COMMISSIONER FOR SUSTAINABILITY AND THE ENVIRONMENT

ACT Scientific Committee
Environment, Planning and
Sustainable Development Directorate
GPO Box 158
Canberra ACT 2601

To Whom it May Concern

Thank you for the opportunity to provide a submission in response to the *Nomination of the Loss of Native Hollow-bearing Trees as a Key Threatening Process*.

My office supports the nomination made to the ACT Scientific Committee by the Conservation Council ACT Region, Friends of Grasslands, Australian Native Plant Society Canberra Region, Canberra Ornithologists Group and the Field Naturalists Association of Canberra.

On an international level, identification and management of key threatening processes is still in early stages of development. In other countries also affected by a long history of land clearing and logging this has led to severe depletion in the numbers of natural hollow-bearing trees, and the loss of hollow-bearing trees has become a significant conservation focus.[1]

The protection of hollow-bearing trees in Australia is imperative because proportionally more terrestrial species (15%; > 300 species) depend on hollows for survival in Australia than anywhere else in the world.

Loss of hollow-bearing trees has been listed as a threatening process in NSW[2] and in Victoria,[3] however this loss has not been listed at a national level.

[1] Gibbons, P. and Lindenmayer, D. 2002, *Tree Hollows and Wildlife Conservation in Australia*, CSIRO Publishing, Victoria, Australia.

[2] NSW Office of Environment and Heritage, 2007, *Loss of Hollow-bearing Trees – profile*, http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20079, accessed 26 May 2017.

If this nomination is agreed to by the Scientific Committee, it represents an opportunity for the ACT to show regional, cross-border collaboration and leadership in Australia.

Loss of native hollow-bearing trees and the detrimental effect this has on native fauna species, including threatened species, is not only an issue in the Territory, it is relevant to other Australian jurisdictions.

A co-ordinated approach across States and Territories demonstrating the importance of the loss of hollow-bearing trees that complies with the criteria for listing as a key threatening process, may influence a national approach to listing.

Additional evidence and information to support the nomination is represented by the following research:

1. Dr Heather Keith's research on the value of hollow-bearing trees in the montane ash forest in the Central Highlands in Victoria.
2. Dr Darren Le Roux's research on the management and perpetuation of hollow-bearing trees in modified landscapes in the ACT.

Key findings from Heather Keith's research in the Central Highlands of Victoria include:

- Abundance of arboreal marsupial animals and their species diversity is highly positively related to the number of hollow-bearing trees in the montane ash forest.[4]
- Both numbers of animals and numbers of hollow-bearing trees have been decreasing significantly over 30 years of monitoring.[5]
- A study of the ecosystem accounts of the Central Highlands concluded that a key threatening process for biodiversity in the region was the loss of hollow-bearing trees and the lack of their recruitment.[6] These trees are a critical habitat component for a wide range of arboreal marsupials and birds, and particularly some critically endangered species. Additionally, large old trees provide habitat for many other

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[3] Department of Environment, Land, Water and Planning, 2016, *Flora and Fauna Guarantee Act 1988*, Processes List, https://www.environment.vic.gov.au/__data/assets/pdf_file/0012/50241/201612-FFG-Processes-list.pdf, accessed 26 May 2017.

[4] Keith, H., Vardon, M., Stein, J., Stein, J.S. and Lindenmayer, D., 2016, *Experimental ecosystem accounts for the Central Highlands of Victoria*, http://fennerschool-associated.anu.edu.au/documents/Ecosystem_Accounts_full_report_v1.pdf.

[5] Lindenmayer, D., Blanchard, W., Blair, D., McBurney, L. and Banks, S., 2016, *Environmental and human drivers influencing large old tree abundance in Australian wet forests*, Forest Ecology and Management 372: 226-235.

[6] Keith, H., Vardon, M., Stein, J., Stein, J.S. and Lindenmayer, D., 2016, *Experimental ecosystem accounts for the Central Highlands of Victoria*, http://fennerschool-associated.anu.edu.au/documents/Ecosystem_Accounts_full_report_v1.pdf.

invertebrates, birds and epiphytes in their thick and decorticating bark, large limbs, cracks and fissures.

