



**Planning for bushfire risk in a changing climate:**  
**Ku-ring-gai Council action**

<b>Council Name</b>	<b>Ku-ring-gai Council</b>
<b>Web Address</b>	<a href="http://www.kmc.nsw.gov.au">www.kmc.nsw.gov.au</a>
<b>Size</b>	82 sq. km
<b>Population</b>	101,083 (2006)
<b>Awards</b>	Local Government and Shires Associations (LGSA) <i>Excellence in the Environment for Energy Saving and Climate Change Adaptation / Mitigation</i> category 2010

## 1. Background

### 1.1 Council profile

The Ku-ring-gai Council Local Government Area (LGA) is located on Sydney's upper north shore, about 16km from the Sydney CBD. The LGA is predominantly residential, but contains significant areas of bushland, parkland, and waterways with often steep terrain. The LGA includes 1,100ha of council-managed bushland and 1,646ha of National Park Estate (Ku-ring-gai Chase, Lane Cove and Garigal National Parks) of which the dominant vegetation type is eucalypt forest. Development is concentrated along ridge-tops and medium density housing has arisen in areas near key transport infrastructure, such as the Pacific Highway and railway stations. Recent growth has occurred in areas in existing urban areas of Gordon, North Turramurra and Turramurra. Significant built infrastructure includes the north shore railway line, the University of Technology Sydney (Ku-ring-gai Campus), the CSIRO Telecommunications and Industrial Physics facilities, the National Measurement Laboratory and a number of community service facilities such as aged-care centres and hospitals.

The LGA supports one critically-endangered and four endangered ecological communities which are 'likely to suffer a loss of species if subject to repeated high frequency fires' (Ku-ring-gai Council, 2006 in Ku-ring-gai Council, 2011a). Council and the community have made extensive investment in activities to protect the area's high biodiversity values. Many bushland areas also host community facilities such as sporting grounds, highly used walking tracks, networks of fire trails, buildings, public assets and critical infrastructure.



Photos courtesy of D. Wilks, Ku-ring-gai Council



## 1.2 Bushfire hazard

The Ku-ring-gai LGA includes 120 bushland reserves, many of which are contiguous with larger natural areas covering approximately 18,000ha. Residential properties and significant infrastructure are situated in areas vulnerable to bushfire risk due to the proximity of extensive fingers of bushland forming 91km of bushland-urban interface. Ku-ring-gai has the highest proportion of dwellings within the bushland-urban interface in the Sydney Metropolitan Area (Ku-ring-gai Council, 2011a). Of a total of over 36,000 dwellings, 13,698 households are located within bushfire prone lands (Ku-ring-gai Council, 2011a).

The Hornsby/ Ku-ring-gai *Bush Fire Risk Management Plan* (2010) classifies approximately 49% of at-risk assets within 100m of the interface as 'extreme risk' with a further 23% as very high risk and 20% as high risk. The aged brick and tile housing stock of the majority of these dwellings renders them vulnerable to ember attack and radiant heat. Other bushfire risk-contributing factors include the extensive ridge-top development within the LGA, aging population and limited evacuation capacity, including 22 evacuation-risk areas. Evacuation-risk areas are identified as often having access limited to one road for entry and exit. Research used in the 2009 Victorian Bushfires Royal Commission indicates that for many areas in Ku-ring-gai LGA, the number of households per exit is exceeded (Cova, 2005). Transport, electricity, water and communication services also occur in some high risk areas.

Some factors make the Ku-ring-gai community relatively resilient to natural hazards such as bushfire. Ku-ring-gai LGA is one of the least-disadvantaged areas in Australia due to a high per capita disposable income, high property insurance coverage, a high quality health care system, good communication networks and a rapid repair capacity for utilities which in most cases facilitates relative quick repair of damages from fire. Nonetheless, some groups of the population are more vulnerable to bushfire risks, such as the elderly, which comprise a relatively high, and increasing proportion of Ku-ring-gai's population (compared with the Sydney Statistical Division) (Ku-ring-gai Council, 2011b).

