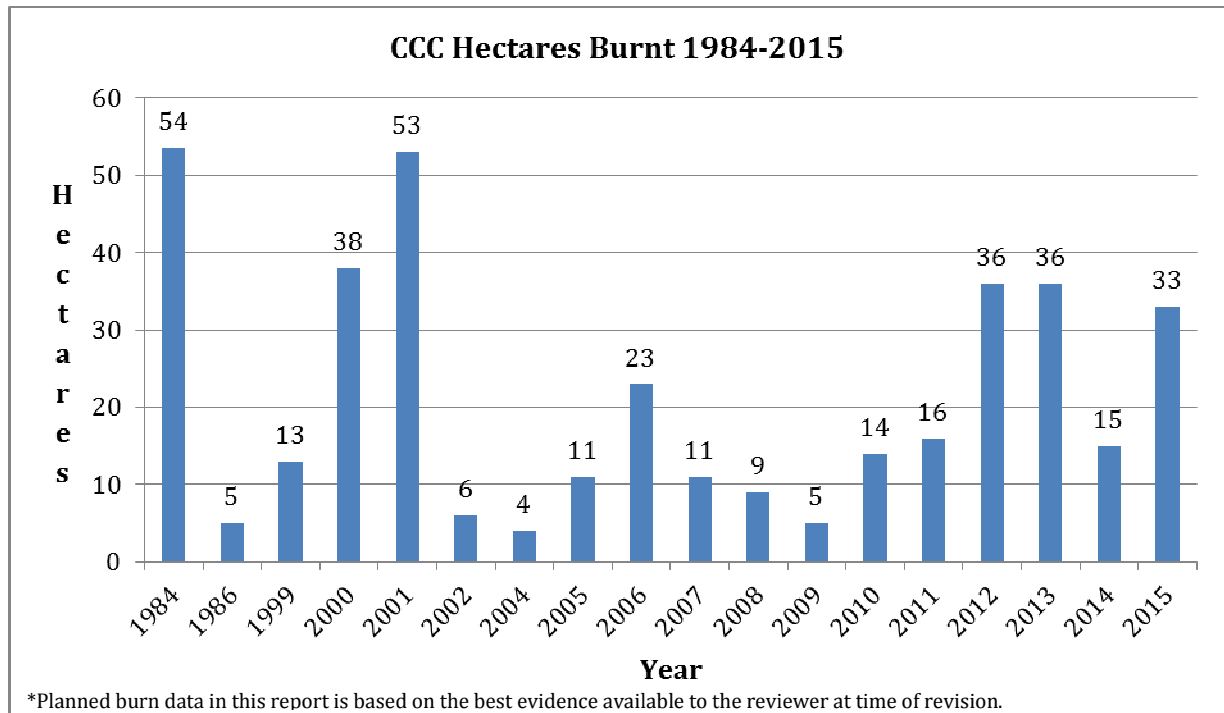
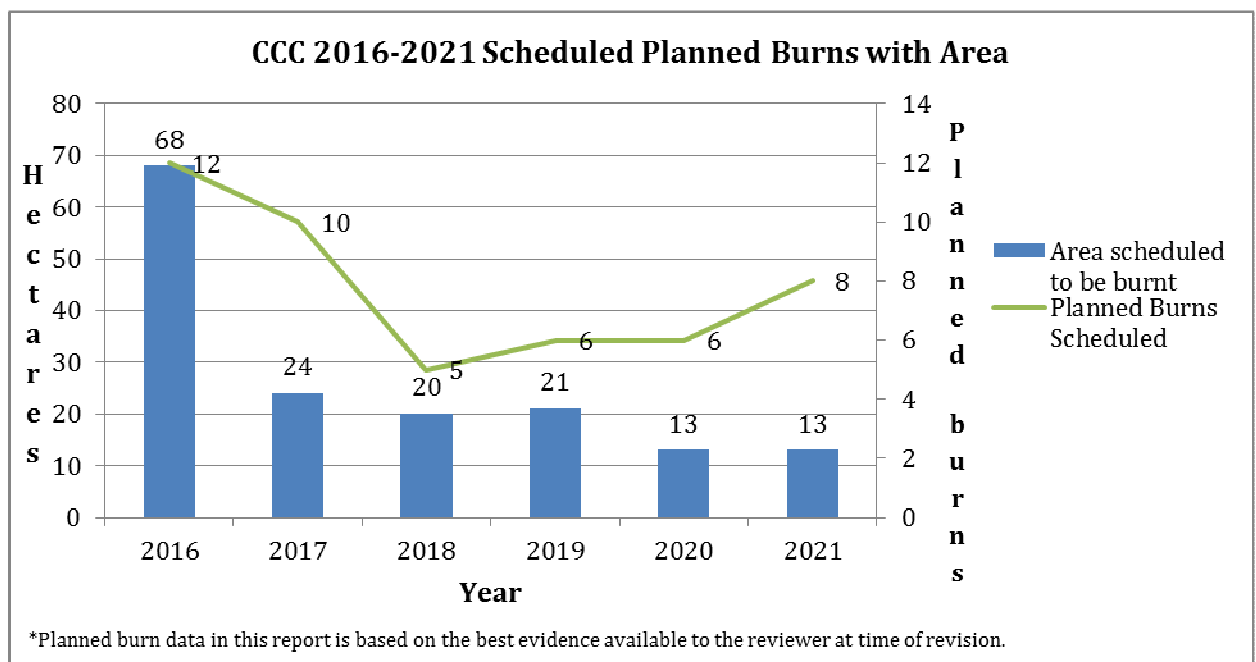


Table 4 – Municipal hectares burnt through planned burning (1984-2015)**Table 5 – CCC scheduled planned burns with area (2016-2021)**

7. Statutory Responsibilities

Clarence City Council and landowners surrounding Council managed land have a general legal responsibility to take all reasonable steps to minimise the risk of fires that originate on their property causing personal injury, damage to adjoining property, or damage to items of natural or heritage value protected by government legislation. Council also has specific responsibilities under various Acts of Parliament for bushfire management, bushfire hazard abatement, and the conservation and management of native flora and fauna. The most important of these are listed below.

Fire Service Act, 1979

The main responsibilities of Clarence City Council and surrounding landowners/occupiers under the Fire Service Act, 1979, are:

- to take all reasonable precautions to prevent any fire lit on their property from spreading onto neighbouring land (Section 63)
- to take diligent steps to extinguish or control any unauthorised fire on their property during a fire permit period, and to report that fire to the TFS, or the Police (Section 64).

As well as the obligations that apply to all landowners/occupiers, Clarence City Council has a number of specific powers and obligations under this Act. These are:

- to nominate a representative to sit on the local Special Fire Area Committee (Section 55)
- to “cause the formation in its municipal area of such fire breaks as it considers necessary or desirable to arrest the spread, or to facilitate the suppression of, fires” (Section 56)
- to contribute towards the operating costs of fire brigades (Sections 79 to 95).

It should also be noted that Section 49 of the Act authorises officers of the TSF to enter and inspect land for any fire hazard. Where a fire hazard is detected, the Act further empowers the State Fire Commission or an authorised officer to:

“by notice in writing given to the council of the municipal area in which that land is situated, require that local council to deal with the fire danger, within such reasonable period of not less than 30 days as is specified in the notice, as if that fire danger were a nuisance under the Local Government Act, 1993.”

Section 66 of the Fire Service Act requires persons lighting fires within a fire permit period that have “the effect of clearing land of vegetation or for a like purpose” to do so “in accordance with the conditions of a permit granted by a fire permit officer”. A person lighting and controlling a fire in accordance with the conditions of a permit is exempt from the Environmental Management and Pollution Control Act, 1994, and “is not liable for any loss, injury or damage caused by that fire unless it is proven that the person acted maliciously or recklessly”.

Local Government Act, 1993

Section 93 of the Act allows councils to impose a service rate on rateable land for the purpose of providing bushfire protection.

