09 July 2020

Parliament of New South Wales
Secretariat: Portfolio Committee No. 2 - Health
Inquiry into the Health impacts of exposure to poor levels of air quality resulting from bushfires and drought

By email only: PortfolioCommittee2@parliament.nsw.gov.au

Dear Secretariat

Answer to question on notice

Environmental Justice Australia thanks the Committee for the opportunity to provide evidence on Friday 12 June 2020, and welcomes the opportunity to provide answer to question on notice taken during hearing on.

Answer to question on notice

Do you think that we will see the health of animals and young children affected long-term as a result of these most recent bushfires?

We provide an answer to this question with respect to the health impact of air pollution from bushfires on native animals.

In preparing the answer to this question on notice we contacted Dr Andrew Peters of Charles Sturt University, whose work has most recently informed scientific understanding of the adverse impacts of smoke inhalation on small native animals. Dr Peters' work appeared in ABC news in February of this year.[1]

We **attach** a briefing paper Dr Peters prepared for Federal and State environment departments et al regarding bushfire smoke inhalation mortality in captive smoky mice in NSW during January 2020. This work is an example of bushfire-smoke related mortality in captive wildlife at significant distance from the zone in which the bushfires occurred.

According to Dr Peters:[2]

[1] See: https://www.abc.net.au/news/2020-02-27/smoky-mice-die-from-bushfire-smoke-inhalation/12005790/.
[2] Andrew Peters, email correspondence with Environmental Justice Australia, 03 July 2020.

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- The findings he and his team were able to make were opportunistic as the animals were in captivity;
- post-mortem examination of the critically endangered smoky mouse indicates that there is more widespread impact from bushfire smoke inhalation of animals than is currently understood;
- Carcass recovery of wildlife following any cause of mortality is very poor, especially in diagnostic conditions;[3]
- The particular context of bushfires likely exacerbates the challenges of identifying cause of death for two main reasons due to carcass incineration and delays in access to regions affected by major bushfire. Scavenging of carcasses by predatory birds,[4] and death of animals in burrows or other inaccessible sites means that there is very low recovery of carcasses that can be examined to determine whether cause of death is associated with bushfire smoke inhalation;
- The research undertaken by Dr Peters and his team demonstrated that deaths in captive smoky mice occurred in hot weather up to one month following bushfire air pollution exposure.

Dr Peters stated to us that the impacts of extreme environmental conditions and natural disasters cannot be accurately predicted without robust diversity and population data from before and after such events. Obtaining such data will demand a significant increase in long-term wildlife population monitoring in Australia, including in conservation reserves as well as agricultural and urban land.

In light of the paucity of data and the necessity that more research be undertaken to understand the impact of bushfire smoke inhalation and mortality in wildlife, in collaboration with Dr Peters we make the following additional recommendations to the Committee:

1. Establish a nationally coordinated approach to wildlife heath research to response with agility to emerging wildlife health problems associated with bushfire and extreme climatic events.
2. Recognise and initiate mitigation strategies to address wildlife and wild plant mortality and morbidity due to infectious and non-infectious causes as a major emerging threatening process for Australian biodiversity and ecosystems.

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[3] Wobeser, G. and A. G. Wobeser, "Carcass disappearance and estimation of mortality in a simulated die-off of small birds" (1992) *Journal of Wildlife Diseases*, 28(4), 548-554.
[4] Peisley, R. K., M. E. Saunders, W. A. Robinson and G. W. Luck, "The role of avian scavengers in the breakdown of carcasses in pastoral landscapes" (2017) *Emu - Austral Ornithology*, 117(1), 68-77.

Charles Sturt University

Briefing Note

FOR: Wildlife Health Australia, Chief Environmental Biosecurity Officer, Australian State and Commonwealth Environment and Agriculture Departments, Threatened Species Commissioner, Wildlife and Threatened Species Bushfire Recovery Expert Panel.

Not for further distribution without approval.