## 1.3 Impacts of climate change

Climate change projections for 2050 for the Sydney region indicate that it is likely there will be higher maximum and minimum temperatures; increased frequency and severity of heatwaves and storms; significantly increased summer rainfall and decreased winter rainfall; changing runoff patterns causing sediment shedding and erosion; increased evaporation leading to drier soil conditions (based on 1990 levels) (DECCW, 2010a).

The frequency of very high or extreme fire-risk days is predicted to increase, weather conditions will be conducive to large, intense fires, and the fire season is likely to be extended (DECCW, 2010b). Current risks from bushfires are expected to increase (Bushfire CRC, 2009 in Ku-ring-gai Council, 2011a)

As part of the ongoing research into climate change adaptation, a community survey was undertaken in 2010. Results indicated that the Ku-ring-gai community is generally well informed on climate change issues, with approximately 83% of the community surveyed believing that climate change was happening or will happen (Ku-ring-gai Council, 2010).

## 2. Council's approach to planning for bushfire risk

Ku-ring-gai Council's objective is to incorporate measures that address an increasing risk of bushfire hazard into its Principal Local Environmental Plan (PLEP), which is currently being prepared. To meet this objective the Council has implemented a number of steps:



## 2.1 Building an evidence base

### *i) Preliminary identification of climate change risks*

In 2007 Council released a *Climate Change Discussion Paper: Mitigation and Adaptation in the Ku-ring-gai Local Government Area* which emphasised the need for a systemic review of vulnerability and resilience for each climate related threat to Ku-ring-gai.

### *ii) Further research to prioritise risk and identify adaptation costs*

Council commissioned a report *Economic evaluation of climate change adaptation strategies for local government; Ku-ring-gai Council Case Study* (2010) to provide a more detailed risk analysis. The report identified bushfire, storms, extreme heat and drought as priority risks for council under climate change. The report also used a method to analyse the economic costs and benefits of various options to address bushfire risk in the Ku-ring-gai LGA, including action versus inaction (Taplin *et al.*, 2010). This analysis provided Council with information on its levels of economic risk.

### *iii) Research to identify planning options*

In 2011 Council released the background study *Managing Bushfire Risks, Now and Into the Future* (Ku-ring-gai Council, 2011a). The purpose of this study was to inform the development of Council's Principal Local Environment Plan. The study reviewed past Australian extreme bush fire events and other climate-related events to learn from the experiences and responses of other authorities and communities. This included looking at the implications local fire events, in addition to occurrences in Canberra 2003, Victoria 2009, the Victorian Bushfire Royal Commission 2010, and other NSW responses. Council sought local expert knowledge for inclusion in the report and reviewed current land use controls. This identified planning constraints and opportunities, and investigated further planning options that may further reduce current and projected bushfire risks.

### *iv) Information gaps addressed via expert research partnerships and proactive community engagement*

The *Economic evaluation of climate change adaptation strategies for local government; Ku-ring-gai Council Case Study* (2010) report was delivered via a research partnership between Council, Macquarie and Bond Universities.

In 2011 the report *Managing Bushfire Risk, Now and into the Future* (Ku-ring-gai Council, 2011a) was placed on public exhibition. Public submissions were invited, including relevant authorities such as the Ku-ring-gai Bush Fire Brigade and the Hornsby Ku-ring-gai Bushfire Management Committee. A number of community information sessions were held and information provided on the Council website and in the local paper. These submissions contributed to finalisation of the report to Council.

Ku-ring-gai Council carried out a community survey in 2010 to inform the development of a climate change adaptation strategy. This was completed as part of an Honours thesis in collaboration with the University of New South Wales.