Section 200 of the Local Government Act requires a council to issue a hazard abatement notice whenever it is satisfied there is, or is likely to be, a fire risk on any privately owned land. If the person served with an abatement notice fails to comply with the notice within the specified time, the council is empowered under Section 201 of the Act to carry out the action specified in the notice, and recover the cost from the owner or occupier of the land.

Threatened Species Protection Act, 1995

The Threatened Species Protection Act (TSPA), 1995, provides for “the protection and management of threatened native flora and fauna, and to enable and promote the conservation of native flora and fauna”. Section 5 of the Act requires that:

“A person who performs a function, or exercises a power, in the administration of a public authority must in so doing have regard to the objectives specified in Schedule 1 for the conservation and management of native flora and fauna”.

Schedule 1 lists the objectives of the Resource Management and Planning System of Tasmania, and the threatened species protection system established by the Act. These objectives include the principles of ‘sustainable development’. The intent of this Act makes protection of threatened species a major objective of any bushfire management plan in the State.

Section 51 (a) of the TSPA states that: “A person must not knowingly, without a permit - take, trade in, keep or process any listed flora or fauna”. The TSPA defines ‘take’ as including: “kill, injure, catch, damage, destroy and collect”. Clarence City Council may therefore be required to obtain a permit from the Department of Primary Industries, Parks Water and Environment to carry out planned burning that may affect any of the species listed in the Act.

Local Government (Building and Miscellaneous Provisions) Act, 1993

Under Section 55 of this Act, Clarence City Council has the power to attach “any terms and conditions it considers appropriate” to a building approval. This would include provisions relating to bushfire protection. Section 56 of this Act gives Clarence City Council the power to impose “any restrictions, limitations or conditions it considers appropriate” on developments.

Environmental Management and Pollution Control Act, 1994

The objectives of the Act as stated in Schedule 1 of the Act includes;

“3(c) to regulate, reduce or eliminate the discharge of pollutants and hazardous substances to air, land or water consistent with maintaining environmental quality”.

Section 96C of this Act allows the Parliament to make environment protection policies for the purpose of furthering any of the objectives of the Act.

Policies that affect bushfire management activities include the draft State Air Quality Policy 2016 and the State Water Quality Management Policy. Note that a person lighting and controlling a fire in accordance with the conditions of a permit issued under section 66 of the Fire Services Act, 1979, is exempt from the provisions of this act.

Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act)

The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the EPBC Act as matters of national environmental significance.

The objectives of the EPBC Act are to:

- provide for the protection of the environment, especially matters of national environmental significance
- conserve Australian biodiversity
- provide a streamlined national environmental assessment and approvals process
- enhance the protection and management of important natural and cultural places
- control the international movement of plants and animals (wildlife), wildlife specimens and products made or derived from wildlife
- promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources
- recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity
- promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

Environment Protection Policy (Air Quality), 2004

Clause 17 of the State Air Quality Policy covers “planned burning” which includes low intensity burning for fuel reduction and ecological management, but does not include back burning to control wildfires. Clause 17 of the policy states that:

“(2) Persons or organisations involved in the conduct of planned burning or in the preparation of management guidelines for such operations must take account of the health and amenity impacts of smoke pollution on individuals and the community.

(3) Best practice environmental management should be employed by those persons undertaking planned burning to minimise the effects of smoke pollution on individuals and the community. This includes, but is not limited to, complying with the State Fire Management Council Guidelines on high intensity and low intensity burning.

(4) Where practicable, agencies, companies or organisations undertaking burning on a regular basis or on a large scale should:

- (a) adopt efficient and effective air quality monitoring programmes;

- (b) adopt a uniform approach to recording and assessing complaints;
- (c) focus upon minimising the impact of smoke on the community in terms of health, amenity and safety;
- (d) encourage the planning and execution of planned burning in a way that minimises the generation of smoke and improves the management of the effects of smoke; and
- (e) require a responsible person involved in planned burning for land management to be competent in relevant burning procedures."

The State Fire Management Council Guidelines for low intensity planned burning advises that:

"The effects of smoke from planned fires should be considered when preparing burning plans, taking account of the probable wind direction. Where practicable, smoke mitigation strategies should be used including: prescribing favourable wind direction; ensuring that fuels are dry; limiting the size of the burning area; limiting the number of areas lit at the same time within the same air shed; allowing time for areas to burn out prior to evening inversions, particularly late in autumn; avoiding planned fires coinciding with public events; avoiding week-ends and Public holidays; providing information to the public."

The State Air Quality Policy also requires that a uniform approach to recording and assessing complaints be developed. This will be implemented through the Tasmanian Air Quality Strategy.

Tasmanian Air Quality Strategy, 2006

The Tasmanian Air Quality Strategy has been established under the Environment Protection Policy (Air Quality) to guide the management of air quality in Tasmania. The overall aim of the Air Quality Strategy is to "to achieve compliance with the National Environment Protection (Ambient Air Quality) Measure Standard and Goal for PM₁₀ particles, in line with the stated requirements of the Environment Protection Policy (Air Quality)".

Objective 13 of the strategy deals with smoke management from planned fires and aims to:

"Improve the management of smoke from planned burning in accordance with the Environmental Protection Policy (Air Quality) 2004 by:

- (a) Establishing smoke management procedures for planned burning;
- (b) Incorporating smoke management procedures into the Forest Practices Code;
- (c) Improving the co-ordination of planned burning to minimise smoke impacts; and
- (d) Investigating the most appropriate way to manage and respond to complaints relating to planned burning."

The strategy also notes that:

"Although fuel reduction burns may impact on air quality, it is recognised that this practice reduces the likelihood of wildfires that could have more significant impacts such as property destruction."

It should also be noted that Section 66 of the Fire Service Act states that:

“a person who lights and controls a fire in accordance with the conditions of a permit granted to that person under this section is exempt from the Environmental Management and Pollution Control Act 1994.”

Implementing the Air Quality Policy and Strategy will require planned burns to be coordinated with other planned burns in the area, and to be carried out when weather conditions will help to disperse the smoke.

State Policy on Water Quality Management, 1997

One of the objectives of the State Policy on Water Quality Management is to:

“6.1(b) Ensure that diffuse source and point source pollution does not prejudice the achievement of water quality objectives and that pollutants discharged to waterways are reduced as far as is reasonable and practical by the use of best practice environmental management.”

Clause 31.4 of the policy under the section dealing with diffuse sources of pollution states that:

“Codes of practice or guidelines required by this Policy in respect of specific activities with the potential to impact on stream-side land should pay specific attention to defining appropriate stream-side buffer strips and acceptable management practices within these strips. Strategies and incentives, including economic instruments, to encourage the retention and/or improved management of streamside vegetation should be investigated.”

In relation to the construction and maintenance of fire trails, Clause 35.1 of the policy states that:

“35.1 Road construction and maintenance operations will be carried out in accordance with the guidelines or code of practice developed pursuant to clause 31.3 of this Policy, or employ other measures consistent with best practice environmental management, to prevent erosion and the pollution of streams and waterways by runoff from sites of road construction and maintenance.”

The only codes of practice under the State Policy on Water Quality Management that are relevant to construction and maintenance of fire trails is the *Wetlands and Waterways Works Manual* (DPIWE, 2003). During March 2008 the Premier directed the Minister for Environment, Parks, Heritage and the Arts to conduct a review of the Water Quality Policy. Public submissions were sought, a Response Paper was released which summarised and responded to the issues raised and provided options for the Policy’s future. Until any changes are made formally through a statutory revision process, the existing Policy remains in force.

Aboriginal Relics Act, 1975

Section 14 of the Act provides for the protection of sites with Aboriginal relics:

“14. Protection of relics

- (1) Except as otherwise provided in this Act, no person shall, otherwise than in accordance with the terms of a permit granted by the Minister on the recommendation of the Director –
 - (a) destroy, damage, deface, conceal, or otherwise interfere with a relic;
 - (b) make a copy or replica of a carving or engraving that is a relic by rubbing, tracing, casting, or other means that involve direct contact with the carving or engraving;
 - (c) remove a relic from the place where it is found or abandoned;
 - (d) sell or offer or expose for sale, exchange, or otherwise dispose of a relic or any other object that so nearly resembles a relic as to be likely to deceive or be capable of being mistaken for a relic;
 - (e) take a relic, or cause or permit a relic to be taken, out of this State; or
 - (f) cause an excavation to be made or any other work to be carried out on Crown land for the purpose of searching for a relic.
- (2) A permit under subsection (1) is of no effect if, to the knowledge of the holder thereof, the relic to which it relates has been acquired or dealt with in contravention of this Act.”