DATE: 4 February 2020 (v1.0)

SUBJECT: BUSHFIRE SMOKE INHALATION MORTALITY EVENT IN CAPTIVE SMOKY MICE (*PSEUDOMYS FUMEUS*) IN NSW DURING JANUARY 2020

Background:

- Mortality event at a captive-breeding facility for threatened smoky mice, east of Canberra, that was exposed to periods of bushfire smoke including hazardous levels of particulate matter ($PM_{2.5}$ and PM_{10}) in December 2019 and January 2020. The facility was 20km northwest of the nearest active bushfire during this period.
- 9 smoky mice have died between 4 January 2020 and 4 February 2020.
- Clinical history and pathological lesions (Figure 1) indicate death due to pulmonary failure associated with smoke inhalation.
- 5 deaths occurred more than two weeks following exposure to peak hazardous smoke levels and these appear to be associated with high ambient temperatures.

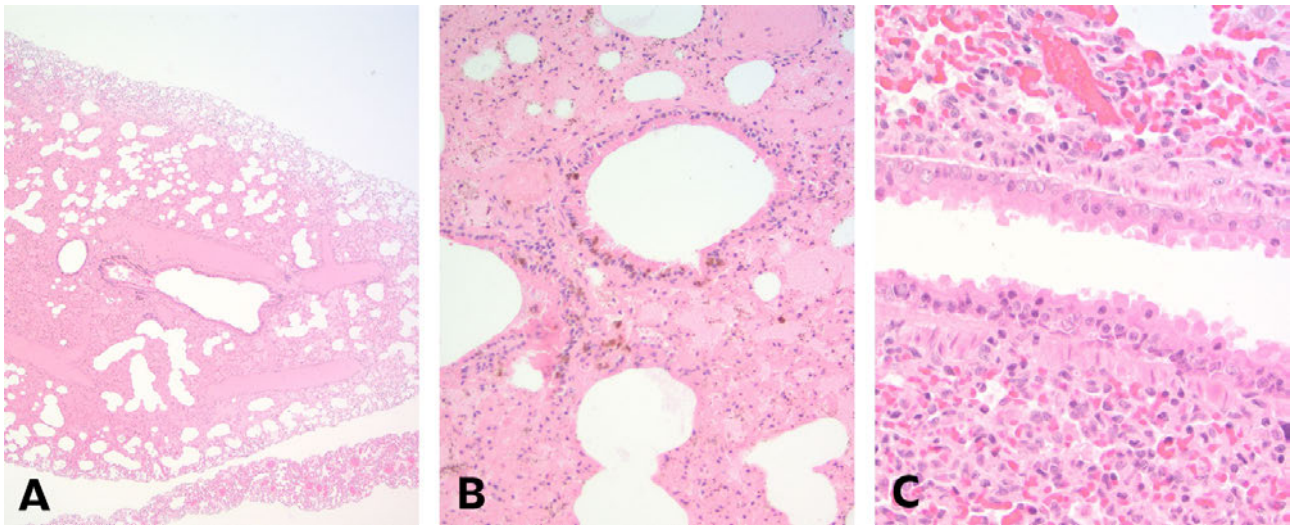

Figure 1. Severe lung lesions associated with bushfire smoke inhalation in smoky mice (*Pseudomys fumeus*), including the presence of abundant pigmented particulate matter consistent with bushfire smoke (PM_{10} and $PM_{2.5}$) (image B) and cytoplasmic blebbing of bronchiolar epithelium (image C).

Analysis:

- Smoke inhalation as a cause of mortality in wildlife is very poorly documented.
- Both immediate and delayed mortalities due to bushfire smoke inhalation were observed and these appear to be associated with periods of increased respiratory demand.
- Some surviving smoky mice at the facility are likely to be compensating for potentially severe respiratory disease.
- This mortality event highlights the possibility that hazardous bushfire smoke may cause disease and death in wildlife at a considerable distance from burnt areas, and for mortalities to occur weeks to months after exposure to bushfire smoke, including in response to non-fire associated stressors such as high ambient heat, predator avoidance or conservation interventions involving capture, transport or handling of affected wildlife.

Cautionary Notes:

- Species and individual animal susceptibility to bushfire smoke inhalation is not known in Australian wildlife.
- The influence of bushfire smoke duration, intensity and composition on the development and severity of disease is not known in Australian wildlife.
- These observations are pending peer-reviewed publication.