## 2.2 Review of existing hazard management policies, plans and strategies

In 2006 the Rural Fire Service (RFS) released an updated edition of *Planning for Bushfire Protection* (PBP), which is the key document governing bushfire protection measures considered in planning and development. The aim of PBP is to use the NSW development assessment and plan-making processes to protect life, property and the environment from bushfire hazards. Since the Victorian fires, an Addendum has been released to clarify changes to bushfire attack levels and incorporate changes to the Australian Standard Building in Bushfire Prone Areas (AS3959-2009).



In the production of its background study, Council has expanded on the measures in PBP to consider future changes in bushfire hazards. A comprehensive review of PBP is currently being considered by RFS.

In 2008 Council reviewed its *Bush Fire Management Policy* to ensure it continued to meet statutory obligations with other legislation including the *Rural Fires Act 1997* and Amendment, *Local Government Act 1993*, *Protection of the Environment Operations Act 1997*, *Environmental Planning and Assessment Act 1979*, *Native Vegetation Conservation Act 1997*, *SEPP 19 – Bushland in Urban Areas 1986*, *Bushfire Environmental Assessment Code for NSW 2006* and *Planning for Bushfire Protection NSW 2006*.

Mapping of bushfire prone lands was undertaken by the RFS in 2008. Climate change projections in terms of intensity and frequency were not considered in this process, however Ku-ring-gai Council believes that the inclusion of climate change projections in the mapping would not change the total area that is considered at risk.

In 2010 the Hornsby-Ku-ring-gai Bushfire Management Committee reviewed its *Bush Fire Risk Management Strategy*. This document is the result of a risk assessment process that identifies community assets at-risk, and sets out a five year program of coordinated inter-agency measures to reduce risk of bushfire in the region. Climate change projections in terms of fire-intensity and frequency were not considered in this risk assessment process.

### 2.3 Climate change policy

In 2008 a *Climate Change Policy* that articulates Council's objectives for both mitigation and adaptation was adopted. A *Climate Change Adaptation Strategy* was implemented in 2010, which identifies potential actions to adapt to climate change risks, based on considerations of environmental, social, economic factors, and the ability of Council to reduce risk. The *Adaptation Strategy* focuses on four extreme-weather scenarios, including bushfire, storm, extreme heat and drought. The risks created by these scenarios were identified in collaboration with Macquarie University, after which a financial analysis to develop a prioritisation model using monetary and non-monetary cost benefit was developed with Bond University. Actions were then ranked and validated by staff, community and industry experts. Through this climate change modelling and consultation process, bushfire was determined to be the most significant risk both in terms of probability and consequence for the Ku-ring-gai LGA.

The *Adaptation Strategy* highlights that optimal management of bushfire risk relies on both mitigation and adaptation responses. It also recognises that early investment of understanding future bushfire risks is economically efficient, as the long-term sustainability of the community, built and natural environment is important regardless of climate change.

### 3. Planning options to reduce bushfire risk

The background study *Managing Bushfire Risks, Now and Into the Future* (Ku-ring-gai Council, 2011a) outlines 25 recommendations for Council to address bushfire risk. In particular, the study recommends that Council's PLEP:

- i) restrict intensification of land uses identified as high-risk, particularly where evacuation opportunities are restricted and intensification would further increase risk and evacuation challenges;
- ii) apply *EP&A Act (1979) E3 Environmental Management* or *E4 Environmental Living zones* to residential land identified as high bushfire risk (depending on level of risk);
- iii) restrict the size of certain land holdings in high-risk areas where accessibility is restricted;



- iv) apply a minimum lot-depth standard to sites that contain lands within 55m of Category 1 and Category 2 bushfire-prone land; and
- v) restrict approval of sensitive land uses on land identified as high bushfire risk and where evacuation risk is high.

The Study also recommends that a development control plan be prepared to provide detailed planning controls on bushfire-risk land in high risk evacuation areas.