During each BMP review process Aboriginal Heritage Tasmania (AHT) must be contacted and requested to search the Aboriginal Heritage Register (AHR) regarding the area inside each BMP boundary. Any AHR searches for BMPs resulting in known locations will require a permit for any bushfire management works that may affect Aboriginal relics.

Tasmanian Weed Management Act, 1999

This is the core piece of weed management legislation within Tasmania. The Act defines a list of 'declared' weeds that:

- Present a threat to Tasmania but are not yet naturalised
- Present a threat but are currently of limited distribution
- Are widely distributed requiring management due to their threat to the native environment and/or agriculture.

There are 107 weeds that have been declared for Tasmania. 36 of these weeds have a presence within the Clarence municipality

The Weed Management Act 1999 (WMA) also provides a Statutory Weed Management Plan (WMP) for each of these declared weeds. The WMP places each weed into either Zone A or Zone B within each municipality. The management objectives for each zone are:

- Zone A – Eradication
- Zone B – Containment (preventing spread to other areas free of that weed)

Under the WMA, landholders are under a legal requirement to control weeds on their land. Weed Inspectors are given powers to enforce the requirements of the Act; they can be employees under state or local government or relevant bodies including community groups (North Barker Ecosystem Services, 2014).

Pre and post burn weed management will need to be implemented for bushfire management activities in the reserves that have declared and Weeds of National Significance (WONS). In addition, any management burning in the reserves identified with serrated tussock infestations will have to be coordinated with a weed control program.

7.1 National Standards and Guidelines

The following documents prepared by Standards Australia deal with bushfire protection issues at a national level:

- Australian Standard 3959 - 2009, Construction of buildings in bushfire-prone areas.
- Standards Australia Handbook 330 - 2009, Living in bushfire-prone areas.

Australian Standard 3959 is referenced in the Building Code of Australia and provides construction techniques to improve building resistance to varying levels of bushfire attack by wind-blown burning debris, radiant heat and direct flame contact. The Standards Australia Handbook 330 - 2009 provides general advice on siting, landscaping, design and construction of buildings in bushfire-prone areas.

8. Implementation of the Strategy

8.1 Administration

8.1.1 Responsibility for Implementing the Bushfire Management Strategy

The role of Council's Fire and Bushland Vegetation Management Coordinator includes overseeing the implementation and primary responsibility of the BMS with the assistance of Council's Fire and Bushland Vegetation Management Works Officer.

This third revision has further defined responsibilities of actions and recommendations within recognising current skillsets of Council's Fire and Bushland Management Team. This definition of responsibilities coincides with the previous strategies comments on implementation improvements.

Fire fighting on Council managed land could be improved if there is a Memorandum of Understanding, or similar arrangement, between the TFS and Council that requires Council's Fire and Bushland Vegetation Management Coordinator to be informed as soon as the TFS responds to a fire on Council managed land. Council's Fire and Bushland Vegetation Management Coordinator can then provide detailed information on the reserve to assist the TFS in planning control strategies.

In the event of potential impact to Council managed land from bushfire, Council's Fire and Bushland Vegetation Management Coordinator is to ensure gates are opened to allow the TFS access to fires in reserves, provide information to assist the Incident Controller (small fires) or the Incident Management Team (larger fires), and to close tracks and trails to the public following fires until they are inspected and declared safe for public use. Once deemed safe and TFS is satisfied they have contained the fire, the area is handed back to Council. Council's Fire and Bushland Vegetation Management Coordinator should coordinate blacking out and patrol duties. See section 6.4 for interim suppression measure until TFS arrival.

In the event of an escaped planned burn Council's Fire and Bushland Vegetation Management Coordinator is to attempt within abilities and skillsets of available resources suppression, and if deemed necessary contact TFS for additional resources.

8.1.2 Training

Successful implementation of the prescribed planned burns within this BMS requires trained personnel and specialised equipment. Each planned burn must have a burn plan prepared by someone who has completed the Forestry Tasmania “Develop Prescribed Burning Plans” course or equivalent. All persons engaged in planned burning or firefighting in the reserve must have completed the Forestry Tasmania “Forest Fire Fighting” course or equivalent.

If the planned burning is contracted out, the contractor must be able to meet the required training accreditation in the previous paragraph, as well as provide evidence of experience in carrying out broadscale low intensity fuel reduction burns.

Any smoke shed associated with planned burning with potential to impact public or private road networks is to have a traffic management plan approved by an accredited person, and implemented pre-ignition.

Council’s Fire and Bushland Management tree fallers are to have current advanced tree falling qualifications.

8.1.3 Coordination and Consultation

MP 9 in the Best Management Practice Guidelines was prepared to ensure effective coordination of bushfire management activities amongst the various stakeholders involved in bushfire and vegetation management within Council managed land. In particular annual meetings with Landcare groups discussing any planned revegetation works and scheduled planned burns.

Where treatments and operations are expected to impact known populations of threatened and rare plant species, the Threatened Species Section of DPIPWE must be consulted in writing requesting a “Permit to take threatened plants for vegetation management”. Operations can only commence once the permit is received, and in accordance with conditions of attached schedule.

Weed management pre and post fire may require coordination between Council work groups to achieve objectives as specified in MP8.

At the commencement of each annual planned burning program consultation between the TFS Fuel Reduction Unit and Council’s Fire and Bushland Management Team should discuss planned burns, and if any multiagency/multi tenure burn boundaries may achieve greater outcomes.

8.1.4 Resources

Council has sufficient resources (experience, manpower and equipment) to carry out all of the planned burns and other treatments prescribed within BMPs. Section 2 discusses recommendations specific to vehicles that if followed will increase productivity through annual heap burning programs, maintenance of defensible spaces and a reduction in associated risks when conducting planned burning.

Implementation of some other recommendations within BMPs (such as integration of weed control with planned burning, and construction of new fire trail links) may require additional resources (contracted machinery).

All personal involved at an operational level with planned burning managed by Clarence City Council's Fire and Bushland Management Team are to have all personal protective equipment as specified in relevant Safe Works Method Statements (SWMS).

8.2 Use of Fire in the Sustainable Management of Bushland

Fire plays an important role in maintaining biodiversity in Australia. Changes in the fire regime (season, frequency and intensity of fire) can cause progressive changes in plant communities. Frequent fire and long-term exclusion of fire have both been shown to lead to progressive changes in plant community structure, and a reduction in biodiversity. Failure to use fire properly as a management tool can be considered a threat to some of the natural habitats in Clarence City Council's bushland reserves.

Inappropriate fire regimes can cause progressive and sometimes irreversible changes in indigenous plant communities, including a loss of biodiversity. On the other hand, identification, prescription and implementation of an appropriate fire regime can be used to:

- Reduce fuel loads whilst promoting natural recruitment in dry forest communities
- manage indigenous flora and fauna habitats in a sustainable manner
- maintain biodiversity
- control selected weed species.

The bushland within Council managed land covered by a BMP has been divided into VMUs to facilitate planned burning in a mosaic pattern and other bushfire management activities.

This BMS aims to apply a specific fire regime to individual VMUs, or where no VMU is allocated based on optimal fire frequencies for plant communities present within a planned burn polygon that will maintain current distribution, structure and floristics on a long-term basis.

Bushfires pose a risk to small, isolated bushland aggregates, as a major fire could remove species, and even whole plant communities, from the area. Extensive, frequent, and indiscriminate fuel reduction burning can have a similar effect.

The potential risks to flora and fauna habitats from bushfire can be managed by minimising the risk of ignitions, maintaining adequate fire trails and fuel breaks, defensible spaces, and by burning suitable areas of vegetation at different times to create a mosaic of VMUs at different stages of recovery from fire.