- Analysis of the criteria for the IUCN Red List of Ecosystems for the montane ash forest in the Central Highlands of Victoria showed that the current low number of hollow-bearing trees, their high rate of loss due to logging and wildfire, and their slow rate of recruitment resulted in the ecosystem being classified as critically endangered with a >99% probability of ecosystem collapse within 50 years.[7] Hollows only begin to form in trees more than 120 years-old, and occurrence of these trees is minimal in a forest harvested on an 80-year rotation by clearfelling and slash burning.
- Analysis of the impact of the loss of hollow-bearing trees in the montane ash forest demonstrated compliance with Criteria A, B and C as a key threatening process under the EPBC Act.
- Common criteria and listings for threatened species, ecosystems and processes across all jurisdictions is becoming increasingly important to provide a national approach to conservation. Emerging national policies include intergovernmental agreements on a common assessment method for listings based on the IUCN Red Lists, and a common national approach to environmental accounts.

Key findings from Darren Le Roux's PhD research in the ACT include:

- The current availability of mature trees (>50cm DBH) that contain hollows is significantly reduced in urban greenspace environments compared to nature reserves.
- The availability of medium (6-10cm entrance) and large sized hollows (>10cm) is reduced compared to smaller (2-5cm) sized hollows.[8]
- Using a dynamic simulation model for tree populations, the future availability of hollow-bearing trees is predicted to decline by an average of 87% in urban greenspace over the next three centuries under current tree management practices.
- To reverse this decline a multi-pronged management approach is required that: (1) maximises tree standing life by at least 40% than currently tolerated; (2) increases tree recruitment by 60% and (3) accelerates the rate of hollow formation by 30% (i.e. artificial hollow creation).[9]

[7] Burns, E., Lindenmayer, D., Stein, J., Blanchard, W. McBurney, L., Blair, D. and Banks, S., 2015. *Ecosystem assessment of mountain ash forest in the Central Highlands of Victoria*, south-eastern Australia. Austral Ecology 40(4): 386-399.

[8] Le Roux, D., Ikin, K., Lindenmayer, D., Blanchard, W., Manning, A. and Gibbons, P., 2014. *Reduced availability of habitat structures in urban landscapes: Implications for policy and practice*, Landscape and Urban Planning, 125, Pages 57-64.

[9] Le Roux, D., Ikin, K., Lindenmayer, D., Manning, A. and Gibbons, P., 2014. *The Future of Large Old Trees in Urban Landscapes*, PLOS ONE 9(6): e99403.

- Many small (20-50cm DBH) or medium (51-80cm DBH) sized trees will not replace the biodiversity value of large, hollow-bearing trees as 29% of bird species were recorded exclusively at large trees (>80cm DBH).[10]
- Enriching small (20-50cm DBH) and medium (51-80cm DBH) sized trees with numerous artificial nest boxes to mimic the structural attributes of hollow-bearing trees, does not increase visitation or attract hollow-nesting avifauna.[11]
- 87% of nest boxes used as a biodiversity offset tool to compensate for the loss of natural hollows were occupied by six common species, including brush-tailed possums, common myna, common starling, crimson rosella, eastern rosella and European honeybee. This suggests that nest boxes may not be an effective substitute for the natural hollows that cater to a wide range of biota.[12]

My Office is happy to be contacted for further clarification if required.

Yours sincerely

Professor Kate Auty (Professorial Fellow, University of Melbourne)
Commissioner for Sustainability and the Environment

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[10] Darren S Le Roux, Karen Ikin, David B Lindenmayer, Adrian D Manning, Philip Gibbons, 2015. *Single large or several small? Applying biogeographic principles to tree-level conservation and biodiversity offsets*. Biological Conservation, 191, pg 558-566.

[11] Le Roux, D. S., Ikin, K., Lindenmayer, D. B., Bistricer, G., Manning, A. D. and Gibbons, P. (2016), Enriching small trees with artificial nest boxes cannot mimic the value of large trees for hollow-nesting birds. Restoration Ecology, 24: 252–258. doi:10.1111/rec.12303.

[12] Le Roux, D. S., Ikin, K., Lindenmayer, D. B., Bistricer, G., Manning, A. D. and Gibbons, P. (2016), Effects of entrance size, tree size and landscape context on nest box occupancy: Considerations for management and biodiversity offsets. Forest Ecology and Management, 366, 135-142.