#### 4. Key drivers for Council's approach

A number of drivers have influenced Council's approach to incorporating bushfire-risk into land use planning, including:

- Council's commitment to the principles of early adaptation and preventative risk management.
- Analysis of Council's potential legal liability (Ku-ring-gai Council, 2011a).
- The establishment of dedicated internal funding for a Strategy and Environment department which involves a multi-disciplinary team responsible for delivering sustainability outcomes. Council also employs a scientific officer dedicated to strategic bushfire management which involves liaison between climate change and planning projects, and between fire agencies, land managers and Council.

#### 5. Key challenges

- Whilst the Draft North Subregional Strategy has not been finalised to date, it is being used to guide local planning. Where studies are undertaken that provide more detail or clarification, these could be considered in local land use planning as the document is intended to guide land use planning to 2031 in the Hornsby and Ku-ring-gai LGAs. Council has identified discrepancies between their modelling of climate change risks and the Draft Strategy's housing and employment targets.
- Kur-ring-gai Council has found the Standard Instrument LEP template is not sufficiently flexible to accommodate local conditions relating to bushfire risk; for example, applying planning controls to sensitive land uses in high bushfire risk areas.
- The recently amended *SEPP (Exempt and Complying Codes) 2008* (Codes SEPP) has been extended to allow complying development to be considered by private certifiers in low-risk bushfire areas. These changes are moderate in nature and were developed in consultation with the RFS to ensure that life and property are protected. Where a council becomes aware of significant changes to vegetation levels and/or out of date mapping, Bush Fire Prone Land maps should be updated as a priority to ensure adherence with protection measures.
- Significant areas of existing development in the Ku-ring-gai LGA do not currently meet bushfire protection requirements however, there are currently no requirements for this development to be upgraded to meet bushfire protection standards.
- Many sites where development has been approved under *Planning for Bushfire Protection 2006* have been designated as Asset Protection Zones (APZs). Landowners are required, by condition of consent, to manage these areas to minimise fire risk. However, the extent to which APZs are maintained is unclear and compliance needs to be monitored.

#### 6. Future Priorities

- Further research needs include the effect of wind on tiled roofs; effectiveness of sarking (foil insulation in the roof cavity) and other appropriate ember protection measures to guide decisions regarding development in bushfire-prone areas. Council will continue to build its research partnerships to assist in addressing these research gaps.



- Strengthen engagement with emergency management agencies and the implementation of the Local Disaster Plan (DISPlan) for bushfire.
- Support for vulnerable members of the community e.g. encourage neighbourhood support programs to help vulnerable individuals (such as helping to maintain their properties and create/maintain APZs on private properties).
- Secure ongoing funding support for high priority actions of the Climate Change Adaptation Strategy.
- Community education on climate change.
- Explore the use of underground power lines in high risk areas.
- Monitor vulnerable land uses such as seniors living.

#### Further information contact

<b>Name</b>	Terri Southwell	<b>Phone</b>	02 9424 0876
<b>Position</b>	Senior Urban Planner	<b>Email</b>	<a href="mailto:tsouthwell@kmc.nsw.gov.au">tsouthwell@kmc.nsw.gov.au</a>

#### References:

Cova, T, 2005, *Public safety in the urban-wildland interface: Should fire-prone communities have a maximum occupancy?*, Natural Hazards Review, vol. 6, No. 3, pp. 99-108,  
[http://longrange.sbcountyplanning.org/planareas/mission\\_canyon/documents/Resources/Public%20Safety%20in%20Urban-Wildland%20Interface.pdf](http://longrange.sbcountyplanning.org/planareas/mission_canyon/documents/Resources/Public%20Safety%20in%20Urban-Wildland%20Interface.pdf)

Department of Environment, Climate Change and Water – see Office of Environment and Heritage  
[www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

Department of Environment, Climate Change and Water, 2010a, *NSW Climate Impact Profile: The impacts of climate change on the biophysical environment of New South Wales*, Department of Environment, Climate Change and Water NSW, Sydney  
<http://www.environment.nsw.gov.au/resources/climatechange/10171climateimpactprof.pdf>