Adoption of a mosaic burning pattern has the following advantages:

- reduces overall fuel loads
- increases habitat diversity
- Can provide potential to reduce rate of spread, and subsequently potential reduction in risk of a single, high-intensity bushfire burning a whole reserve when bushfire impacts less than 5 years post planned burn.

Within the mosaic of VMUs the fire regime can be manipulated to achieve some or all of the following objectives:

- removal of woody and herbaceous weeds, and weed seeds from elevated fuels, near surface and surface fuels
- manipulation of ecological processes such as; species composition (via the promotion of selected species or communities), regeneration of senescent vegetation, and the creation of suitable conditions for native seed germination
- reduction in the levels of plant nutrients, such as phosphorus and nitrogen, which may be contributing to weed invasion
- Protection of species of conservation value by maintaining habitat elements that are critical for their survival.

It has been found that sites with accumulated forest litter support a larger and more diverse invertebrate fauna than sites where fire has reduced the litter (Suckling et al., 1985). If a wide range of invertebrate species is to be maintained within Council managed land, it is important that some patches of the different habitats in each reserve remain unburnt. These sites provide essential refugia from which recolonisation can occur (Campbell & Tanton, 1981). The optimal timing of fire for invertebrates in dry forest habitats maintained by relatively frequent burning is not known with certainty, although Hammer (1997) concludes that in dry sclerophyll forest late spring burning is likely to have the least adverse impact.

In bushland, fire can be used to stimulate germination of indigenous plant seeds. She-oaks, most Eucalypts, Acacias, members of the pea family (*Fabaceae*) and many species from other families frequently germinate prolifically in areas that have been burnt, particularly if the fire was of high intensity.

However, in small isolated reserves where a full suite of native herbivores is no longer present the rapid spread of native species such as she oak and wattle after fire can dominate reserves and reduce biodiversity. The burnt area will also be open to weed invasion and must be carefully monitored. In some cases it may be necessary to include native species such as sheoak and wattles in weed control programs to maintain biodiversity.

Frequent burning of native forests is known to reduce species diversity and make them more vulnerable to weed invasion (Williams, 1991). A high fire frequency (less than five years) will usually favour grasses and bracken in the understorey at the expense of shrubs, and severely restrict the re-establishment of canopy species.

In rural areas frequent burning is sometimes used to control woody weeds, and this method can also be helpful in native grasslands. However, in native bushland fire will generally increase an existing weed problem. Many woody weeds re-sprout rapidly from rootstock after fire, often coppicing densely (hawthorn, gorse, wattle). Herbaceous species (including many grasses) respond in a similar way, regenerating from growth buds on a network of robust underground rhizomes (pampas grass, bracken). Seed germination is usually prolific after fire, a response which necessitates prompt control measures, on-going monitoring, and site maintenance (gorse, boneseed, broom).

Therefore, where weeds are already a problem, planned burning should only be carried out after weeds have been treated, and follow up weed control can be carried out. In general, weed infested bushland areas should not be burnt if resources for post-fire weeding are not available. The exception to this is high bushfire hazard areas close to dwellings where burning is the only feasible method of hazard reduction.

8.3 Bushfire Hazard Reduction

As the intensity of a bushfire increases it becomes progressively more difficult to contain and suppress the fire. Very high intensity (less than 4000 kW/m heat output at the fire front) fires with flame heights greater than 10m are generally uncontrollable (NSW Rural Fire Service, 1997). The threat from a bushfire therefore increases as its intensity increases. Bushfire intensity is directly related to the quantity, type, and the distribution, of fine fuel (dead plant matter less than 6mm diameter and live plant matter less than 2mm diameter) available to the fire. Other factors, such as effective slope and moisture content of the fuel, also influence fire intensity, but the only factor that can be effectively controlled to limit fire intensity is fine fuel load (usually expressed in tonnes per hectare) and the distribution of the fuel structure. Table 6 shows the FDR system used in Tasmania at time of review.

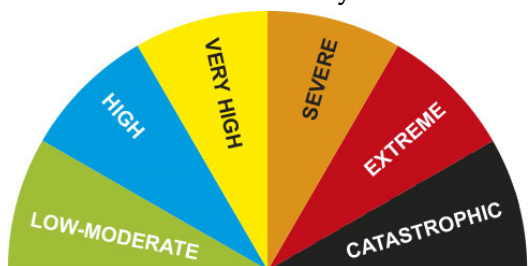
8.3.1 Defendable Spaces

A defendable space is an area of managed vegetation around an asset likely to be at risk from bushfire that protects it from direct flame contact and intense radiant heat, as well as providing an area where fire fighters can defend the asset. The two primary functions of defendable spaces are room to move, and clear line of site for firefighting resources.

The TFS document *Bushfire Survival Plan 2015-2016* recommends that a defendable space includes two 'zones':

- An inner zone (formerly a Bushfire Protection Zone) where flammable materials are minimised.

Table 6 - Tasmanian FDR system



FIRE DANGER RATING	RECOMMENDED ACTION AND POTENTIAL FIRE BEHAVIOUR AND IMPACT
CATASTROPHIC FDR 100+	ACTION: Leaving early is the safest option for your survival – regardless of any plan to stay and defend. <ul style="list-style-type: none"> Most fires will be uncontrollable, unpredictable and fast moving. Flames will be higher than roof tops. Thousands of embers will be blown around. Spot fires will move quickly and come from many directions, up to 20 km ahead of the fire. Some people may die and be injured. Thousands of homes may be destroyed. Well-prepared, constructed and actively defended homes may not be safe during a fire unless firefighters have assessed them as defendable in the prevailing conditions.
EXTREME FDR 75-99	ACTION: Leaving early is the safest option for your survival. Only well-prepared, well constructed and actively defended houses are likely to offer safety during a fire. <ul style="list-style-type: none"> Some fires will be uncontrollable, unpredictable and fast moving. Flames will be higher than roof tops. Thousands of embers will be blown around. Spot fires will move quickly and come from many directions, up to 6 km ahead of the fire. Some people may die and be injured. Hundreds of homes may be destroyed.
SEVERE FDR 50-74	ACTION: Leaving early is the safest option for your survival. Only stay if your home is well prepared and you can actively defend it. <ul style="list-style-type: none"> Some fires will be uncontrollable and move quickly. Flames may be higher than roof tops. Expect embers to be blown around. Spot fires may occur up to 4 km ahead of the fire. There is a chance some people may die and be injured. Some homes will be destroyed. Well-prepared and actively defended houses can offer safety during a fire.
VERY HIGH FDR 25-49	ACTION: Only stay if your home is well prepared and you can actively defend it. <ul style="list-style-type: none"> Some fires can be difficult to control. Flames may burn into the tree tops. Expect embers to be blown ahead of the fire. Spot fires may occur up to 2 km ahead of the fire. There is a possibility people may die or be injured. Some homes may be damaged or destroyed. Well-prepared and actively defended houses can offer safety during a fire.
HIGH FDR 12-24	ACTION: Know where to get more information and monitor the situation for any changes. <ul style="list-style-type: none"> Fires can be controlled. Expect embers to be blown ahead of the fire. Spot fires can occur close to the main fire. Loss of life is highly unlikely and damage to property will be limited. Well-prepared and actively defended houses can offer safety during a fire.
LOW-MODERATE FDR 0-11	ACTION: Know where to get more information and monitor the situation for any changes. <ul style="list-style-type: none"> Fires can be controlled easily. There is little to no risk to life and property.

- An outer zone (formerly a Fuel Modified Buffer Zone) where a low level of flammable material is permitted.

In the inner zone, flammable materials on, under and around your home should be moved away from the house.

In the inner zone:

- Include non-flammable areas such as paths, driveways, and mowed lawns.
- Use non-flammable mulch; do not use woodchips or bark.
- Locate any dams, orchards, vegetable gardens and any effluent disposal areas on the fire-prone side of the home.
- Use radiation shields and windbreaks such as stone or metal fences and hedges using low-flammability plants.
- Remove fire hazards such as wood piles, rubbish heaps and stored fuels.
- Replace all highly-flammable plants with low-flammability plants.
- Prune lower branches on trees and remove flammable shrubs from under and between trees.
- Rake up bark and leaves and keep roofs and gutters clear of flammable debris.

