# Illawarra Escarpment State Conservation Area

## Fire Management Strategy

## 2009

Map Sheet 1 of 3

**This strategy should be used in conjunction with aerial photography and field reconnaissance during incidents and the development of incident action plans.**

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**This strategy is a relevant Plan under Section 38 (4) and Section 44 (3) of Rural Fires Act 1997.**

The NSW National Parks and Wildlife Service is part of the Department of Environment and Climate Change.
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Department of Environment & Climate Change NSW

## Fire Season Information

| | |
|---|---|
| **Wildfires** | The statutory wildfire season occurs between 1st October and 31st March. This may be extended if weather conditions lead to increased fire danger outside of this period. |
| **Prescribed Burning** | Prescribed burning in this area is normally undertaken in Autumn through to Spring. |

## Related Documents

- National Parks and Wildlife Service Fire Management Manual.
- The Illawarra Escarpment State Conservation Area Plan of Management
- The Illawarra Escarpment State Conservation Area Fire Management Strategy (Draft) Type 3, June 2004.
- Sydney South Region Incident Procedures and Contact Lists.
- Threatened Species Hazard Reduction Guidelines, Parts 1,2 and 3. N.S.W. Rural Fire Service, As amended.

## Contact Information

| Agency | Position / Location | Phone |
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| | Illawarra Area Manager | 4223 3000<br>0438 928 022 |
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## Map Details

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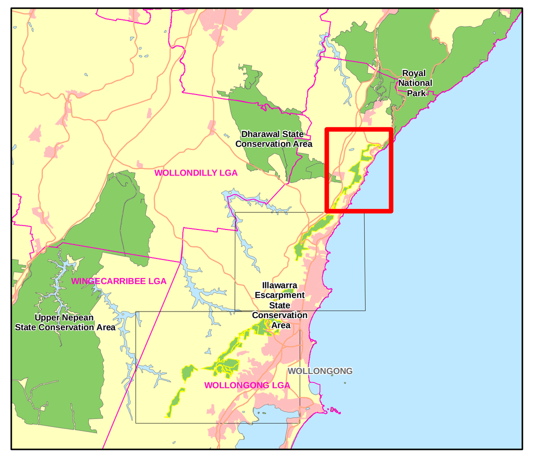
| **Datum:** Australian Geodectic Datum of Australia (AGD) 1966 | **Aerial Photography:** Flown in 2001 |
| **Projection:** Australian Map Grid (AMG) Zone 56 | **1:25k Topographic Map:** Appin 9029 -1S / Bulli 9029 -2N / Otford 9129 -4S. (LPI) |

## Locality of Reserve and Local Government Areas

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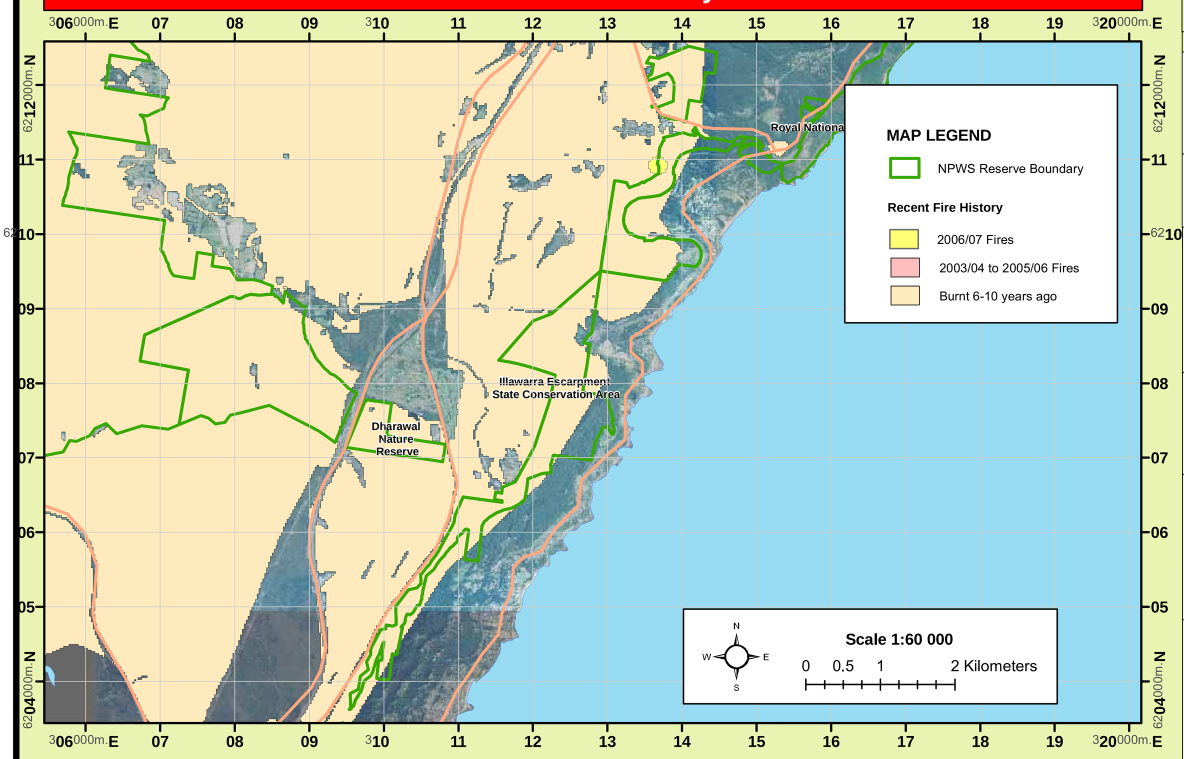


## Current Vegetation Status (Fire Thresholds)

### Fire Thresholds

| | |
|---|---|
| **Overburnt** | Fire thresholds have been exceeded.<br>*· Protect from fire as far as possible.* |
| **Vulnerable** | The area will be Overburnt if it burns this year.<br>*· Protect from fire as far as possible.* |
| **Recently Burnt** | Time since fire is less than the optimal interval, but before that it was within threshold.<br>*· Avoid fires if possible.* |
| **Within Threshold** | Fire history is within the threshold for vegetation in this area.<br>*· A burn is neither required nor should one necessarily be avoided.* |
| **Almost Underburnt** | The area is close to its threshold and may become underburnt with the absence of fire.<br>*· A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.* |
| **Underburnt** | Fire frequency is below fire thresholds in the area.<br>*· A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.* |
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*NB. Fire thresholds are defined for vegetation communities to conserve biodiversity*

Scale 1:60 000
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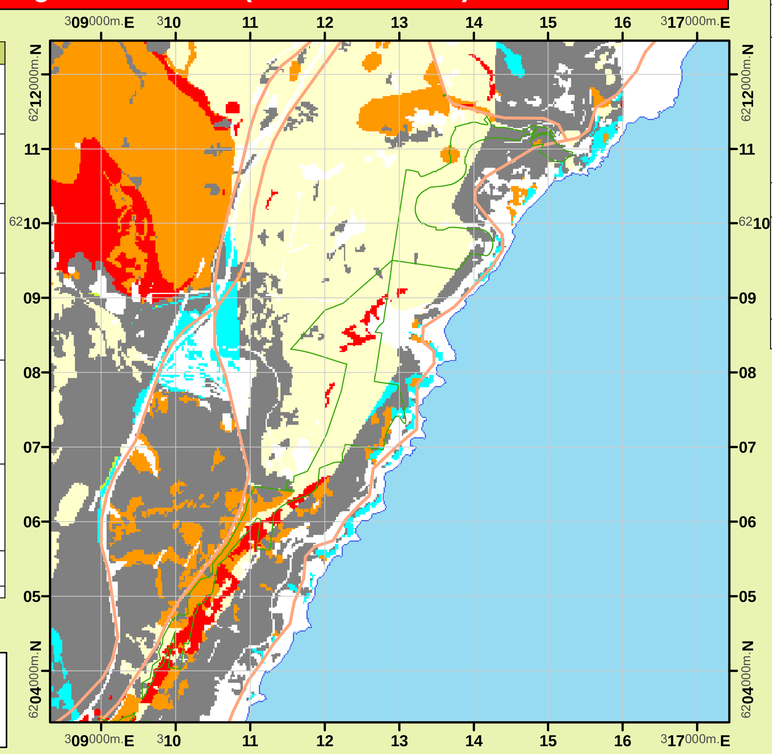
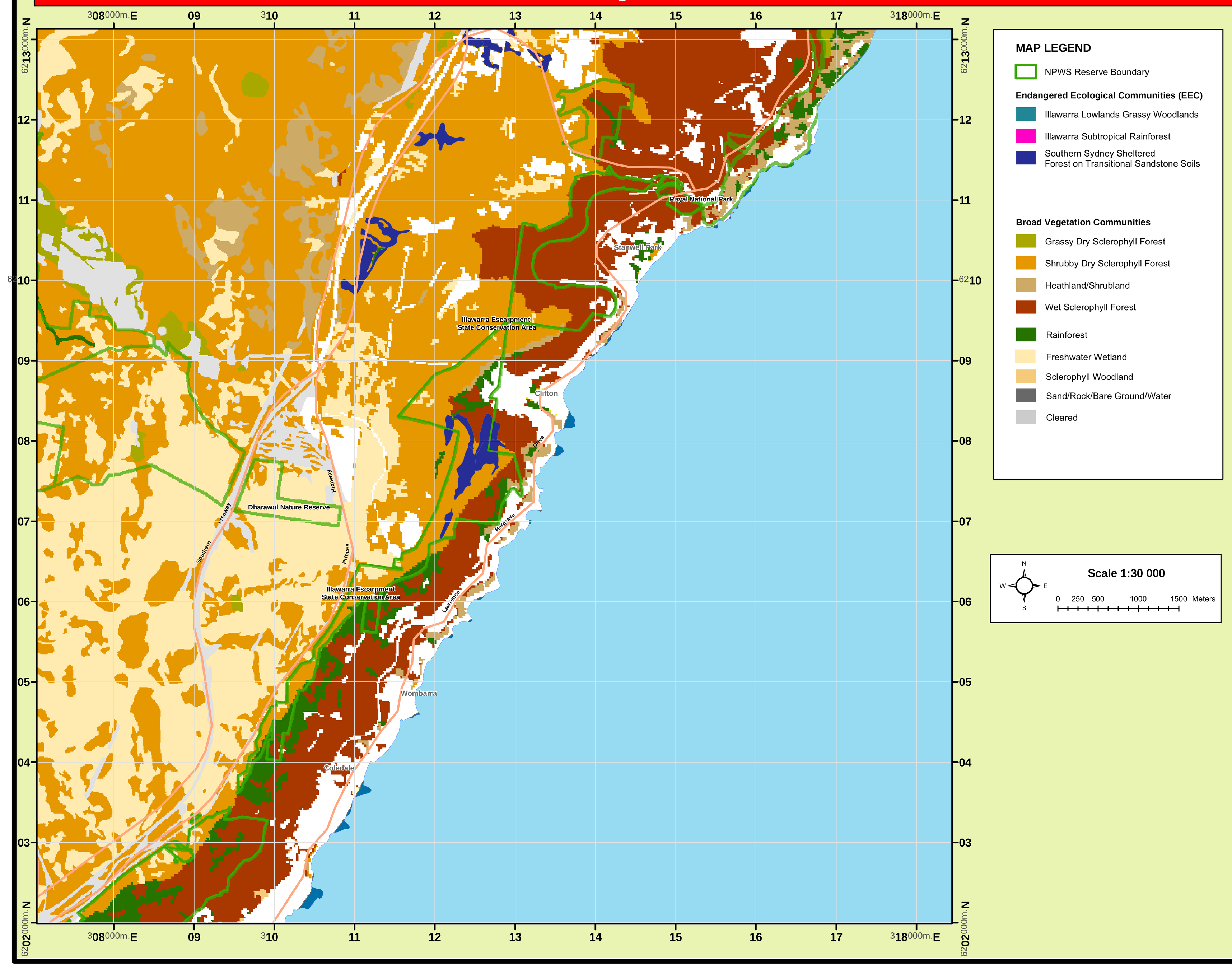


