

WILDFIRE

Wildfire risk for Queensland

Instructions:

1. Provide students with a print out, or PDF of the journal article: *Bushfire Risks*, by Ken Granger, Dave Luxton and Michael Berechree available at http://www.ga.gov.au/webtemp/image_cache/GA4214.pdf
2. Give students sufficient time to read the article, either within class time or as a homework task. Ask students to make notes of the key findings of the article, paying particular attention to the abstract, introduction, and discussion. Suggested reading time: 20 minutes.
3. Provide students with the following questions to review while reading the article. Suggested time for answering questions: 15 minutes
4. Following reading the article conduct an in class discussion to go over students' responses to the questions posed in the article. Suggested time for in class discussion: 15minutes
5. At the end of the discussion provide Cairns Regional Council bushfire zone maps to students, or present one area map to the class as a projector slide (maps can be accessed by turning on the bushfire hazard layer at: <https://ssapub.cairns.qld.gov.au/connect/analyst/mobile/#/main?mapcfg=CairnsPlan%202016>)

Answers

- A1: Yes, although bushfires in South East Queensland are not considered to be as hazardous as NSW or VIC bushfires, South East Queensland bushfires have still caused the loss of life and property.
- A2: The increasing popularity of rural residential living and the preservation of natural areas within urban developments in South-East Queensland
- A3: During late winter/early spring, especially if a good summer 'wet' season which produced abundant growth of grass and other fuel, is followed by a winter of low rainfall and lengthy periods of dry westerly winds.
- A4: That fire control is a property owner's responsibility, supported in an organised manner by the community through the Rural Fire Brigades. There is a philosophy that "if you own the fuel, you own the fire".
- A5: This means that rural landholders are responsible for reducing fire fuel levels within their properties. Landholders can reduce fuel loads by obtaining a permit from a rural fire authority that allows landholders to use hazard reduction burning techniques to reduce fuel loads. Queensland rural fire authorities issue these permits which are aimed at ensuring there is legal protection for responsible users of fire and punitive action for irresponsible users.
- A6: Resistance from local environmental groups and residents with medical conditions aggravated by smoke from fuel reduction burnoffs. However following severe bushfires in 1994, and bushfire hazard reduction plans are largely operation in urban-rural areas.
- A7: There must be fuel available to burn; there must be sufficient heat to cause and maintain ignition; and, there must be sufficient oxygen to sustain combustion.
- If any one of these is absent or inadequate the fire will either not start in the first place, or will not spread.
- A8: 1) Heat yield – most native Australian bushlands have very high heat yield due to volatile oils in native trees species including Melaleucas and Banksias. These fuels invariably produce more intense fires and yield more heat than does grass.
- 2) Rate of spread. This can be influenced by two main conditions – terrain and weather. Fires burn more rapidly and with greater intensity on up-slopes than they do on down-slopes or on the flat. Generally, the steeper the up-slope, the greater the speed and intensity of the fire. Rising temperatures and wind velocities, and decreasing humidity, directly contribute to an increase in both the rate of fire spread and its intensity. As fuels dry out, ignition becomes easier and the rate of spread increases.
- 3) The amount and nature of the fuel available. This can be influenced by the nature of the preceding growth season – a wet summer will give rise to much more growth than will a dry summer; the length of time since the area was last burnt (either by a previous bushfire or by fuel reduction burning); and by other land management practices such as cultivation, slashing, irrigation and so on.
- A9: Largely fires which have affected forestry areas, housing and property as well as injury to fire fighters and residents.
- A10: Areas at the interface between urban built up areas, and bushland.
- A11: 1) Exposure to flames – this requires a building, or person being very close to the fire, to be affected.



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2) Burning debris - Buildings are at risk from wind-blown sparks and embers that can be carried significant distances from the fire front.

3) radiant heat. Bushfires generate extreme heat levels at their active front. As the fire travels forward, this extreme heat lasts for only a few minutes, however, it is sufficient to fracture glass or cause combustible items inside the building, such as fabric and paper, to burst into flame

4) strong winds generated by the fire. Winds can cause direct damage, e.g. by unroofing buildings; it can cause impact damage by

propelling debris, including burning debris, at considerable velocity;

trees or power poles may be toppled , especially if weakened by the fire.