The TFS notes it is not necessary to remove all vegetation from the inner zone. Individual trees rarely cause houses to burn in bushfires.

Trees can screen a building from windblown embers while protecting it from radiant heat. Smooth barked trees are less likely to catch fire than those with rough bark. No tree should be able to fall on the building.

In the outer zone, small-sized natural fuels (such as leaf litter, bark, sticks, tussocks and some shrubs) should be removed and larger fuels (trees and shrubs) should be cut back to reduce the intensity of an approaching bushfire.

Natural fuels, both on the ground and between the ground and any larger trees, should be reduced by selective removal of vegetation, both horizontally and vertically, followed by ongoing maintenance.

In the outer zone:

- Retain established trees to trap embers and reduce wind speeds.
- Selectively remove small trees and shrubs to create clumps (rather than a continuous wall of trees) separated by open areas.
- Remove the vegetation between the ground and the bottom of the tree canopy, to a height of at least two metres.
- Minimise fine fuels at ground level, such as grasses and leaf litter.

8.3.2 Hazard Reduction on Private Property

A properly prepared home can be defended by able-bodied people under most conditions experienced in Tasmania, but if severe, extreme or catastrophic FDR conditions are forecast, leaving early is the safest option (TFS, 2015).

Effective bushfire protection requires owners of most properties adjoining Council managed land to manage the bushfire hazard on their properties to complement works within the reserves. In some locations maintenance of defensible spaces in Council managed land will be largely ineffective if adjoining landowners do not also maintain properties as defensible spaces.

This needs to be undertaken through targeted community education, followed up by hazard abatement notices where required.

At time of review the TFS document *Bushfire Survival Plan 2015-2016* can be accessed from the TFS website and provides information on how home owners can prepare their properties for bushfires.

8.3.3 Vineyards and Smoke Taint

Grapevines that are exposed to heavy, persistent smoke can be at risk of producing wine that is affected by smoke taint. The main consequence of smoke taint is to the taste of the wine, where it can produce a burnt or charred taste. The impact of smoke on grapes and the resultant wine varies considerably (TFS, 2003). During the planning stages of a burn Council's Fire and Bushland Management Team will engage with any vineyards with potential to be impacted by smoke resulting from the burn. Details of burn will include location, size, objective and expected smoke modelling.

The Tasmanian grape harvest usually runs between mid-March and late April but some varieties may not be picked until mid-May (TFS, 2003).

8.4 Bushfire Risk Assessment

The bushfire risk to the built and cultural heritage assets within and surrounding Council reserves was assessed using the following procedure developed from the National Emergency Risk Assessment Guidelines (NEMC, 2010). This assessment process has been analysed and complies with AS/NZS IOS:31000-2009. The purpose of this assessment is to rank the bushfire risk to assets within and adjoining Council reserves so that risk reduction works within the reserves can be prioritised and are appropriate to the level of risk.

Most Council reserves with specific BMPs have been impacted by at least one bushfire within the last twenty years, although there have been no reports of any significant damage to adjoining properties from bushfires that have started in Council reserves. However, there is sufficient fine fuel in at least part of all the reserves to sustain a high intensity fire on days of very high or higher FDR that has the potential to damage assets in and adjoining the reserve or cause death.

Although there may be some variation in the likelihood of a bushfire starting and spreading in different reserves, this has been assumed to be a constant in the risk assessment, i.e. it is certain to occur at some time.

The assessment is only for fires burning within Council reserves, or approaching an adjoining asset from a reserve. Some assets may face a greater bushfire risk from bushland that is not under Council control. The assessment is based on three main factors:

1. bushfire threat in terms of fuel loads and fire approach
2. vulnerability to damage of the asset
3. Potential consequences of a fire damaging or destroying the asset.

Scores are weighted where it is considered that the factor would have a major influence on bushfire risk. The score numbers are only multiplied so that assets that are not at risk from bushfire have a score of zero. The scores allow the level of risk to be placed in the broad risk categories of low, medium and high.

The assessment is carried out by assigning each factor a relative score, and multiplying the scores to determine a relative level of risk.

0 – minimal risk of fire damage

1 to 250 – low risk

251 to 2000 – moderate risk

2001 to 11664 – high risk.

These risk categories have the following general meanings:

LOW – asset of low value or considered to have a low risk of damage from bushfires in the reserve due to its construction, location, or protection measures already in place.

MODERATE – asset is vulnerable to damage by bushfires and could face attack by a moderate to high intensity bushfire, but has features that will reduce the intensity of the fire attack, or provide some protection from fires. Further bushfire protection measures are required.

HIGH – asset is of high value, is vulnerable to damage by bushfires and could face attack by a high intensity bushfire with few, if any, features that would reduce the intensity of fire attack. Further bushfire protection measures are required.

NOTE: It was not possible to inspect assets on properties adjoining Council reserves. The risk assessment therefore makes the following assumptions about these assets:

- Landowners/residents have established and are maintaining a defensible space to current TFS standards around vulnerable assets, either wholly within the lot, or up to the boundary with the Council reserve where there is insufficient space within the lot. Where this is not the case the asset may face a much higher bushfire risk than indicated in the risk assessment.
- All dwellings adjoining a reserve are well maintained to resist attack by wind-blown burning embers. Where this is not the case the asset may face a much higher bushfire risk than indicated in the risk assessment.

Fuel Loads

Vegetation type is used as a surrogate for fuel loads as actual fuel loads vary with time after the last fire, but reach different maximum levels in different vegetation types. The risk assessment is therefore based on the maximum bushfire hazard likely to arise, rather than the actual hazard at a particular time.

(A) VEGETATION TYPE	SCORE
Wet and mixed forests	6
Dry forest & woodland, shrub or heath understorey	5
Heathland and shrubland	4
Dry forest, grass understorey	3
Grassland and grassy woodland	2
Rainforest	1

The vegetation type used in the analysis is the one in the reserve with the highest score within 100m of the asset. Scores are halved where the vegetation threatening the asset is less than 1 hectare in area, or the potential fire run is less than 20m. Areas of mown grass may burn under extreme conditions but the fire is unlikely to be a threat to adjoining assets. Areas of mown grass are therefore considered to be part of the defensible space rather than a hazard.

Bushfire Approach

Bushfire approach has two aspects, slope and wind direction. Fires burning downslope generally have a lower intensity than fires burning upslope in the same fuel type. Extreme bushfire weather in south-eastern Tasmania generally occurs with hot, dry, northerly to north-westerly winds. These winds are usually generated ahead of cold fronts that cause the winds to back round to the west and south as the front passes.

This wind change can turn the previous flank of the bushfire into the head fire which can continue to burn with high intensity until the cooler temperatures and higher humidity brought by the change increase fuel moisture levels. The two bushfire approach factors are scored as follows:

(B) BUSHFIRE APPROACH - SLOPE	SCORE
Up slopes greater than 5 degrees	3
Across slopes – 5 degrees to + 5 degrees	2
Down slopes greater than 5 degrees	1
(C) BUSHFIRE APPROACH - DIRECTION	SCORE
North through west to south-east	3
North-east and east	1

Where there is more than one possible bushfire approach within or from a Council reserve, the combination of vegetation type, slope, and bushfire approach direction that gives the highest risk score should be used in the assessment.

Vulnerability to Damage

Vulnerability to damage is assessed using three factors; the combustibility of the asset, bushfire protection measures in place in the form of a defensible space and whether the asset is accessible by multi-agency fire service vehicles. Note that the assessment does not include an assessment of the vulnerability of structures to ember attack.

It was not possible to inspect properties adjoining Council reserves to determine if they have a defensible space, so the assessment of risk to buildings on these properties from fires in the adjoining reserve is based on whether there is sufficient room on the property to maintain a defensible space to TFS standards, or if the building was constructed to AS:3959 Construction of buildings in bushfire-prone areas. Existing defensible spaces within the reserves were taken into account. Residents adjoining Council bushland reserves need to be reminded that they need to manage the bushfire hazard on their properties to complement defensible spaces within reserves. Where defensible spaces are not being maintained around vulnerable assets on private property adjoining a reserve they may face a much higher bushfire risk than indicated in this risk assessment.

