

KOALAS AND FIRE MANAGEMENT IN THE BERMAGUI AREA

Fire management and the Koala Habitat Conservation and Restoration Project

The Koala Habitat Conservation and Restoration Project has supported conservation initiatives and restoration works on 16 selected properties in the Bermagui and Bega Valley areas. Several participating landholders have expressed concern over fire management policies in public forests adjoining their property. These concerns vary from lack of fuel reduction burns (and of the consequent high fuel loads) to the too frequent burning leading to more fire prone ecosystems.

Both perspectives share a concern that the chances of koala recovery are being reduced by these different approaches. On the one hand it is argued that burning infrequently leads to higher fuel loads that increase the severity of fire thus increasing the chances of koala mortality. It is also argued that the absence of fire can lead to increases in colonies of bell minors *Manorina melanophrys* that cause the defoliation of eucalypts and thus can degrade koala habitat. On the other it is argued that too frequent burning can also increase the chances of koala mortality, impact unfavourably on browse species composition and may also reduce browse palatability for koalas.

This document has been prepared as a contribution to the discussion on fire management and koala conservation and to present some strategies and principles that could be considered when developing fire management plans in relevant areas. This discussion focuses on the forests in the Bermagui area where an important koala population survives. Koala populations rare in SENSW and extremely rare on the Far South Coast. Fire probably poses the greatest immediate threat to these populations. Developing a cohesive and coordinated approach to the management fire in this part of the region is therefore of key importance to the Far South Coast Koala Recovery Program

Koalas and fire

Wildfire can cause high koala mortalities (ANZECC 1998). Koala populations that are small and disjunct, usually because they have not recovered from past impacts, are more vulnerable to extinction by wildfire than those that are larger and more robust. Wildfire (particularly in 1952) was probably responsible for the extinction of such smaller populations in several areas in the Far South Coast region (Lunney and Leary 1988, Allen 2003).

Koalas have evolved defense strategies against fire. For example, they are known to seek the shelter of moist cool gullies during hot and windy weather. Koalas have an acute sense of smell, would be aware of fire activity a considerable distance away and will try to seek refuge. For example, many koalas survived the January 2001 wildfire in the Cambelltown area by seeking refuge in the gorge areas (B. Close pers. comm.). However, koalas have less defense against fires caused by back-burning or aerial incendiary operations if these are ignited in or near their home range areas because they have less warning of fire occurring.

Koalas may also be vulnerable to higher intensity fuel reduction burns in the cooler months. Anecdotal evidence suggests that they probably favour warmer areas as roosting locations on sunny winter days and these areas are more likely to be targeted for such burns and to burn more severely. Even if there is no canopy scorch koalas can suffer stress, smoke inhalation and burnt feet if they try to leave a fire area.

For the above reasons many argue that a basic strategy for koala conservation is to try to exclude fire from areas where koalas are known to exist. However, a major difficulty when attempting this with low-density koala populations such as in the Bermagui area, where a relatively few animals may be scattered over several thousand hectares, is prioritising those areas where this strategy should be implemented.

Fire regimes and biodiversity conservation

Despite the need to protect koalas from fire, this is also a natural part of the ecology of the forests and woodlands that sustain the species. Those responsible for managing these ecosystems try to influence and manage fire regimes but have a range of sometimes competing pressures that need to be considered. These

include available resources, the need to protect property, biodiversity conservation and protecting specific endangered and threatened species. In addition there is still limited understanding about the ecology of fire in eucalypt forests and woodlands.

In the context of the above a basic management strategy for fire-prone ecosystems in reserves in NSW, including forest and woodland reserves sustaining koalas, is to try to keep the intervals between fires within maximum and minimum thresholds that are appropriate to particular ecosystems. Another management strategy is to try, if possible, to deliberately exclude fire from specific areas, particularly those sustaining threatened species that are known to be vulnerable to fire (such as koalas).

The advantage of using thresholds to determine fire regimes is that it is not directing an ecosystem to a single state but maintaining it in a range of states above and below these thresholds. Within those thresholds the objective is to vary fire regimes in time, space and intensity across the landscape so that there is a diversity of fire regimes that include fires of high, moderate and low intensity, frequency and size.

While scientific information supporting this strategy is limited, such an approach can be refined as further knowledge is accumulated. Assessment of fire regimes through the mapping of individual fires (including the characteristics of the fire) enables strategies to be regularly reviewed, refined and adjusted.

The fire regime thresholds for the major groups of vegetation within the Bermagui area has been calculated as follows (NPWS 2000):

- With dry shrub ash forests communities and dry open grass forests communities a decline in biodiversity is predicted if there are three or more consecutive fires with each of the fires occurring less than 12 years apart or more than 50 years apart. A decline in biodiversity is also predicted if there is repeated occurrence of low intensity fires, high intensity fires, and fires during lengthy dry spells.
- With wetter shrub/fern forests and herb/grass forests a decline in biodiversity is predicted if there are three or more consecutive fires with each of the fires occurring less than 15 years apart or more than 60 years apart. A decline in biodiversity is also predicted if there is repeated non-crown fires that reduce survival of standing trees, but fail to open understorey sufficiently for eucalypt recruitment, repeated non-crown fires that reduce open ground stratum.
- With rainforest communities a decline in biodiversity is predicted if there is fire of any occurrence.