Department of Environment, Climate Change and Water, 2010b, *Impacts of Climate Change on Natural Hazard Profiles*, Department of Environment, Climate Change and Water NSW, Sydney  
<http://www.environment.nsw.gov.au/climateChange/naturalhazardprofiles.htm>

Department of Planning, 2007, *Draft North Subregional Strategy*  
<http://www.metrostrategy.nsw.gov.au/LinkClick.aspx?fileticket=ypOhPTpC2cs%3d&tabid=75>

Hornsby/Ku-ring-gai Bushfire Management Committee, 2010, *Hornsby Ku-ring-gai Bushfire Risk Management Plan*, [http://www.hkbfmc.org.au/files/BFRMP\\_Final\\_Lowres\\_04032010.pdf](http://www.hkbfmc.org.au/files/BFRMP_Final_Lowres_04032010.pdf)

Ku-ring-gai Council, 2011a, *Managing Bushfire Risk, Now and into the Future*, Ku-ring-gai Principal LEP Draft Background Study <http://www.kmc.nsw.gov.au/resources/documents/attomc22Feb2011GB15-02.pdf>

Ku-ring-gai Council, 2011b, *Demographic Profile* <http://www.kmc.nsw.gov.au/www/html/320-demographic-profile.asp>

Ku-ring-gai Council, 2011c, *Climate Change Adaptation Strategy*  
[http://www.kmc.nsw.gov.au/resources/documents/Climate\\_Change\\_Adaptation\\_Strategy\\_FINAL.pdf](http://www.kmc.nsw.gov.au/resources/documents/Climate_Change_Adaptation_Strategy_FINAL.pdf)

Ku-ring-gai Council, 2008, *Bush Fire Risk Management Policy*, [http://www.kmc.nsw.gov.au/resources/documents/Bushfire\\_Management\\_Policy\\_PRINT.pdf](http://www.kmc.nsw.gov.au/resources/documents/Bushfire_Management_Policy_PRINT.pdf)

Ku-ring-gai Council, 2008, *Certified Ku-ring-gai Bushfire Prone Land Map and Bushfire Evacuation Risk Map*  
<http://www.kmc.nsw.gov.au/www/html/471-bushfire-prone-areas.asp>



Local Government  
Association of NSW



Shires Association  
of NSW

Ku-ring-gai Council, 2007, *Climate Change Discussion Paper: Mitigation and Adaptation in the Ku-ring-gai Local Government Area* [http://www.kmc.nsw.gov.au/resources/documents/Climate\\_change.pdf](http://www.kmc.nsw.gov.au/resources/documents/Climate_change.pdf)

Local Government and Shires Associations Excellence in the Environment Awards 2010 <http://www.lgsa-plus.net.au/www/html/3620-energy-saving-and-climate-adaption--mitigation-award.asp?intSiteID=2>

Macquarie University- Ku-ring-gai Council collaborative research project:  
[www.kmc.nsw.gov.au/www/html/24-news.asp?n=1851](http://www.kmc.nsw.gov.au/www/html/24-news.asp?n=1851) Project members: Prof Ann Henderson-Sellers, Assoc Prof Stefan Trueck and Ms Supriya Mathew, Macquarie University, Ros Taplin, Bond University and Peter Davies, Jenny Scott and Louise Hayward from Ku-ring-gai Council.

Taplin, R., Henderson-Sellers, A., Trueck, S., Mathew, S., Weng, H., Street, M., Bradford, W., Scott, J., Davies, P. and Hayward, L., 2010, *Economic Evaluation of Climate Change Adaptation Strategies for Local Government: Ku-ring-gai Council Case Study*, Bond University, Macquarie University and Ku-ring-gai Council,

[http://www.kmc.nsw.gov.au/resources/documents/Economic\\_Evaluation\\_of\\_Climate\\_Change\\_Adaptation\\_Final\\_Report\\_15Mar102.pdf](http://www.kmc.nsw.gov.au/resources/documents/Economic_Evaluation_of_Climate_Change_Adaptation_Final_Report_15Mar102.pdf)