(D) COMBUSTIBILITY	SCORE
Asset is constructed primarily of combustible materials and is highly susceptible to attack by wind-blown burning embers, radiant heat and/or flame contact.	3
Asset contains structural, or other essential elements, that are combustible and are likely to be subjected to at least attack by wind-blown burning embers during a bushfire, or may fail at the temperatures likely to be generated by a bushfire (all dwellings adjoining reserves have been included in this category on the assumption they are well maintained).	2
Asset constructed of non-combustible materials but contains combustible materials that, if ignited, could damage the building or cause structural failure (e.g. steel framed and clad buildings with a concrete floor).	1
Asset constructed of non-combustible materials capable of maintaining structural integrity during a bushfire.	0

(E) DEFENDABLE SPACE	SCORE
None (flame contact, intense radiant heat, burning embers).	3
Present but does not meet TFS standard for width without complementary fuel management within the reserve (intense radiant heat, burning embers).	2
Meets current TFS standard for assets within the reserve (low level radiant heat, wind-blown burning embers only). For assets on adjoining properties, there is sufficient space to provide an adequate defendable space on the property or the adjoining portion of the reserve is already managed as an adequate fuel modified buffer zone.	0.2

Accessibility

This factor assesses the ability of the multi-agency fire service vehicles to actively defend an asset during a bushfire. The assessment is in terms of the ability of vehicles to access that asset and assumes that there will be sufficient water available to at least extinguish spot fires on or around the asset. The assessment considers all possible access routes, not just those running through a Council reserve. It should be noted that in a major bushfire where firefighting resources are heavily committed, there may not be enough resources available to defend every dwelling in the path of a bushfire. It is also possible that during high intensity fires it may not be safe for fire fighters to actively defend an asset.

This factor also provides an indication of the likely danger and difficulty in evacuating residents during a major bushfire. It should be noted that in all areas near bushland evacuation becomes progressively more dangerous as the fire front approaches unless the access is through urban areas and is unlikely to be cut by fire.

(F) ACCESSIBILITY	SCORE
No fire brigade vehicle access.	4
Dead end access through bushland, light tanker only.	3
Dead end access through bushland, light and heavy tanker.	2
Through road or fire trail, or no bushfire hazard along access.	1

Potential Consequences

The following potential consequences of fire have been adapted from those in the National Emergency Risk Assessment Guidelines (NEMC, 2010) to suite the local scale of this assessment. There are no reserves where a bushfire originating in or moving through a reserve is likely to have a catastrophic level of impact.

(G) CONSEQUENCES	SCORE
MAJOR: Assets may be lost or severely damaged and are of high personal, heritage or community value. Persons other than fire fighters likely to be present in or near the asset. Multiple cases of injury or loss of life possible. All dwellings have been included in this category on the assumption that residents may be sheltering in them during a bushfire.	6
MODERATE: Assets may be lost or severely damaged and are of moderate personal, heritage or community value. Persons other than fire fighters may be present in or near the asset. Isolated cases of injury or loss of life possible.	4
MINOR: Isolated cases of damage to structures, equipment and infrastructure only, or asset is of low personal, heritage or community value. Persons other than fire fighters unlikely to be in or around the asset during a bushfire.	2
INSIGNIFICANT: Superficial damage to structures, equipment and infrastructure, if any, or asset is of very low personal, heritage or community value. Persons other than fire fighters unlikely to be in or around the asset during a bushfire.	1

Active protection of an asset during a bushfire can greatly reduce the bushfire risk. Inevitably active protection may not be an option during bushfire suppression due to operational restraints. The potential for active protection by the TFS is incorporated into the assessment under Factor F “accessibility” as there is potential.

Some minor assets such as fencing, timber barriers, signage, wooden steps on paths etc. can be damaged by fire but the cost of replacing the asset, should it be damaged in a fire, is far less than the cost of protecting it from bushfire. However, care will need to be taken to prevent damage to these assets during planned burns.

Other assets, such as Aboriginal heritage sites, may not be directly damaged by fire but may be damaged by bushfire management and bushfire suppression activities, such as construction of fire control lines.

8.5 Likely Effect of Climate Change on Bushfire Risk

A report on the climate change impacts on bushfire weather in south-east Australia by the CSIRO and the Bureau of Meteorology (Hennessy et al. 2005) modelled likely changes in bushfire weather due to global warming using both high and low rates of global warming as predicted by the International Panel on Climate Change.

The results of the model for Hobart broadly predicted very little, if any, change in the average number of days when the Forest Fire Danger Index (FFDI), and a slight increase in the average number of days the Grassland Fire Danger Index (GFDI), is very high or greater over the next 50 years as projected increases in temperature are offset by predicted increases in rainfall and humidity.

FDR ratings above severe occur in Tasmania around three times a year. Ratings above extreme have occurred only half a dozen times in Tasmania during the last 90 years. However, with the impact of climate change, the potential for such days is increasing (TFS, 2016).

There are currently 67.5 days when the GFDI is very high or greater and this could increase to 68.1 – 71.5 days by 2050 (Hennessy et al. 2005).

One possible effect of climate change that could influence the occurrence rather than the severity of bushfires is the incidence of thunderstorms. Currently there are no predictions available on the effect of climate change on the incidence of thunderstorms around Hobart. At present, bushfires started by lightning strikes are rare in Clarence, though at least one was started by lightning on 31 December 2009. This means that ignitions in Clarence are, directly or indirectly, due to people and therefore can be reduced by education programs, surveillance, equipment maintenance, defensible spaces etc. However an increase in the incidence of thunderstorms would introduce a new ignition source into the area over which we have little control.

8.6 Community Involvement

Revision and expansion of Clarence City Council's existing BMPs, and the preparation of one new BMP included extensive consultation with stakeholders to understand what they value. The two stages of consultation recommended during reviews are:

1. Direct contact with stakeholders during preparation of the draft revised BMPs.
2. Public exhibition of the draft revised BMS and reserve BMPs.

During preparation of the draft BMPs, consultation was undertaken with the following individuals and groups:

- Clarence City Council Officers
- TFS - Fuel Reduction Unit

- DPIPWE - Nature Conservation Branch
- Aboriginal Heritage Tasmania
- Major landowners adjoining the reserves
- Community groups with an interest in the reserves
- Other adjacent property owners and community members.

Residents surrounding the reserves and key stakeholder groups were contacted directly by Clarence City Council and invited to attend a community “walk and talk” for each reserve. The walk and talks discussed basic information on the aims and process of the BMP review. A comments sheet was also included for those who wished to make written suggestions. The community “walk and talk” meetings were held on Saturdays and Sundays in November, 2015. The results of the initial community consultation program has been compiled into a Summary of Comments and appended to the relevant reserve BMP.

Public submissions on the draft BMS will be collated into a Summary of Responses. This will include a summary of the issues raised in each submission, identification of where the issues are addressed in the management plans, the Council’s response, and the action taken.

8.7 Community Education and Awareness

To ensure successful implementation of this BMS, and improve public understanding of bushfire mitigation and vegetation treatments, it will be necessary to develop and implement a community awareness education program. This program should be designed to complement campaigns by the TFS. See section 5 *Management of Council managed land* for allocating ownership of this task.

The community education program should include information on:

- the effects and benefits of fire in native ecosystems
- BMP structure for reserves, specifically the breakdown of VMUs
- Council’s annual planned burning program, incorporating information on Council’s heap burning program
- Council’s Fire and Bushland Management VMP
- maintenance and establishment of Council’s defensible spaces
- why bushfire hazard management is integrated with broader nature/conservation aims
- illegal rubbish dumping within reserves
- how to manage bushfire hazard on private land to protect assets
- reporting fires and suspicious activities to Council and or TFS.