## Vegetation




## Operational Guidelines

**Refer to Strategy for Fire Management 2003 and Fire Management Manual**
Brief all personnel involved in suppression operations on the following issues:

| General | Guidelines |
|---|---|
| Aerial Water Bombing | • The use of bombing aircraft should support containment operations by aggressively attacking hotspots and spot-overs.<br>• The use of bombing aircraft without the support of ground based suppression crews should be limited to very specific circumstances.<br>• Where practicable foam should be used to increase the effectiveness of the water.<br>• Ground crews must be alerted to water bombing operations. |
| Aerial Ignition | • Aerial ignition may be used during back-burning or fuel reduction operations where practicable, but only with the prior consent of NPWS Regional Manager or Section 44 delegate.<br>• Utilise incendiaries to rapidly progress back-burns down slope where required. |
| Backburning | • Temperature and humidity trends must be monitored carefully to determine the safest times to implement back-burns. Generally, when the FDI is Very High or greater, backburning should commence when the humidity begins to rise in the late afternoon or early evening. With a lower FDI backburning may be safely undertaken during the day.<br>• Where practicable, clear a 1m radius around dead and fibrous barked trees adjacent to containment lines prior to backburning, or wet down these trees as part of the backburn ignition.<br>• Avoid ignition of backburns at the bottom of slopes where a long and intense up slope burn is likely. |
| Command & Control | • The first combatant agency on site may assume control of the fire, but then must ensure the relevant land management agency is notified promptly.<br>• On the arrival of other combatant agencies, the initial incident controller will consult with regard to the ongoing command, control and incident management team requirements as per the relevant BFMC Plan of Operations. |
| Containment Lines | • Construction of new containment lines should be avoided, where practicable, except where they can be constructed with minimal environmental impact. New containment lines require the prior consent of a senior NPWS officer.<br>• Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation.<br>• All containment lines not required for other purposes should be closed at the cessation of the incident.<br>• All personal involved in containment line construction should be briefed on both natural and cultural heritage sites in the location. |
| Earthmoving Equipment | • Earthmoving equipment may only be used with the prior consent of a senior NPWS officer, and then only if the probability of its success is high.<br>• Earthmoving equipment must be always guided and supervised by an experienced officer, and accompanied by a support vehicle. When engaged in direct or parallel attack this vehicle must be a firefighting vehicle.<br>• Containment lines constructed by earthmoving equipment should consider the protection of drainage features, observe the Threatened Species and Cultural Heritage Operational Guidelines, and be surveyed, where possible, to identify unknown cultural heritage sites.<br>• Earthmoving equipment should be washed down, where practicable, prior to it entering NPWS estate. |
| Fire Advantage Recording | • All fire advantages used during wildfire suppression operations must be mapped and where relevant added to the database. |
| Fire Suppression Chemicals | • Wetting and foaming agents (surfactants) are permitted for use in wildfire suppression.<br>• The use of fire retardant is only permitted with the prior consent of the senior NPWS officer, and should be avoided where reasonable alternatives are available.<br>• Exclude the use of surfactants and retardants within 50m of rainforest, watercourses, dams and swamps.<br>• Areas where fire suppression chemicals are used must be mapped and the used product's name recorded.<br>• The Threatened Species Operational Guidelines are to be observed. |
| Rehabilitation | • Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation. |
| Smoke Management | • The potential impacts of smoke and possible mitigation tactics must be considered when planning for wildfire suppression and prescribed burning operations.<br>• If smoke becomes a hazard on local roads or highways, the police and relevant media must be notified.<br>• Smoke management must be in accordance with relevant RTA traffic management guidelines. |
| Visitor Management | • The reserve may be closed to the public during periods of extreme fire danger or during wildfire suppression operations. |

## Suppression Strategies

| Current FDR | Forecast FDR | |
|---|---|---|
| Low – Mod | Low – Mod | • As far as possible, undertake indirect, parallel or direct attack along existing control lines.<br>• As far as possible, maximise area burnt without threatening assets, including biodiversity.<br>• Identify and survey backup control lines. |
| Low – Mod | = > High | • Undertake indirect, parallel or direct attack to minimise the time taken to contain the fire.<br>• Construct new control lines if necessary to minimise the time to contain the fire.<br>• Identify and survey backup control lines. |
| High | All | • Undertake indirect attack along existing or newly constructed control lines.<br>• Secure and deepen control lines along the next predicted downwind side of the fire.<br>• Identify and survey backup control lines |
| All | All | • Ensure there is sufficient time to secure control lines before the fire gets to them.<br>• If there is insufficient time to secure control lines, fall back to the next potential control line.<br>• As far as possible, implement threatened species and cultural heritage management guidelines. |

## Communications Information

| Service | Channel | Location and Comments |
|---|---|---|
| NPWS - VHF | 4<br>10<br>9 | • Mt Keira – Good coverage below escarpment.<br>• Garrawarra Farm – Good coverage above escarpment.<br>• Garrawarra Hospital – Good coverage above escarpment. |
| Mobile Phone – GSM | - | • Moderate coverage. |
| Satellite Phone | - | • Moderate coverage |

| Resource | Guidelines |
|---|---|
| **Aboriginal Cultural Heritage Site Management** | |
| A2 | • As far as possible protect site from fire.<br>• Avoid ground disturbance including handtools, dozers.<br>• Avoid water bombing which may cause ground disturbance. |
| A3 | • Avoid ground disturbance including handtools, dozers.<br>• Avoid water bombing which may cause ground disturbance.<br>• Site may be burnt by wildfire, backburn, prescribed burn. |
| **Historic Heritage Management** | **RCHMS: Regional Cultural Heritage Management Strategy.*<br>• *In areas where the asset may be in or close to a water body, wetland or swamp, no foam or retardant is to be used.*<br>• *Earth-moving machinery is to be used around, rather than over/through assets.* |
| H1 | • High RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR.<br>• Avoid all water bombing activities. |
| H2 | • High RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR. |
| H3 | • High or low RCHMS* priority.<br>• Heritage site unlikely to be effected by fire.<br>• Danger to any fire crew activity. Avoid site at all costs. |
| H4 | • Low RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR.<br>• Avoid all water bombing activities. |
| **Threatened Fauna Management** | |
| FA1 | • Protect large and hollow bearing trees.<br>• Avoid fire around cave habitats. |
| FA2 | • Protect large and hollow bearing trees.<br>• Avoid interfire intervals of < 10 yrs.<br>• Avoid high intensity fires that consume tree canopies and fallen logs. |
| FA6 | • Avoid fire, including wildfire, backburning & HR, as far as possible in wetland habitat.<br>• Avoid use of earth moving machinery in wetland habitats.<br>• Avoid use of retardant and foam in wetland habitats. |
| FA7 | • Avoid high intensity fires that consume tree canopies and fallen logs.<br>• Avoid burning of Allocasuarina thickets. |
| **Threatened Flora Management** | |
| FL1 | • Avoid interfire intervals of < 10 yrs.<br>• Avoid the use of earthmoving machinery.<br>• Avoid the use of retardant. |
| FL2 | • Avoid fire, including wildfire, backburn, HR, as far as possible.<br>• Avoid the use of earthmoving machinery.<br>• Avoid the use of retardant. |
| **Threatened Property** | • Where possible property owners with assets at risk from a wildfire event should be kept informed regarding the progress of the fire; and asked for an assessment of their current level of asset protection preparedness. |

## Threatened Fauna Fire Ecology

| Label | Name | Fire Ecology |
|---|---|---|
| FA2 | *Callocephalon fimbriatum*<br>Gang-gang Cockatoo<br>(Vulnerable) | • Avoid high frequency fires in known habitat. |
| FA2 | *Calyptorhynchus lathami*<br>Glossy Black-Cockatoo<br>*(Vulnerable)* | • Avoid burning of Allocasuarina thickets. |
| FA2 | *Pachycephala olivacea*<br>Olive Whistler<br>*(Vulnerable)* | • No slashing, trittering or tree removal. |
| FA2 | *Petroica rodinogaster*<br>Pink Robin<br>Vulnerable | • No slashing, trittering or tree removal |
| FA2 | *Ptilinopus regina*<br>Rose-crowned Fruit Dove<br>Vulnerable | • Avoid burning remnant patches of rainforest |
| FA2 | *Neophema pulchella*<br>Turquoise Parrot<br>Vulnerable | • Protect hollows<br>• No removal of trees |
| FA1 | *Tyto novaehollandiae*<br>Masked Owl<br>*(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing trittering or tree removal around known nesting sites. |
| FA1 | *Ninox strenua*<br>Powerful Owl<br>*(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing trittering or tree removal around known nesting sites. |
| FA1 | *Tyto tenebricosa*<br>Sooty Owl<br>*(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing, trittering or tree removal. |
| FA1 | *Miniopterus schreibersii oceanensis*<br>Eastern Bentwing-bat<br>Vulnerable | • Avoid fire around known roost sites.<br>• No slashing around maternity sites. |
| FA1 | *Myotis adversus*<br>Large-footed Myotis<br>*(Vulnerable)* | • Avoid fire around known roost sites.<br>• No removal of trees around known roosting sites. |
| FA1 | *Falsistrellus tasmaniensis*<br>Eastern False Pipistrelle<br>Vulnerable | • Protect hollows<br>• No removal of trees |
| FA1 | *Mormopterus norfolkensis*<br>Eastern Free-tail Bat<br>*(Vulnerable)* | • Avoid fire in the near vicinity of roost within known/potential habitat where possible.<br>• Maintain a mosaic of age classes within known/potential foraging habitat.<br>• Avoid slashing, trittering or tree removal within known habitat. |
| FA1 | *Cercartetus nanus*<br>Eastern Pygmy-possum<br>Vulnerable | • No slashing, trittering or tree removal |
| FA7 | *Dasyurus maculates*<br>*Spotted-tailed Quoll*<br>*Vulnerable* | • Avoid burning around known nesting sites. |
| FA7 | *Phascolarctos cinereus*<br>Koala<br>*(Vulnerable)* | • Intense wildfire with canopy scorch will cause high mortality and injury.<br>• Post fire areas may be recolonised within 6 – 18 months. With eucalypts providing many nutritious and less toxic leaves for improved food quality. |
| FA7 | *Pteropus poliocephalus*<br>Grey-headed Flying-fox<br>*(Vulnerable)* | • Avoid burning around known roost sites.<br>• Avoid slashing, trittering or tree removal within known roost sites. |
| FA7 | *Hoplocephalus bungaroides*<br>Broad-headed Snake<br>Endangered | • No slashing, trittering or tree removal |
| FA6 | *Heleioporus australiacus*<br>Giant Burrowing Frog<br>Vulnerable | • Avoid burning adjacent to streams, and no burning around ephemeral drainage lines near the headwaters of creeks |
| FA6 | *Mixophyes balbus*<br>Stuttering Frog<br>Endangered | • No burning within 100 metres of streams<br>• No slashing, trittering or tree removal |
| FA6 | *Litoria aurea*<br>Green & Golden Bell Frog<br>Endangered | • No burning within 50 metres of wetlands and other large water bodies<br>• No slashing, trittering or tree removal |
| FA6 | *Pseudophryne australia*<br>Red-crowned Toadlet<br>Vulnerable | • Avoid burning adjacent to streams, and no burning around ephemeral drainage lines near the headwaters of creeks. |