A12: 100m. The greatest distance recorded (in the 1967 Hobart fires) was 684m from the vegetation boundary.

A13: Correct siting of the building, the provision of suitable landscaping to act as a barrier to the oncoming fire, and the protection of windows.

Source

Source: K. Granger and M. Hayne (2000) Natural hazards and the risks they pose to South-East Queensland. Australian Geological Survey Organisation. Available via: http://www.ga.gov.au/webtemp/image_cache/GA4214.pdf

Curriculum links

11	Geography	ACHGE012: Geographical knowledge and understanding; Overview of natural and ecological hazards	An overview of the nature of natural hazards (atmospheric, hydrological, and geomorphic) and ecological hazards
11	Geography	ACHGE013: Geographical knowledge and understanding; Overview of natural and ecological hazards	The concept of risk as applied to natural and ecological hazards
11	Geography	ACHGE015: Geographical knowledge and understanding; Overview of natural and ecological hazards	The role of spatial technologies in the study of natural and ecological hazards
11	Geography	ACHGE022: Geographical knowledge and understanding; Depth and study of an ecological hazard	The nature and causes of the selected hazard and how the activities of people can intensify its impacts
11	Geography	ACHGE023: Geographical knowledge and understanding; Depth and study of an ecological hazard	The magnitude, frequency, duration, temporal spacing and effects of the hazard
11	Geography	ACHGE024: Geographical knowledge and understanding; Depth and study of an ecological hazard	The diffusion and resulting spatial distribution of the hazard, and how an understanding of biophysical and human processes can be used to explain its spread
11	Geography	ACHGE025: Geographical knowledge and understanding; Depth and study of an ecological hazard	The physical and human factors that explain why some places are more vulnerable than others
12	Science	ACSES094: Science as a human endeavour; The cause and impact of Earth hazards	People can use scientific knowledge to inform the monitoring, assessment and evaluation of risk
12	Science	ACSES097: Science as a human endeavour; The cause and impact of Earth hazards	Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability
12	Science	ACSES098: Science as a human endeavour; The cause and impact of Earth hazards	Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment; their occurrence may not be prevented but their effect can be mitigated
12	Science	ACSES100: Science as a human endeavour; The cause and impact of Earth hazards	Monitoring and analysis of data, including earthquake location and frequency data and ground motion monitoring, allows the mapping of potentially hazardous zones, and contributes to the future prediction of the location and probability of repeat occurrences of hazardous Earth events, including volcanic eruptions, earthquakes and tsunamis

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Read the article, *Bushfire Risks*, by Ken Granger, Dave Luxton and Michael Berechree and answer the following questions.

Question 1:

Have bushfires in Southern Queensland caused property loss or fatalities (hint: read abstract)?

Question 2:

What is the cause for increased bushfire risk in the Southern Queensland area?

Question 3:

At what time of year are bushfires more prevalent in South East Queensland?

Question 4:

What is the Queensland Fire and Emergency Service (QFES) Rural Fire Service's "basic philosophy of operation"?

Question 5:

What do you think this means for landholders? What are measures landholder's can take to reduce their risk of bushfire? What involvement do Queensland rural fire authorities have in these preventative measures?

Question 6:

What obstacles are there for urban-rural residents wishing to reduce fuel loads in their local area?

Question 7:

What are the three things needed for a bushfire to start and be sustained?

Question 8:

What are the three factors that determine the intensity of a bushfire?

Question 9:

Look over Table 11.1 in the article and summarise the major types of damage to housing and infrastructure, and injuries caused.

Question 10:

Which areas are most at risk of bushfire?

Question 11:

What are the four main mechanisms by which bushfires cause damage?

Question 12:

The fires which affected Bribie Island and elsewhere in 1994 demonstrated that urban dwellings can also be affected by bushfires. How close were 95% of buildings destroyed by bushfire to bushland? What is the furthest recorded distance between bushland and an urban dwelling that caused the destruction of the building?

Question 13:

Under the Queensland Building Act, which calls up the Building Code of Australia, all buildings constructed since 1993 in those areas so designated by each local government authority as being bushfire prone, must comply with standard AS 3959-1991 Construction of buildings in bushfire-prone areas (Standards Australia, 1991). What are other passive measures that can be made to reduce a landholder's bushfire risk?