Residents adjoining Council reserves, as well as user and Landcare groups, will need to be informed about the bushfire management issues in their reserves and the recommendations in the reserve BMP. The Community Education and Awareness Program must be designed and implemented prior to the 2021 review. It is recommended this be displayed on the Council website, and promoted annually through social media and local community newspapers and newsletters.

In addition Council's annual planned burning programs should be advertised biannually (at the start of spring and autumn) through social media and written print such as the Mercury Newspaper and local community newspapers.

8.7.1 Rubbish Dumping in Reserves

During site inspections undertaken as part of this review dumped rubbish was observed in the following reserves; Lauderdale Wetlands, Pilchers Hill, Rokeby Hills, Rosny Foreshore, Rosny Hill, Roscommon, Seven Mile Beach, Waverley Flora Park and Wiena Reserve. Most of the rubbish consisted of plant material that appeared to originate from nearby private property. This material can substantially increase the bushfire hazard on reserve perimeters, spread weeds and hamper planned burning and asset protection during bushfires. Bushfire risk could be reduced if residents are educated not to dump garden wastes and other rubbish in reserves and Council takes effective action to reduce dumping where education programs are not effective.

8.8 Liaison with the Tasmania Fire Service (TFS)

Since the establishment of the TFS Fuel Reduction Unit in 2014, a multi-agency approach has been adopted by Council's Fire and Bushland Management Team. Council aims to contribute to a holistic bushfire risk management approach through annually disclosing planned burning programs and reserve fire history with the TFS Fuel Reduction Unit, in addition to regular engagement.

The TFS is responsible for bushfire suppression within Council managed land. To carry out this function effectively it is important that local brigades are familiar with the reserves they are responsible for. The TFS should be provided with copies of the reserve BMPs so the information in the plans can be used when brigades respond to fires in the reserves. Local brigades will be provided a tour of the reserves in their area upon request so they are familiar with the location and condition of fire trails, defensible spaces, assets at risk and planned burn history.

Clarence City Council's Fire and Bushland Vegetation Management Coordinator has equipment and a trained crew that can assist the TFS in a number of ways during bushfire control operations, including:

- advising the Incident Controller on the location and condition of access points, fire trails, fuel breaks, defensible spaces and water points as well as fuel loads

- advising the Incident Controller of the location of assets (infrastructure, heritage and natural) that need to be protected from fire
- advising the Incident Controller of potential hazards for fire fighters
- guiding fire crews, particularly at night
- opening gates
- coordinating the supply of other Council resources (such as water carriers and earth moving equipment) to assist in bushfire suppression
- undertaking blacking out and patrol duties once bushfires have been contained.

8.9 Threatened or Rare Species

It is important that planned burning promotes populations of species of conservation value. In the absence of any specific information on the bushfire management requirements of a particular threatened species, the BMPs prepared under this strategy aim to maintain the structure and floristics of the plant communities in which they occur. However, given the uncertainties in our knowledge of the fire ecology of some of the threatened plants, known populations should be monitored for any changes in population size following bushfires and planned burns. This will allow fire regimes to be altered if they are having an adverse impact on threatened species. Individual BMPs state what if any threatened or rare species are present, in addition to threatened species permit requirements.

8.10 Cultural Heritage

The preservation of cultural heritage values within bushland reserves are a high priority. Cultural heritage sites such as Aboriginal heritage sites, may not be directly damaged by bushfire but may be damaged by bushfire management and bushfire suppression activities, such as constructing fire control lines. These risks if present are noted in the bushfire risk assessment for built and cultural assets in each BMP. During each strategy review Aboriginal Heritage Tasmania must be engaged to conduct searches of the Aboriginal Heritage Register for each BMP.

8.11 Monitoring and Evaluation

Council's Fire and Bushland Management Team established its VMP during 2012. This program was designed with three key objectives in mind, the collection of long term data, utilisation of data to review prescribed treatments effectiveness, and modification of treatments to meet desired outcomes. The program is a collaboration of methodologies used by Planned Burn Practitioners, Field Foresters, and influences from Vegetation Condition Assessment methodologies deriving from NRM South.

Collection of data:

Council's Fire and Bushland Management Team annually collect data from an assortment of assessment plots within bushland reserves. Photo point monitoring helps to visually assess treatments effectiveness and long term impacts to biodiversity. Each assessment site location is stored on Council's Fire Management GIS context.

Review treatments effectiveness:

Storing datasets through cloud computing (internet based data storage) enables Council's Fire and Bushland Management Team to review treatments effectiveness at the touch of a button through an iPad. This makes evaluation relatively easily if the bushfire risk has been reduced or ecological objectives been achieved. The datasets also assist reviewing treatments at strategic level at each five year BMS review.

Modify treatments to suit:

After reviewing datasets at each five year BMS review, Council's Fire and Bushland Management Team can amend treatments to better achieve the VMUs objectives. Annual collection of data continues after the treatment being applied is producing the desired results, in turn completing the adaptive management cycle.

The future expansion of the monitoring program should include threatened species and be developed in consultation with the Threatened Species Section of the DPIPWE. It should also be in accordance with any conditions attached to a permit to take threatened species. As stated in Recommendation 8, the permanent creation of a Technical Fire and Bushland Management Team position will allow for the implementation of a more formalised and effective program.

8.11.1 Performance Indicators

Where applicable, performance indicators are included for actions recommended in reserve BMPs. The performance indicators are used to determine if the specific objectives of the BMPs have been achieved. For example a recommended action may be "Ensure all personnel engaged in planned burning activities in the reserve have the appropriate level of training", the performance indicator would be "All personnel are able to demonstrate the required level of training."

Performance indicators will be assessed every five years when the BMPs are revised. Where performance targets are not being achieved, a review of the relevant portion of the BMP should be undertaken.

8.12 Maintaining Records

8.12.1 Bushfire Management Activities

The area and date of planned burns or bushfires within the area covered by this BMS must be recorded and stored on Council's Fire Management GIS context as outlined in MP 8. This data is to be shared annually with the TFS Fuel Reduction Unit as noted in section 8.8.

8.12.2 Fire Management Geographic Information System (GIS) Context

During 2013 Council's Fire and Bushland Management Team in conjunction with Councils GIS Systems Asset Officer, established an extensive Fire Management GIS Context. This context is updated multiple times annually, and designed as a central repository for Council's Fire and Bushland Asset Management. The context stores datasets such as planned burn and bushfire history, fire trail location, VMU locations, conservation significant flora, defensible spaces and VMP sites.

In a multi-agency approach to bushfire risk management, planned burn, bushfire history and VMU datasets are to be supplied to the TFS Fuel Reduction Unit annually. In addition natural values datasets (such as weed mapping) is to be shared with the Natural Values Atlas annually.

Use of this context as a central repository for information outlined in each BMP will allow BMPs to be easily updated and revised. This is essential to the adaptive management approach used in this BMS, as there will be a need to modify the BMPs in response to:

- new information on the fire ecology of the flora and fauna species in the reserves
- establishment of new fire trails and defensible spaces
- acquisition of new Council land
- unplanned incidents, such as major bushfires
- changes in Clarence City Council and government policy affecting bushfire management.

8.13 Review of the Bushfire Management Strategy

Every five years, Clarence City Council's BMS must be reviewed to ensure that its objectives and strategies meet legislative requirements, operational requirements and current TFS guidelines.

The BMS and all other relevant Council plans such as RAPs must have a collaborative approach to ensure successful implementation and do not prescribe or recommend conflicting actions.

8.13.1 Revision of the Bushfire Management Plans (BMPs)

Reserve BMPs must be reviewed and revised every five years in conjunction with the review of the BMS, and when any of the triggers listed in Table 7 are encountered. The review should include:

- comparison of the condition of burnt and unburnt VMUs
- an audit to ascertain if procedures have been properly carried out and performance targets have been achieved
- a review of contemporary bushfire management and fire ecology literature to incorporate the latest information into each BMP
- a review of established defensible spaces to ensure compliance with most current TFS guidelines
- evaluation of VMP data (section 8.11) to see if management objectives have been met and, if not, what changes need to be incorporated in the revised plans to meet these objectives
- Preparation of a revised BMP to cover the next five years.