In addition to the threshold-based and threatened species management strategies there are fire mitigation strategies that try to reduce the intensity and frequency of fire reaching sites where life and property are to be protected. Fire mitigation strategies typically include fuel management practices such as a mosaic pattern of prescribed burning with buffer zones and the maintenance of vehicular access routes for fire fighters and potential fire control lines.

Fire management in forests in the Bermagui area

The area under discussion in this section of this document extends out from the township of Bermagui to the north, west and south for between 6 and 10 kilometers (Figure 1). The boundaries are somewhat arbitrary, but recent records suggest that they probably capture most of the core area being used by the koala population in this part of the region. Ten properties from within this zone are participating in the Koala Habitat Conservation and Restoration Project

The area encompasses a range of tenures including private land, national parks, state forests, crown land that has recently being returned to Aboriginal ownership. In addition, the NSW government has committed to return all of Biamanga and Gulaga National Park to Aboriginal ownership under the National Parks/Aboriginal Ownership Amendment; Schedule 14 of the *National Parks and Wildlife Act 1974*.

This area has had a long history of impacts since the arrival of Europeans. Selective and intensive logging, clearing for agriculture and housing, wildfire and frequent fuel reduction burning have all contributed to a fragmented and ecologically degraded landscape. In addition there are many areas where severe defoliation of eucalypts is occurring due to the presence of colonies of bell minors *Manorina melanophrys*.

Fire management varies and will continue to vary under the different tenures with fuel reduction burns undertaken more frequently in some areas, particularly in areas where fire mitigation strategies are required for property protection. On some private land fuel reduction burns have been undertaken particularly frequently in past decades and may continue, particularly given the recent political controversy over appropriate levels of fuel reduction needed to reduce the impacts of wildfire. Furthermore, in some lakeside areas the understorey and ground layer components of the forests have been bulldozed to reduce fuel loads, despite concerns that this may be contravening the *Native Vegetation Act* (1997). However, other properties are owned by landholders who try to exclude fire whenever possible.

In addition to this range of fire management regimes, there are coastal lake systems, swamps and the Bermagui River estuary that provide natural fire buffers. This, together with the patchwork of areas along the coast and around the lakes that have been cleared for farming and housing development, means that a heterogeneous landscape occurs within the zone with a varied fire and disturbance history and commensurate fuel loads.

Generally speaking it is the forested areas towards the western perimeter of this zone where the highest and most extensive fuel loads occur. It is also from this direction that wildfire is most likely.

Given the above the following principles and guidelines could be considered in developing fire management strategies for this zone:

1. Landholders' initiatives to maintain a buffer edge around their properties where low fuel loads are maintained should be supported. As well as fuel reduction burning, slashing, the use of stock and encouragement of native herbivores are other strategies that could be encouraged.
2. Areas that were intensively logged in the early 1980's should be given high priority for fuel reduction burns, particularly along existing trails that extend in a north/south direction. For example, if this was undertaken in the patches of dense young regeneration along Nutleys Fire Trail, Siltstone Rd and Honeymoon Ridge Rd an extensive north/south buffer helping to protect koala areas to the east could be established.
3. Areas where there are colonies of bell minors *Manorina melanophrys* should also have a high priority for fuel reduction burns.
4. Koalas are more likely to occupy mature and relatively undisturbed patches forest where the floristic ecosystems *Coastal Dry Shrub Forest* (Map Unit 32) and *Brogo Wet Shrub Forest* (Map Unit 34) (South East Forests Conservation Council 1997). These ecosystems tend to merge into each other between drier ridges and slopes and moister gullies and sheltered slopes. These areas should have a very low priority for fuel reduction burning. If fuel reduction burns are to be undertaken in these areas then fire intensity should be kept as low as possible.
5. Surveys for koalas should be integrated into site planning and preparation before such operations are undertaken within this zone. Ideally these should occur immediately before burning is commenced and be undertaken by fire crews with appropriate guidance. This will assist those crews to familiarise themselves with the area that is to be burnt. It will also increase knowledge about koala survey methods. Encouraging those involved in fire-fighting work to be on the lookout for koala evidence is an important way of gathering more information about koala distribution.
6. In the event of wildfire the priorities listed in points 2, 3 & 4 should also apply when considering where to undertake back-burning or aerial incendiary work.
7. A long-term monitoring program needs to be established to improve understanding of fire ecology and the impact of differing fire regimes in the Bermagui Forests. Sites where fire history is known need to be stratified and then appropriate sites selected and data recorded so that biodiversity changes and fuel loads are monitored. Areas where there are colonies of bell minors could also be included in this monitoring program. Two areas of private forest owned by participants in the Koala Habitat Conservation and Restoration Project that have not been burnt for five and three decades respectively would be good candidates for this monitoring project.

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