## Threatened Flora Fire Ecology

| Label | Name | Fire Ecology |
|---|---|---|
| FL1 | Acacia baueri subsp.*aspera*<br>Vulnerable | • Mechanical hazard reduction should be limited to 50cm height after March.<br>• No fire more than once every 7 years. |
| FL2 | *Cyanchum elegans*<br>White-flowered Wax Plant<br>Endangered | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal. |
| FL1 | *Pultenaea aristata*<br>Prickly Bush-pea<br>Vulnerable | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal |
| FL1 | *Haloragis exalata* subsp *exalata*<br>Vulnerable | • No fire more than once every 10 years<br>• No slashing, trittering or tree removal |
| FL2 | *Syzygium paniculatum*<br>Magenta Lilly Pilly<br>Vulnerable | • No fire<br>• No slashing, trittering or tree removal |
| FL2 | *Pomaderris adnata*<br>Sublime Point Pomaderris<br>Endangered | • No fire.<br>• No slashing, trittering or tree removal. |
| FL2 | *Solalum celatum*<br>Endangered | • No fire.<br>• No slashing, trittering or tree removal. |
| FL2 | *Daphnandra sp C Illawarra*<br>Illawarra Socketwood<br>Endangered | • No fire.<br>• No slashing, trittering or tree removal |
| FL1 | *Callistemon linearifolius*<br>Netted Bottle-brush<br>Vulnerable | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal. |

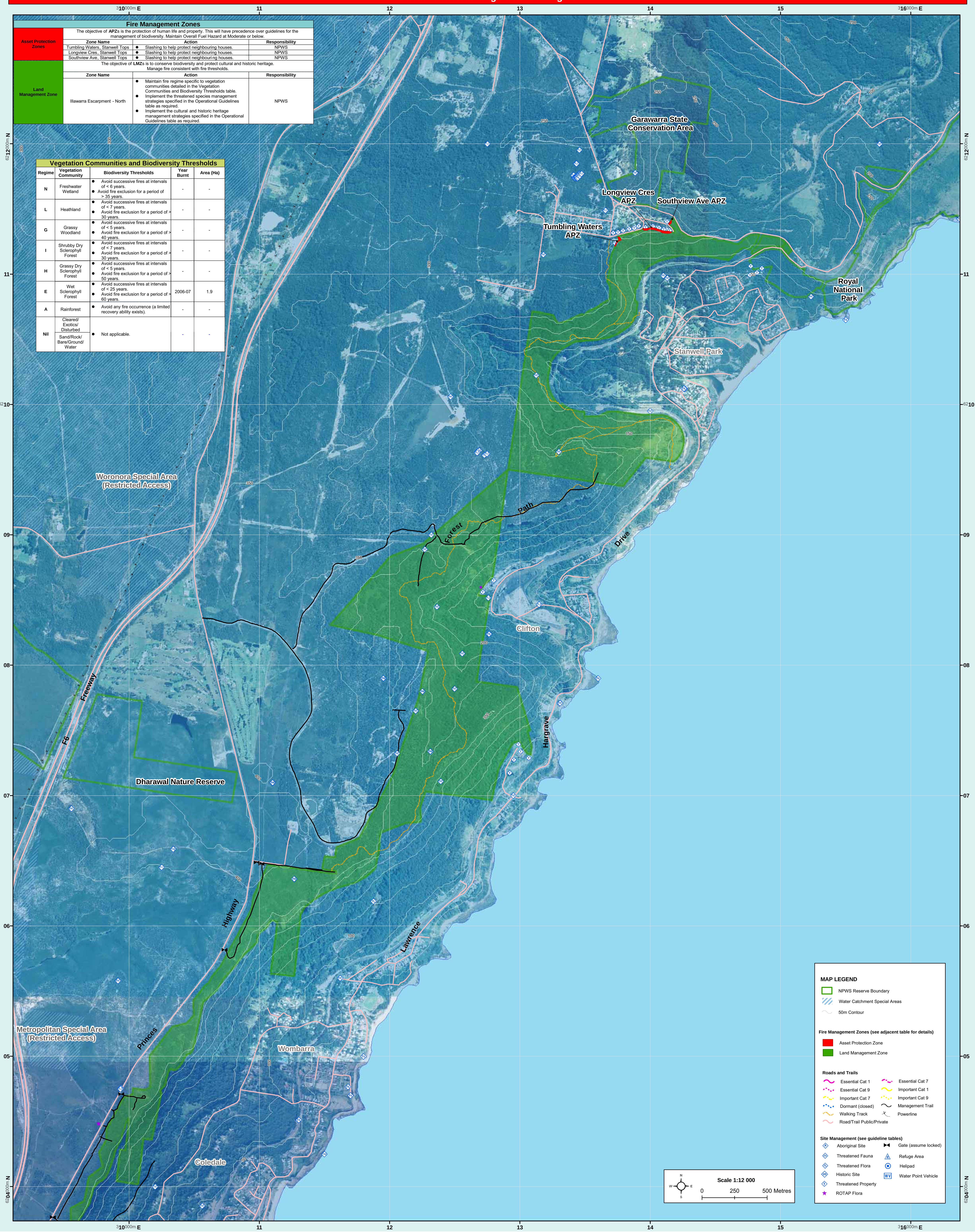
## Bushfire Risk Management Strategies

### Fire Management Zones

| | | | |
|---|---|---|---|
| **Asset Protection Zones** | The objective of **APZ**s is the protection of human life and property. This will have precedence over guidelines for the management of biodiversity. Maintain Overall Fuel Hazard at Moderate or below. | | |
| | **Zone Name** | **Action** | **Responsibility** |
| | Tumbling Waters, Stanwell Tops | • Slashing to help protect neighbouring houses. | NPWS |
| | Longview Cres, Stanwell Tops | • Slashing to help protect neighbouring houses. | NPWS |
| | Southview Ave, Stanwell Tops | • Slashing to help protect neighbouring houses. | NPWS |
| **Land Management Zone** | The objective of **LMZ**s is to conserve biodiversity and protect cultural and historic heritage. Manage fire consistent with fire thresholds. | | |
| | **Zone Name** | **Action** | **Responsibility** |
| | Illawarra Escarpment - North | • Maintain fire regime specific to vegetation communities detailed in the Vegetation Communities and Biodiversity Thresholds table.<br>• Implement the threatened species management strategies specified in the Operational Guidelines table as required.<br>• Implement the cultural and historic heritage management strategies specified in the Operational Guidelines table as required. | NPWS |

### Vegetation Communities and Biodiversity Thresholds

| Regime | Vegetation Community | Biodiversity Thresholds | Year Burnt | Area (Ha) |
|---|---|---|---|---|
| N | Freshwater Wetland | • Avoid successive fires at intervals of < 6 years.<br>• Avoid fire exclusion for a period of > 35 years. | - | - |
| L | Heathland | • Avoid successive fires at intervals of < 7 years.<br>• Avoid fire exclusion for a period of > 30 years. | - | - |
| G | Grassy Woodland | • Avoid successive fires at intervals of < 5 years.<br>• Avoid fire exclusion for a period of > 40 years. | - | - |
| I | Shrubby Dry Sclerophyll Forest | • Avoid successive fires at intervals of < 7 years.<br>• Avoid fire exclusion for a period of > 30 years. | - | - |
| H | Grassy Dry Sclerophyll Forest | • Avoid successive fires at intervals of < 5 years.<br>• Avoid fire exclusion for a period of > 50 years. | - | - |
| E | Wet Sclerophyll Forest | • Avoid successive fires at intervals of < 25 years.<br>• Avoid fire exclusion for a period of > 60 years. | 2006-07 | 1.9 |
| A | Rainforest | • Avoid any fire occurrence (a limited recovery ability exists). | - | - |
| Nil | Cleared/ Exotics/ Disturbed<br>Sand/Rock/ Bare/Ground/ Water | • Not applicable. | - | - |



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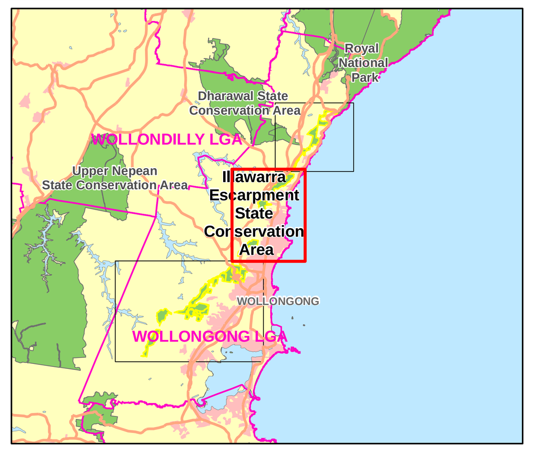


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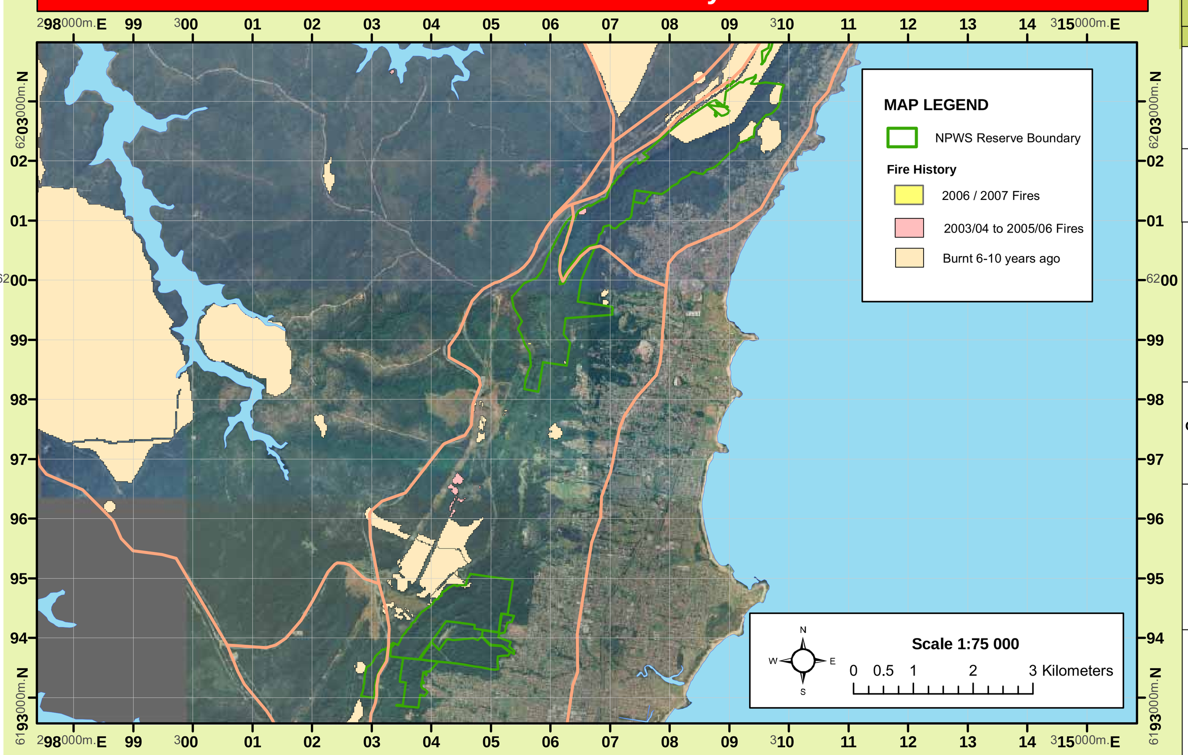


## Current Vegetation Status (Fire Thresholds)

### Fire Thresholds

| | |
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| **Vulnerable** | The area will be Overburnt if it burns this year.<br>*· Protect from fire as far as possible.* |
| **Recently Burnt** | Time since fire is less than the optimal interval, but before that it was within threshold.<br>*· Avoid fires if possible.* |
| **Within Threshold** | Fire history is within the threshold for vegetation in this area.<br>*· A burn is neither required nor should one necessarily be avoided.* |
| **Almost Underburnt** | The area is close to its threshold and may become underburnt with the absence of fire.<br>*· A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.* |
| **Underburnt** | Fire frequency is below fire thresholds in the area.<br>*· A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.* |
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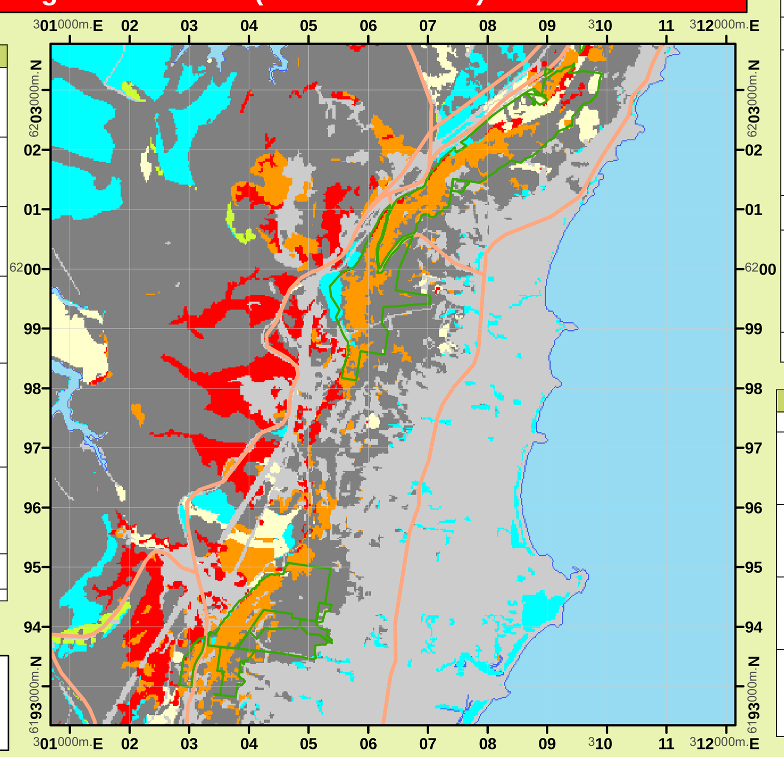
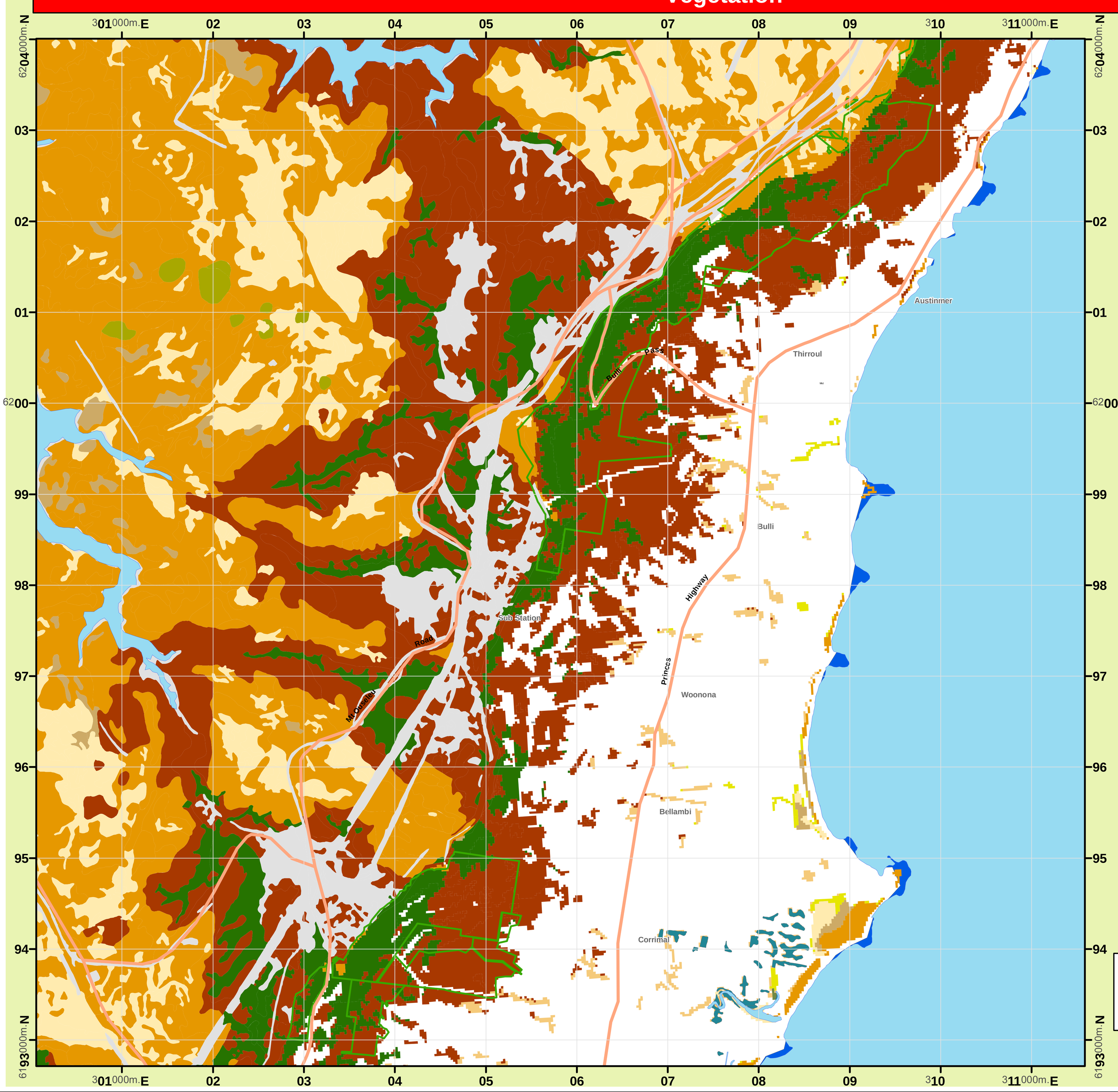
*NB. Fire thresholds are defined for vegetation communities to conserve biodiversity*

Scale 1:75 000
0 0.5 1 2 3 Kilometers



## Vegetation

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| **Aerial Water Bombing** | • The use of bombing aircraft should support containment operations by aggressively attacking hotspots and spot-overs.<br>• The use of bombing aircraft without the support of ground based suppression crews should be limited to very specific circumstances.<br>• Where practicable foam should be used to increase the effectiveness of the water.<br>• Ground crews must be alerted to water bombing operations. |
| **Aerial Ignition** | • Aerial ignition may be used during back-burning or fuel reduction operations where practicable, but only with the prior consent of NPWS Regional Manager or Section 44 delegate.<br>• Utilise incendiaries to rapidly progress back-burns down slope where required. |
| **Backburning** | • Temperature and humidity trends must be monitored carefully to determine the safest times to implement back-burns. Generally, when the FDI is Very High or greater, backburning should commence when the humidity begins to rise in the late afternoon or early evening. With a lower FDI backburning may be safely undertaken during the day.<br>• Where practicable, clear a 1m radius around dead and fibrous barked trees adjacent to containment lines prior to backburning, or wet down these trees as part of the backburn ignition.<br>• Avoid ignition of backburns at the bottom of slopes where a long and intense up slope burn is likely. |
| **Command & Control** | • The first combatant agency on site may assume control of the fire, but then must ensure the relevant land management agency is notified promptly.<br>• On the arrival of other combatant agencies, the initial incident controller will consult with regard to the ongoing command, control and incident management team requirements as per the relevant BFMC Plan of Operations. |
| **Containment Lines** | • Construction of new containment lines should be avoided, where practicable, except where they can be constructed with minimal environmental impact. New containment lines require the prior consent of a senior NPWS officer.<br>• Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation.<br>• All containment lines not required for other purposes should be closed at the cessation of the incident.<br>• All personal involved in containment line construction should be briefed on both natural and cultural heritage sites in the location. |
| **Earthmoving Equipment** | • Earthmoving equipment may only be used with the prior consent of a senior NPWS officer, and then only if the probability of its success is high.<br>• Earthmoving equipment must be always guided and supervised by an experienced officer, and accompanied by a support vehicle. When engaged in direct or parallel attack this vehicle must be a firefighting vehicle.<br>• Containment lines constructed by earthmoving equipment should consider the protection of drainage features, observe the Threatened Species and Cultural Heritage Operational Guidelines, and be surveyed, where possible, to identify unknown cultural heritage sites.<br>• Earthmoving equipment should be washed down, where practicable, prior to it entering NPWS estate. |
| **Fire Advantage Recording** | • All fire advantages used during wildfire suppression operations must be mapped and where relevant added to the database. |
| **Fire Suppression Chemicals** | • Wetting and foaming agents (surfactants) are permitted for use in wildfire suppression.<br>• The use of fire retardant is only permitted with the prior consent of the senior NPWS officer, and should be avoided where reasonable alternatives are available.<br>• Exclude the use of surfactants and retardants within 50m of rainforest, watercourses, dams and swamps.<br>• Areas where fire suppression chemicals are used must be mapped and the used product's name recorded.<br>• The Threatened Species Operational Guidelines are to be observed. |
| **Rehabilitation** | • Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation. |
| **Smoke Management** | • The potential impacts of smoke and possible mitigation tactics must be considered when planning for wildfire suppression and prescribed burning operations.<br>• If smoke becomes a hazard on local roads or highways, the police and relevant media must be notified.<br>• Smoke management must be in accordance with relevant RTA traffic management guidelines. |
| **Visitor Management** | • The reserve may be closed to the public during periods of extreme fire danger or during wildfire suppression operations. |

### Suppression Strategies

| Current FDR | Forecast FDR | |
|---|---|---|
| Low – Mod | Low – Mod | • As far as possible, undertake indirect, parallel or direct attack along existing control lines.<br>• As far as possible, maximise area burnt without threatening assets, including biodiversity.<br>• Identify and survey backup control lines. |
| Low – Mod | = > High | • Undertake indirect, parallel or direct attack to minimise the time taken to contain the fire.<br>• Construct new control lines if necessary to minimise the time to contain the fire.<br>• Identify and survey backup control lines. |
| High | All | • Undertake indirect attack along existing or newly constructed control lines.<br>• Secure and deepen control lines along the next predicted downwind side of the fire.<br>• Identify and survey backup control lines. |
| All | All | • Ensure there is sufficient time to secure control lines before the fire gets to them.<br>• If there is insufficient time to secure control lines, fall back to the next potential control line.<br>• As far as possible, implement threatened species and cultural heritage management guidelines. |

| Resource | Guidelines |
|---|---|
| **Aboriginal Cultural Heritage Site Management** | |
| **A2** | • As far as possible protect site from fire.<br>• Avoid ground disturbance including handtools, dozers.<br>• Avoid water bombing which may cause ground disturbance. |
| **A3** | • Avoid ground disturbance including handtools, dozers.<br>• Avoid water bombing which may cause ground disturbance.<br>• Site may be burnt by wildfire, backburn, prescribed burn. |
| **Historic Heritage Management** | **RCHMS: Regional Cultural Heritage Management Strategy.*<br>*• In areas where the asset may be in or close to a water body, wetland or swamp, no foam or retardant is to be used.*<br>*• Earth-moving machinery is to be used around, rather than over/through assets.* |
| **H1** | • High RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR.<br>• Avoid all water bombing activities. |
| **H2** | • High RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR. |
| **H3** | • High or low RCHMS* priority.<br>• Heritage site unlikely to be effected by fire.<br>• Danger to any fire crew activity. Avoid site at all costs. |
| **H4** | • Low RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR.<br>• Avoid all water bombing activities. |
| **Threatened Fauna Management** | |
| **FA1** | • Protect large and hollow bearing trees.<br>• Avoid fire around cave habitats. |
| **FA2** | • Protect large and hollow bearing trees.<br>• Avoid interfire intervals of < 10 yrs.<br>• Avoid high intensity fires that consume tree canopies and fallen logs. |
| **FA6** | • Avoid fire, including wildfire, backburning & HR, as far as possible in wetland habitat.<br>• Avoid use of earth moving machinery in wetland habitats.<br>• Avoid use of retardant and foam in wetland habitats. |
| **FA7** | • Avoid high intensity fires that consume tree canopies and fallen logs.<br>• Avoid burning of Allocasuarina thickets. |
| **Threatened Flora Management** | |
| **FL1** | • Avoid interfire intervals of < 10 yrs.<br>• Avoid the use of earthmoving machinery.<br>• Avoid the use of retardant. |
| **FL2** | • Avoid fire, including wildfire, backburn, HR, as far as possible.<br>• Avoid the use of earthmoving machinery.<br>• Avoid the use of retardant. |
| **Threatened Property** | • Where possible property owners with assets at risk from a wildfire event should be kept informed regarding the progress of the fire; and asked for an assessment of their current level of asset protection preparedness. |

### Threatened Fauna Fire Ecology

| Label | Name | Fire Ecology |
|---|---|---|
| FA2 | *Callocephalon fimbriatum*<br>Gang-gang Cockatoo<br>(Vulnerable) | • Avoid high frequency fires in known habitat. |
| FA2 | *Calyptorhynchus lathami*<br>Glossy Black-Cockatoo<br>*(Vulnerable)* | • Avoid burning of Allocasuarina thickets. |
| FA2 | *Pachycephala olivacea*<br>Olive Whistler<br>*(Vulnerable)* | • No slashing, trittering or tree removal. |
| FA2 | *Petroica rodinogaster*<br>Pink Robin<br>Vulnerable | • No slashing, trittering or tree removal |
| FA2 | *Ptilinopus regina*<br>Rose-crowned Fruit Dove<br>Vulnerable | • Avoid burning remnant patches of rainforest |
| FA2 | *Neophema pulchella*<br>Turquoise Parrot<br>Vulnerable | • Protect hollows<br>• No removal of trees |
| FA1 | *Tyto novaehollandiae*<br>Masked Owl<br>*(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing trittering or tree removal around known nesting sites. |
| FA1 | *Ninox strenua*<br>Powerful Owl<br>*(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing trittering or tree removal around known nesting sites. |
| FA1 | *Tyto tenebricosa*<br>Sooty Owl<br>*(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing, trittering or tree removal. |
| FA1 | *Miniopterus schreibersii oceanensis*<br>Eastern Bentwing-bat<br>Vulnerable | • Avoid fire around known roost sites.<br>• No slashing around maternity sites. |
| FA1 | *Myotis adversus*<br>Large-footed Myotis<br>*(Vulnerable)* | • Avoid fire around known roost sites.<br>• No removal of trees around known roosting sites. |
| FA1 | *Falsistrellus tasmaniensis*<br>Eastern False Pipistrelle<br>Vulnerable | • Protect hollows<br>• No removal of trees |
| FA1 | *Mormopterus norfolkensis*<br>Eastern Free-tail Bat<br>*(Vulnerable)* | • Avoid fire in the near vicinity of roost within known/potential habitat where possible.<br>• Maintain a mosaic of age classes within known/potential foraging habitat.<br>• Avoid slashing, trittering or tree removal within known habitat. |
| FA7 | *Cercartetus nanus*<br>Eastern Pygmy-possum<br>Vulnerable | • No slashing, trittering or tree removal |
| FA2 | *Dasyurus maculates*<br>*Spotted-tailed Quoll*<br>*Vulnerable* | • Avoid burning around known nesting sites. |
| FA7 | *Phascolarctos cinereus*<br>Koala<br>*(Vulnerable)* | • Intense wildfire with canopy scorch will cause high mortality and injury.<br>• Post fire areas may be recolonised within 6 – 18 months. With eucalypts providing many nutritious and less toxic leaves for improved food quality. |
| FA7 | *Pteropus poliocephalus*<br>Grey-headed Flying-fox<br>*(Vulnerable)* | • Avoid burning around known roost sites.<br>• Avoid slashing, trittering or tree removal within known roost sites. |
| FA2 | *Hoplocephalus bungaroides*<br>Broad-headed Snake<br>Endangered | • No slashing, trittering or tree removal |
| FA6 | *Heleioporus australiacus*<br>Giant Burrowing Frog<br>Vulnerable | • Avoid burning adjacent to streams, and no burning around ephemeral drainage lines near the headwaters of creeks |
| FA6 | *Mixophyes balbus*<br>Stuttering Frog<br>Endangered | • No burning within 100 metres of streams<br>• No slashing, trittering or tree removal |
| FA6 | *Litoria aurea*<br>Green & Golden Bell Frog<br>Endangered | • No burning within 50 metres of wetlands and other large water bodies<br>• No slashing, trittering or tree removal |
| FA6 | *Pseudophryne australia*<br>Red-crowned Toadlet<br>Vulnerable | • Avoid burning adjacent to streams, and no burning around ephemeral drainage lines near the headwaters of creeks. |

### Threatened Flora Fire Ecology

| Label | Name | Fire Ecology |
|---|---|---|
| FL1 | Acacia baueri subsp.*aspera*<br>Vulnerable | • Mechanical hazard reduction should be limited to 50cm height after March.<br>• No fire more than once every 7 years. |
| FL2 | *Cyanchum elegans*<br>White-flowered Wax Plant<br>Endangered | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal. |
| FL1 | *Pultenaea aristata*<br>Prickly Bush-pea<br>Vulnerable | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal |
| FL1 | *Haloragis exalata* subsp *exalata*<br>Vulnerable | • No fire more than once every 10 years<br>• No slashing, trittering or tree removal |
| FL2 | *Syzygium paniculatum*<br>Magenta Lilly Pilly<br>Vulnerable | • No fire<br>• No slashing, trittering or tree removal |
| FL2 | *Pomaderris adnata*<br>Sublime Point Pomaderris<br>Endangered | • No fire.<br>• No slashing, trittering or tree removal. |
| FL1 | *Solalum celatum*<br>Endangered | • No fire.<br>• No slashing, trittering or tree removal. |
| FL2 | *Daphnandra sp C Illawarra*<br>Illawarra Socketwood<br>Endangered | • No fire.<br>• No slashing, trittering or tree removal |
| FL1 | *Callistemon linearifolius*<br>Netted Bottle-brush<br>Vulnerable | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal. |

## Bushfire Risk Management Strategies

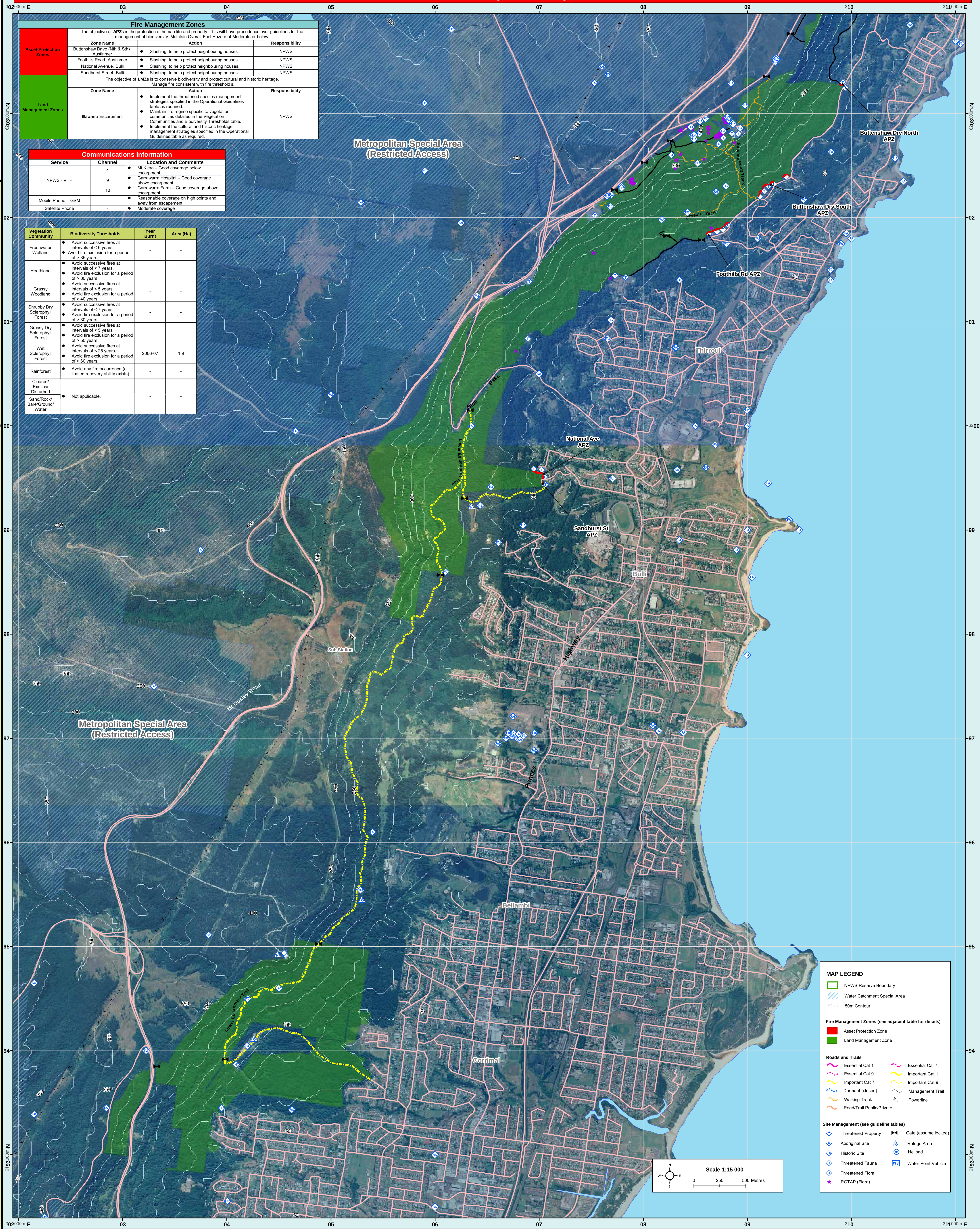
### Fire Management Zones

| | | | |
|---|---|---|---|
| **Asset Protection Zones** | The objective of **APZ**s is the protection of human life and property. This will have precedence over guidelines for the management of biodiversity. Maintain Overall Fuel Hazard at Moderate or below. | | |
| | **Zone Name** | **Action** | **Responsibility** |
| | Buttenshaw Drive (Nth & Sth), Austinmer | • Slashing, to help protect neighbouring houses. | NPWS |
| | Foothills Road, Austinmer | • Slashing, to help protect neighbouring houses. | NPWS |
| | National Avenue, Bulli | • Slashing, to help protect neighbouring houses. | NPWS |
| | Sandhurst Street, Bulli | • Slashing, to help protect neighbouring houses. | NPWS |
| **Land Management Zones** | The objective of **LMZ**s is to conserve biodiversity and protect cultural and historic heritage. Manage fire consistent with fire thresholds. | | |
| | **Zone Name** | **Action** | **Responsibility** |
| | Illawarra Escarpment | • Implement the threatened species management strategies specified in the Operational Guidelines table as required.<br>• Maintain fire regime specific to vegetation communities detailed in the Vegetation Communities and Biodiversity Thresholds table.<br>• Implement the cultural and historic heritage management strategies specified in the Operational Guidelines table as required. | NPWS |

### Communications Information

| Service | Channel | Location and Comments |
|---|---|---|
| NPWS - VHF | 4 | • Mt Kiera – Good coverage below escarpment. |
| | 9 | • Garrawarra Hospital – Good coverage above escarpment. |
| | 10 | • Garrawarra Farm – Good coverage above escarpment. |
| Mobile Phone – GSM | - | • Reasonable coverage on high points and away from escapement. |
| Satellite Phone | - | • Moderate coverage |

| Vegetation Community | Biodiversity Thresholds | Year Burnt | Area (Ha) |
|---|---|---|---|
| Freshwater Wetland | • Avoid successive fires at intervals of < 6 years.<br>• Avoid fire exclusion for a period of > 35 years. | - | - |
| Heathland | • Avoid successive fires at intervals of < 7 years.<br>• Avoid fire exclusion for a period of > 30 years. | - | - |
| Grassy Woodland | • Avoid successive fires at intervals of < 5 years.<br>• Avoid fire exclusion for a period of > 40 years. | - | - |
| Shrubby Dry Sclerophyll Forest | • Avoid successive fires at intervals of < 7 years.<br>• Avoid fire exclusion for a period of > 30 years. | - | - |
| Grassy Dry Sclerophyll Forest | • Avoid successive fires at intervals of < 5 years.<br>• Avoid fire exclusion for a period of > 50 years. | - | - |
| Wet Sclerophyll Forest | • Avoid successive fires at intervals of < 25 years.<br>• Avoid fire exclusion for a period of > 60 years. | 2006-07 | 1.9 |
| Rainforest | • Avoid any fire occurrence (a limited recovery ability exists). | - | - |
| Cleared/ Exotics/ Disturbed<br>Sand/Rock/ Bare/Ground/ Water | • Not applicable. | - | - |



# Illawarra Escarpment State Conservation Area
## Fire Management Strategy 2009
### Map Sheet 3 of 3

**This strategy should be used in conjunction with aerial photography and field reconnaissance during incidents and the development of incident action plans.**

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**This strategy is a relevant Plan under Section 38 (4) and Section 44 (3) of Rural Fires Act 1997.**
The NSW National Parks and Wildlife Service is part of the Department of Environment and Climate Change.
Published by the Department of Environment and Climate Change (NSW), June 2009.

Contact: PO Box 44, Sutherland NSW 1499

ISBN 978 1 7432 3527 7 DECC 2009/461 Date Approved: 30/6/2009

## Fire Season Information

| | |
|---|---|
| **Wildfires** | • The statutory wildfire season occurs between 1st October and 31st March. This may be extended if weather conditions lead to increased fire danger outside of this period. |
| **Prescribed Burning** | • Prescribed burning in this area is normally undertaken in Autumn through to Spring. |

## Related Documents

- National Parks and Wildlife Service Fire Management Manual.
- The Illawarra Escarpment State Conservation Area Plan of Management
- The Illawarra Escarpment State Conservation Area Fire Management Strategy (Draft) Type 3, June 2004.
- Sydney South Region Incident Procedures and Contact Lists.
- Threatened Species Hazard Reduction Guidelines, Parts 1,2 and 3, N.S.W. Rural Fire Service, As amended.

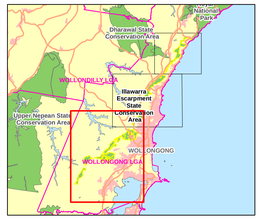
## Contact Information

| Agency | Position / Location | Phone |
|---|---|---|
| National Parks & Wildlife Service | Regional Duty Officer (24 hour) | 0419 428 054 |
| | Illawarra Area Manager | 4223 3000<br>0438 928 022 |
| | Fire Management Officer | 9542 0636<br>0419 462 105 |
| | Regional Operations Coordinator | 9542 0624<br>0409 042 412 |
| | Illawarra Area Office | 4223 3000<br>(fax) 4223 3009 |
| | Sydney South Regional Office | 9542 0624<br>(fax) 9542 1420 |
| Sydney Catchment Authority | 24 Hours | 1800 061 069 |
| Sutherland District NSW Rural Fire Service | 24 Hours | 9520 6022 |
| | Business Hours | 9520 4040 |
| Wollongong District NSW Rural Fire Service | 24 Hours | 4256 8432 |
| | Business Hours | 4230 8200 |
| SES | Business Hours | 000 |
| | Sutherland Shire | 9548 6355 |
| | Wollongong City | 4251 1200 |
| Police | Emergency | 000 |
| | Wollongong | 4226 7899 |
| | Helensburg | 4294 1013 |
| Ambulance | Emergency | 000 |
| | Bookings | 131 233 |
| Hospital | Wollongong | 4222 5000 |
| | Bulli | 4284 4344 |
| Council | Wollongong City Council | 4227 7111 |

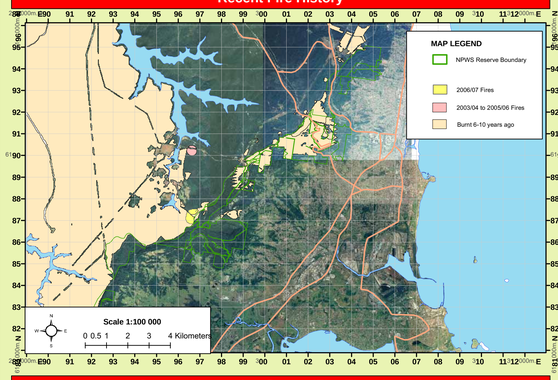
## Map Details

| | |
|---|---|
| **Datum:** Australian Geodectic Datum of Australia (AGD) 1966 | **Aerial Photography:** Flown in 2001 |
| **Projection:** Australian Map Grid (AMG) Zone 56 | **1:25k Topographic Map:** Avon River 9029 -3S / Wollongong 9029 -2S (LPI) |

## Locality of Reserve and Local Government Areas




## Recent Fire History

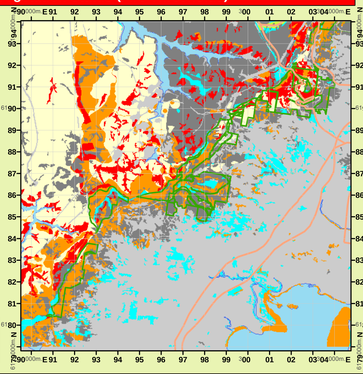



## Current Vegetation Status (Fire Thresholds)

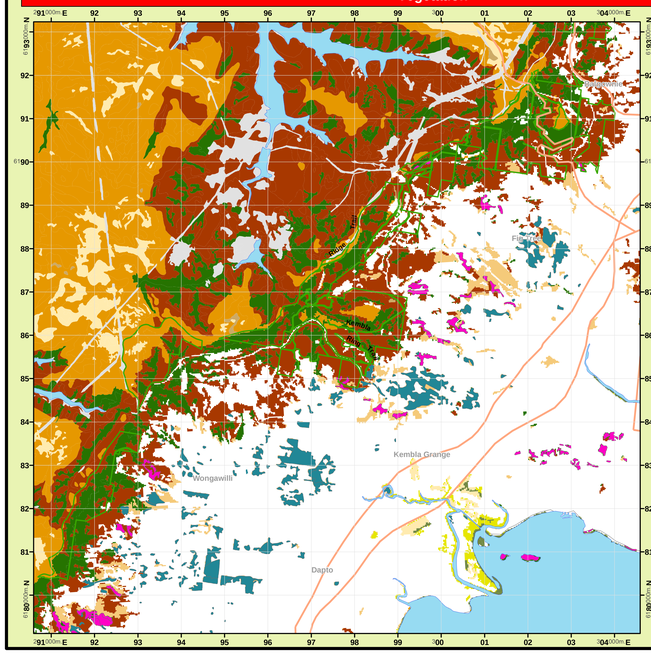
### Fire Thresholds

| | |
|---|---|
| **Overburnt** | Fire thresholds have been exceeded. *- Protect from fire as far as possible.* |
| **Vulnerable** | The area will be Overburnt if it burns this year *- Protect from fire as far as possible.* |
| **Recently Burnt** | Time since fire is less than the optimal interval, but before that it was within threshold. *- Avoid fires if possible.* |
| **Within Threshold** | Fire history is within the threshold for vegetation in this area. *- A burn is neither required nor should one necessarily be avoided.* |
| **Almost Underburnt** | The area is close to its threshold and may become underburnt with the absence of fire. *- A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.* |
| **Underburnt** | Fire frequency is below fire thresholds in the area. *- A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.* |
| **Unknown** | Insufficient data to determine fire threshold. |

*NB: Fire thresholds are defined for vegetation communities to conserve biodiversity*




## Vegetation




## Operational Guidelines

**Refer to Strategy for Fire Management 2003 and Fire Management Manual**
Brief all personnel involved in suppression operations on the following issues:

| General | Guidelines |
|---|---|
| **Aerial Water Bombing** | • The use of bombing aircraft should support containment operations by aggressively attacking hotspots and spotovers.<br>• The use of bombing aircraft without the support of ground based suppression crews should be limited to very specific circumstances.<br>• Where practicable foam should be used to increase the effectiveness of the water.<br>• Ground crews must be alerted to water bombing operations. |
| **Aerial Ignition** | • Aerial ignition may be used during backburning or fuel reduction operations where practicable, but only with the prior consent of NPWS Regional Manager or Section 44 delegate.<br>• Utilise incendiaries to rapidly progress backburns down slope where required. |
| **Backburning** | • Temperature and humidity trends must be monitored carefully to determine the safest times to implement backburns. Generally, when the FDI is Very High or greater, backburning should commence when the humidity begins to rise in the late afternoon or early evening. With a lower FDI backburning may be safely undertaken during the day.<br>• Where practicable, clear a 1m radius around dead and fibrous barked trees adjacent to containment lines prior to backburning, or wet down these trees as part of the backburn ignition.<br>• Avoid ignition of backburns at the bottom of slopes where a long and intense up slope burn is likely. |
| **Command & Control** | • The first combatant agency on site may assume control of the fire, but then must ensure the relevant land management agency is notified promptly.<br>• On the arrival of other combatant agencies, the initial incident controller will consult with regard to the ongoing command, control and incident management team requirements as per the relevant BFMC Plan of Operations. |
| **Containment Lines** | • Construction of new containment lines should be avoided, where practicable, except where they can be constructed with minimal environmental impact. New containment lines require the prior consent of a senior NPWS officer.<br>• Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation.<br>• All containment lines not required for other purposes should be closed at the cessation of the incident.<br>• All personal involved in containment line construction should be briefed on both natural and cultural heritage sites in the location. |
| **Earthmoving Equipment** | • Earthmoving equipment may only be used with the prior consent of a senior NPWS officer, and then only if the probability of its success is high.<br>• Earthmoving equipment must be always guided and supervised by an experienced officer, and accompanied by a support vehicle. When engaged in direct or parallel attack this vehicle must be a firefighting vehicle.<br>• Containment lines constructed by earthmoving equipment should consider the protection of drainage features, observe the Threatened Species and Cultural Heritage Operational Guidelines, and be surveyed, where possible, to identify unknown cultural heritage sites.<br>• Earthmoving equipment should be washed down, where practicable, prior to it entering NPWS estate. |
| **Fire Advantage Recording** | • All fire advantages used during wildfire suppression operations must be mapped and where relevant added to the database. |
| **Fire Suppression Chemicals** | • Wetting and foaming agents (surfactants) are permitted for use in wildfire suppression.<br>• The use of fire retardant is only permitted with the prior consentof the senior NPWS officer, and should be avoided where reasonable alternatives are available.<br>• Exclude the use of surfactants and retardants within 50m of rainforest, watercourses, dams and swamps.<br>• Areas where fire suppression chemicals are used must be mapped and the used product's name recorded.<br>• The Threatened Species Operational Guidelines are to be observed. |
| **Rehabilitation** | • Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation. |
| **Smoke Management** | • The potential impacts of smoke and possible mitigation tactics must be considered when planning for wildfire suppression and prescribed burning operations.<br>• If smoke becomes a hazard on local roads or highways, the police and relevant media must be notified.<br>• Smoke management must be in accordance with relevant RTA traffic management guidelines. |
| **Visitor Management** | • The reserve may be closed to the public during periods of extreme fire danger or during wildfire suppression operations. |

## Suppression Strategies

| Current FDR | Forecast FDR | |
|---|---|---|
| Low – Mod | Low – Mod | • As far as possible, undertake indirect, parallel or direct attack along existing control lines.<br>• As far as possible, maximise area burnt without threatening assets, including biodiversity.<br>• Identify and survey backup control lines. |
| Low – Mod | = > High | • Undertake indirect, parallel or direct attack to minimise the time taken to contain the fire.<br>• Construct new control lines if necessary to minimise the time to contain the fire.<br>• Identify and survey backup control lines. |
| High | All | • Undertake indirect attack along existing or newly constructed control lines.<br>• Secure and deepen control lines along the next predicted downwind side of the fire.<br>• Identify and survey backup control lines. |
| All | All | • Ensure there is sufficient time to secure control lines before the fire gets to them.<br>• If there is insufficient time to secure control lines, fall back to the next potential control line.<br>• As far as possible, implement threatened species and cultural heritage management guidelines. |

| Resource | Guidelines |
|---|---|
| **Aboriginal Cultural Heritage Site Management** | |
| **A2** | • As far as possible protect site from fire.<br>• Avoid ground disturbance including handtools, dozers.<br>• Avoid water bombing which may cause ground disturbance. |
| **A3** | • Avoid ground disturbance including handtools, dozers.<br>• Avoid water bombing which may cause ground disturbance.<br>• Site may be burnt by wildfire, backburn, prescribed burn. |
| **Historic Heritage Management** | **RCHMS: Regional Cultural Heritage Management Strategy;*<br>• *In areas where the asset may be in or close to a water body, wetland or swamp, no burn or wetdown is to be used.*<br>• *Where possible, hoses are to be used around, rather than overthrough assets.* |
| **H1** | • High RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR.<br>• Avoid all water bombing activities. |
| **H2** | • High RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR. |
| **H3** | • High or low RCHMS* priority.<br>• Heritage site unlikely to be effected by fire.<br>• Danger to any fire crew activity. Avoid site at all costs. |
| **H4** | • Low RCHMS* priority.<br>• Avoid fire, including wildfire, backburning & HR.<br>• Avoid all water bombing activities. |
| **Threatened Fauna Management** | |
| **FA1** | • Protect large and hollow bearing trees.<br>• Avoid fire around cave habitats. |
| **FA2** | • Protect large and hollow bearing trees.<br>• Avoid interfire intervals of < 10 yrs.<br>• Avoid high intensity fires that consume tree canopies and fallen logs. |
| **FA6** | • Avoid fire, including wildfire, backburning & HR, as far as possible in wetland habitat.<br>• Avoid use of earth moving machinery in wetland habitats.<br>• Avoid use of retardant and foam in wetland habitats. |
| **FA7** | • Avoid high intensity fires that consume tree canopies and fallen logs.<br>• Avoid burning of Allocasuarina thickets. |
| **Threatened Flora Management** | |
| **FL1** | • Avoid interfire intervals of < 10 yrs.<br>• Avoid the use of earthmoving machinery.<br>• Avoid the use of retardant. |
| **FL2** | • Avoid fire, including wildfire, backburn, HR, as far as possible.<br>• Avoid the use of earthmoving machinery.<br>• Avoid the use of retardant. |
| **Threatened Property** | • Where possible,property owners with assets at risk from a wildfire event should be kept informed regarding the progress of the fire; and asked for an assessment of their current level of asset protection preparedness. |

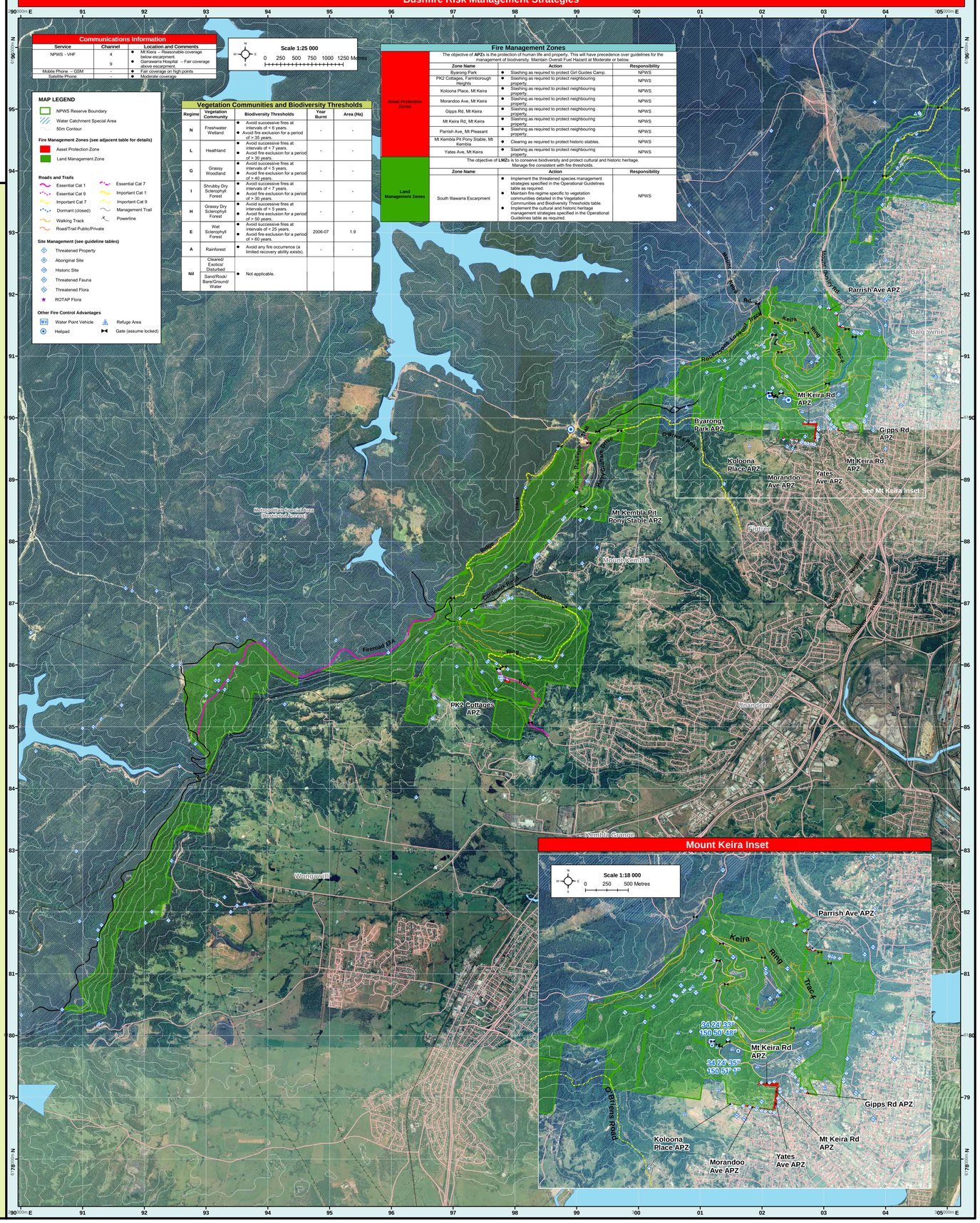
## Threatened Fauna Fire Ecology

| Label | Name | Fire Ecology |
|---|---|---|
| | *Callocephalon fimbriatum* Gang-gang Cockatoo (Vulnerable) | • Avoid high frequency fires in known habitat. |
| | *Calyptorhynchus lathami* Glossy Black-Cockatoo (Vulnerable) | • Avoid burning of Allocasuarina thickets. |
| | *Pachycephala olivacea* Olive Whistler (Vulnerable) | • No slashing, trittering or tree removal. |
| | *Petroica rodinogaster* Pink Robin Vulnerable | • No slashing, trittering or tree removal |
| | *Ptilinopus regina* Rose-crowned Fruit Dove Vulnerable | • Avoid burning remnant patches of rainforest |
| | *Neophema pulchella* Turquoise Parrot Vulnerable | • Protect hollows<br>• No removal of trees |
| | *Tyto novaehollandiae* Masked Owl *(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing trittering or tree removal around known nesting sites. |
| | *Ninox strenua* Powerful Owl *(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing trittering or tree removal around known nesting sites. |
| | *Tyto tenebricosa* Sooty Owl *(Vulnerable)* | • Avoid burning around known nesting sites at any time.<br>• Avoid slashing, trittering or tree removal. |
| | *Miniopterus schreibersii oceanensis* Eastern Bentwing-bat Vulnerable | • Avoid fire around known roost sites.<br>• No slashing around maternity sites. |
| | *Myotis adversus* Large-footed Myotis (Vulnerable) | • Avoid fire around known roost sites.<br>• No removal of trees around known roosting sites. |
| | *Falsistrellus tasmaniensis* Eastern False Pipistrelle Vulnerable | • Protect hollows<br>• No removal of trees |
| | *Mormopterus norfolkensis* Eastern Free-tail Bat (Vulnerable) | • Avoid fire in the near vicinity of roost within known/potential habitat where possible.<br>• Maintain a mosaic of age classes within known/potential foraging habitat.<br>• Avoid slashing, trittering or tree removal within known habitat. |
| | *Cercartetus nanus* Eastern Pygmy-possum Vulnerable | • No slashing, trittering or tree removal |
| | *Dasyurus maculatus* Spotted-tailed Quoll Vulnerable | • Avoid burning around known nesting sites. |
| | *Phascolarctos cinereus* Koala *(Vulnerable)* | • Intense wildfire with canopy scorch will cause high mortality and injury.<br>• Post fire areas may be recolonised within 6 – 18 months. With eucalypts providing many nutritious and less toxic leaves for improved food quality. |
| | *Pteropus poliocephalus* Grey-headed Flying-fox (Vulnerable) | • Avoid burning around known roost sites.<br>• Avoid slashing, trittering or tree removal within known roost sites. |
| | *Hoplocephalus bungaroides* Broad-headed Snake Endangered | • No slashing, trittering or tree removal |
| | *Heleioporus australiacus* Giant Burrowing Frog Vulnerable | • Avoid burning adjacent to streams, and no burning around ephemeral drainage lines near the headwaters of creeks |
| | *Mixophyes balbus* Stuttering Frog Endangered | • No burning within 100 metres of streams<br>• No slashing, trittering or tree removal |
| | *Litoria aurea* Green & Golden Bell Frog Endangered | • No burning within 50 metres of wetlands and other large water bodies<br>• No slashing, trittering or tree removal |
| | *Pseudophryne australis* Red-crowned Toadlet Vulnerable | • Avoid burning adjacent to streams, and no burning around ephemeral drainage lines near the headwaters of creeks. |

## Threatened Flora Fire Ecology

| Label | Name | Fire Ecology |
|---|---|---|
| | *Acacia baueri subsp.aspera* Vulnerable | • Mechanical hazard reduction should be limited to 50cm height after March.<br>• No fire more than once every 7 years. |
| | *Cyanchum elegans* White-flowered Wax Plant Endangered | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal. |
| | *Pultenaea aristata* Prickly Bush-pea Vulnerable | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal |
| | *Haloragis exalata subsp exalata* Vulnerable | • No fire more than once every 10 years<br>• No slashing, trittering or tree removal |
| | *Syzygium paniculatum* Magenta Lilly Pilly Vulnerable | • No fire.<br>• No slashing, trittering or tree removal |
| | *Pomaderris adnata* Sublime Point Pomaderris Endangered | • No fire.<br>• No slashing, trittering or tree removal. |
| | *Solatum celatum* Endangered | • No fire.<br>• No slashing, trittering or tree removal. |
| | *Daphnandra sp C Illawarra* Illawarra Socketwood Endangered | • No fire.<br>• No slashing, trittering or tree removal |
| | *Callistermon linearifolius* Netted Bottle-brush Vulnerable | • No fire more than once every 7 years.<br>• No slashing, trittering or tree removal. |

## Bushfire Risk Management Strategies




### Communications Information

| Service | Channel | Location and Comments |
|---|---|---|
| NPWS - VHF | 4<br>9 | • Mt Kiera – Reasonable coverage below escarpment.<br>• Garrawarra Hospital – Fair coverage above escarpment. |
| Mobile Phone – GSM | - | • Fair coverage on high points |
| Satellite Phone | - | • Moderate coverage |

### Vegetation Communities and Biodiversity Thresholds

| Regime | Vegetation Community | Biodiversity Thresholds | Year Burnt | Area (Ha) |
|---|---|---|---|---|
| N | Freshwater Wetland | • Avoid successive fires at intervals of < 2 years.<br>• Avoid fire exclusion for a period of > 35 years. | - | - |
| L | Heathland | • Avoid successive fires at intervals of < 7 years.<br>• Avoid fire exclusion for a period of > 30 years. | - | - |
| G | Grassy Woodland | • Avoid successive fires at intervals of < 5 years.<br>• Avoid fire exclusion for a period of > 40 years. | - | - |
| I | Shrubby Dry Sclerophyll Forest | • Avoid successive fires at intervals of < 7 years.<br>• Avoid fire exclusion for a period of > 30 years. | - | - |
| H | Grassy Dry Sclerophyll Forest | • Avoid successive fires at intervals of < 5 years.<br>• Avoid fire exclusion for a period of > 50 years. | - | - |
| E | Wet Sclerophyll Forest | • Avoid successive fires at intervals of < 25 years.<br>• Avoid fire exclusion for a period of > 60 years. | 2006-07 | 1.9 |
| A | Rainforest | • Avoid any fire occurrence (a limited recovery ability exists). | - | - |
| Nil | Cleared/ Exotics/ Disturbed<br>Sand/Rock/ Bare/Ground/ Water | • Not applicable. | | |

### Fire Management Zones

The objective of **APZs** is the protection of human life and property. This will have precedence over guidelines for the management of biodiversity. Maintain Overall Fuel Hazard at Moderate or below.

| Zone Name | Action | Responsibility |
|---|---|---|
| **Asset Protection Zones** | | |
| Byarong Park | • Slashing as required to protect Girl Guides Camp. | NPWS |
| PK2 Cottages, Farmborough Heights | • Slashing as required to protect neighbouring property. | NPWS |
| Koloona Place, Mt Keira | • Slashing as required to protect neighbouring property. | NPWS |
| Morandoo Ave, Mt Keira | • Slashing as required to protect neighbouring property. | NPWS |
| Gipps Rd, Mt Keira | • Slashing as required to protect neighbouring property. | NPWS |
| Mt Keira Rd, Mt Keira | • Slashing as required to protect neighbouring property. | NPWS |
| Parrish Ave, Mt Pleasant | • Slashing as required to protect neighbouring property. | NPWS |
| Mt Kembla Pit Pony Stable, Mt Kembla | • Clearing as required to protect historic stables. | NPWS |
| Yates Ave, Mt Keira | • Slashing as required to protect neighbouring property. | NPWS |

The objective of **LMZs** is to conserve biodiversity and protect cultural and historic heritage. Manage fire consistent with fire thresholds.

| Zone Name | Action | Responsibility |
|---|---|---|
| **Land Management Zones** | | |
| South Illawarra Escarpment | • Implement the threatened species management strategies specified in the Operational Guidelines table as required.<br>• Maintain fire regime specific to vegetation communities detailed in the Vegetation Communities and Biodiversity Thresholds table.<br>• Implement the cultural and historic heritage management strategies specified in the Operational Guidelines table as required. | NPWS |