Table 7 –BMP revision procedures

ASSESSMENT:	REVIEW TRIGGER:	RECOMMENDED ACTION:
Monitoring of bushfires in Clarence City Council reserves.	Bushfire burns more than half of any single VMU in a reserve.	Consider the whole VMU to have been burnt and reschedule the next planned burn according to the optimal fire frequency for the vegetation communities in the VMU.
Monitoring of bushfires in Clarence City Council reserves.	Bushfire burns more than 50% of the combined VMUs in a reserve in any single year.	Completely revise the burning schedule for the reserve.
Flora and fauna surveys or incidental recordings.	Further threatened species considered sensitive to fire recorded in a reserve.	Revise the burning prescription and/or burning schedule for the VMU in which the species occurs to ensure it is not adversely affected. A permit to take threatened species will be required for future burns in the areas in which they occur.
Check of actual burn outcomes against the desired outcomes.	Burning prescription not producing the desired outcomes.	Revise burning prescription based on information recorded during the burn to ensure desired outcomes can be achieved.
Weed monitoring in burnt areas.	Post-fire weed treatment has not been successful in controlling target weeds.	Carry out follow-up treatments until target weeds are under control.
Release of recovery plans for threatened species in Clarence City Council reserves.	Current fire regimes are incompatible with the requirements of the recovery plan.	Revise burning schedules for the VMUs containing the particular species or plant community.

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Glossary

The following descriptions of bushfire related terms are taken or adapted from:

Tasmanian Planning Commission. (2016). *Interim Planning Directive No. 1 Bushfire-Prone Areas Code*. Hobart:

Tasmanian Planning Commission.

Tasmanian Fire Service. (2015). *Bushfire Survival Plan 2015-2016*. Tasmanian Fire Service, Hobart.

Marsden-Smedley J. B. (2009) *Planned Burning in Tasmania, operational guidelines and review of current knowledge*. Fire Management Section, Parks and Wildlife Service, Department of Primary Industries, Water and the Environment, Hobart.

Australian Fire Authorities Council (2009) *Wildfire glossary*

Bushfire attack level (BAL):

means the bushfire attack level as defined in AS3959 –2009 *Construction of Buildings in Bushfire Prone Areas* as ‘a means of measuring the severity of a building’s potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire’.

Back-burning

A fire started intentionally along the inner edge of a fire line during indirect attack operations to consume the fuel in the path of a bushfire. This is usually the only method for controlling large wildfires.

Black out

The process of extinguishing or removing burning material along or near the fire control line, felling stags, trenching logs to prevent rolling and the like, in order to make the fire safe.

Bushfire

An unplanned fire burning in vegetation; also referred to as wildfire.

Bushfire Hazard

Materials that can fuel a fire.

Bushfire-Prone Area

In Tasmania a Bushfire Prone Area is:

- a) Land that is within the boundary of a bushfire-prone area shown on an overlay on a Planning Scheme map; and
- b) (i) where there is no overlay on a Planning Scheme map: or
- (ii) where there land is outside the boundary of a bushfire-prone area shown on an overlay on such a map,

Land that is within 100m of an area of bushfire-prone vegetation equal to or greater than 1 hectare.

Bushfire-Prone Vegetation

Means continuous vegetation including grasses and shrubs but not including maintained lawns, parks and gardens, nature strips, plant nurseries, golf courses, vineyards, orchards or vegetation on land that is used for horticultural purposes.

Bushfire Risk

In general, bushfire risk is the probability of a wildfire starting and spreading, but it can also be used to describe the likelihood of an asset, such as a building, being damaged or destroyed in a bushfire.

Defendable Space

An area of managed vegetation around an asset likely to be at risk from bushfire that protects it from direct flame contact and intense radiant heat, as well as providing an area where fire fighters can defend the asset.

Duff

The layer of decomposing vegetative matter on the forest floor below the litter layer, the original structure still being recognisable.

Effective slope

The slope under vegetation which most influences the bushfire attack direction.

Fine Fuel

Dead plant matter less than 6mm in diameter and live plant matter less than 2mm in diameter (including grasses, bracken, leaves, bark, and twigs and branches) that ignites readily and burns rapidly when dry. Fine fuel is what burns at the fire front and contributes directly to fire behaviour. Increasing fine fuel loads increases the rate of spread and intensity of fire fronts.

Fire Danger Rating (FDR)

A system to warn of the potential impact of a bushfire on any given day, based on forecast weather conditions. Rated as: **low-moderate** (FDI 0-11), **high** (FDI 12-24), **very high** (FDI 25-49), **severe** (FDI 50-74), **extreme** (FDI 75-99) or **catastrophic** (FDI >100).

Fire Intensity

The rate of energy output per unit length of fire front, usually measured in kilowatts per metre. It is a function of the heat yield of the fuel (H), the dry weight of the fuel consumed (W), and the forward rate of spread of the fire (R) i.e. $I = HWR$.

Fire Regime

The history of fire in a particular vegetation type or area including the frequency, intensity and season of burning. It may also include proposals for the use of fire in a given area.

Fuel break

Synonymous with “firebreak”; any natural or constructed change in fuel characteristics, which affects fire behaviour so that fires burning into them can more readily be controlled. Fuel breaks will not stop a major bushfire but provide a fire control line from which to suppress a fire.

Fuel Load

The amount of combustible material commonly expressed in tonnes per hectare (also known as fuel loading).

Fuel Structure

The quantity and type of fuel at different heights above the ground usually separated into the following strata; surface, near surface, elevated and canopy. Where trees are present bark fuel is also included. In forests and woodlands the canopy fuels are normally left out of fuel assessments, but are included in shrublands and heathlands where they are the equivalent of elevated fuels in forests.

Hazard Management Area

The area between a habitable building or building area and bushfire-prone vegetation, which provides access to a fire front for fire fighting, which is maintained in a minimal fuel condition and in which there are no other hazards present which significantly contribute to the spread of fire.

Hazard Reduction

Reducing fuel loads in a given area. Generally by burning, mechanical, manual or chemical means.

Head Fire

The part of a fire where the rate of spread, flame height and intensity are greatest, usually when burning downwind or upslope.

Heap burning

The piling of vegetation into large bonfires and burning.

Indigenous Vegetation

The plant species and/or plant communities which occur naturally in a locality. The term 'indigenous' excludes Australian species from another locality or region, as well as non-native species that have been introduced to a locality.

Inner Zone

An area between an asset at risk from bushfire and the outer zone, where fine fuels are maintained in a minimum fuel condition to ensure that the zone acts as a barrier between the assets and bushfire.

Introduced Species

Species of plants or animals that have been deliberately, or accidentally, brought into an area in which they did not naturally occur.

Managed Vegetation

Combustible material that is permanently maintained in a minimal fuel state. Generally mechanically treated in defensible spaces.

Minimum Fuel Conditions

A condition where fine fuels are minimised to the extent that the passage of a fire will be prevented or severely restricted. This generally requires the removal of dead fine fuel and control of live fuel, breaks in the continuity of any fuel, maintenance of a high moisture content in vegetation, or replacement of vegetation with roads, paths, etc.

Outer Zone

The area between the inner zone and unmanaged vegetation where fine fuels are removed and larger fuels strategically modified to reduce the intensity of an approaching bushfire. Provision of an inner zone and an outer zone will ensure that there is a progressive reduction of fine fuel between a bushfire hazard and any combustible structure.

Planned Burn

(Synonymous with prescribed fire, controlled burn, prescription burn, scheduled fire or management burn) The controlled application of fire under specified environmental conditions to a predetermined area, and at the time, intensity, and rate of spread required to attain planned resource management objectives. It is undertaken in specified environmental conditions.

Soil Dryness Index (SDI)

A form of drought index. A measure of the average dryness of an area in terms of the number of millimetres of rainfall required to thoroughly wet the soil.

Spot Fire

Isolated fire started ahead of the main fire by sparks, embers, or other ignited material carried by the wind, sometimes to a distance of several kilometres.

Spotting

Behaviour of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Wildfire

An unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires.