



FLORA & FAUNA
GUARANTEE

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE

FINAL RECOMMENDATION ON A NOMINATION FOR LISTING

The cascading effects of the loss or removal of dingoes from Victorian landscapes (Potentially Threatening Process)

Date of receipt of the nomination: 27 November 2017

Date of preliminary recommendation: 13 June 2019

Date of final recommendation: 8 August 2019

File: FF/54/3789

Validity: The nomination is for a valid item

Prescribed Information: The prescribed information was provided.

Name of the Nominator is adequately provided.

Name of the item is adequately provided. In the opinion of the Scientific Advisory Committee (SAC) the process is adequately defined and described. The nominated process is defined as the 'The cascading effects of the loss or removal of dingoes from Victorian landscapes'.

The nomination provided the following description of the potentially threatening process.

'The misidentification of dingoes as an 'invasive species' of feral dogs or wild dogs and the subsequent indiscriminate culling and removal of wild dingo populations in Victoria poses a threat to the state's natural ecosystems. The culling or removal of dingoes is shown to induce trophic cascades which can increase the population density of other potentially harmful species as well as cause declines in vulnerable native species and ecosystems.'

'The areas affected coincide with areas where dingo populations are naturally occurring. Dingo populations are widespread in reserved and unreserved Crown Lands, including throughout national parks in the Eastern Highlands and East Gippsland (Menkhorst 1995). Dingoes have also been recorded from some areas of Wyperfeld National Park and the Big Desert in north-west Victoria.'

The nomination further argued that '...the loss or removal of the dingo from Victoria was likely to affect a range of native species, making it eligible for listing under the FFG Regulations sub-criterion 5.1.1, which states that the potentially threatening process poses or has the potential to pose a significant threat to the survival of two or more taxa.'

Definition of trophic cascades

In its assessment, the SAC has used the following description for the term 'trophic cascades' (Morgan et al. 2017, p. 77)

'Identifying and defining a trophic cascade can be challenging. Indeed, cascading trophic effects can occur from time to time in the absence of a classic trophic cascade occurring. Trophic cascades are the ecological changes that percolate down through a food web in a destabilised system. Essentially, consumers at a high trophic level (e.g. predators) affect the abundance and biomass of lower trophic level species (e.g. herbivores) triggering a change of state in a still lower trophic level (e.g. producers or plants). Trophic cascades create systemic change that is irreversible without an intervention of sufficient magnitude to return the system to the previous state or shift it to another state. Such changes in state are recognised as regime shifts that occur when ecosystems are forced through a threshold of change, by means such as the removal of a top predator.'

The nomination identified two sub-criteria (5.1.1 and 5.1.2) as its basis; the SAC's response to these is as follows:

Evidence provided:

Sub-criterion 5.1.1 *the potentially threatening process poses or has the potential to pose a significant threat to the survival of two or more taxa.*

Sub-criterion 5.2.2 *The potentially threatening process poses or has the potential to pose a significant threat to the evolutionary development of a community.*

Evidence:

The nomination argued that:

- '...the loss or removal of the dingo from Victoria is likely to affect a range of native species (Table 1), making it eligible for listing under the FFG Regulations' sub-criterion 5.1.1...'
- 'Several species currently at risk have been identified, however further research is required to determine the scale of species indirectly affected by this process.' and

- 'Additionally, due to impacts on component species, the cascading effects of the loss or removal of dingoes from Victorian landscapes may further be eligible for listing under 'sub-criterion 5.2.2' for the *Victorian Mallee Bird Community* listed on the FFG Act.'

Common name	Scientific name
Tiger Quoll	<i>Dasyurus maculatus maculatus</i>
Brush-tailed Rock Wallaby	<i>Petrogale penicillata</i>
Mallee emu-wren	<i>Stipiturus mallee</i>
Malleefowl	<i>Leipoa ocellata</i>

Table 1: Taxa identified by the nominators as threatened by the described process

The terms dingo and wild dog are used throughout the scientific literature and we use both here for clarity. The determination of taxonomic status is an issue beyond the scope of consideration of this nomination.

The SAC identifies three threads to this nomination and each is discussed below

- i) *The misidentification of dingoes as an 'invasive species' of feral dogs or wild dogs and the subsequent indiscriminate culling and removal of wild dingo populations in Victoria poses a threat to the state's natural ecosystems.* Dingoes are already listed as a protected species in Victoria under the Flora and Fauna Guarantee Act (SAC 2007). The consideration of the definition of a dingo versus domestic dogs and subsequent management implications (e.g. consideration variously as invasive species, wild dog, hybrid and/or dingo) is the jurisdiction of state government land managers (particularly the Department of Environment, Land, Water and Planning) and not a SAC role. The SAC has not considered this component of the nomination.
- ii) *The culling or removal of dingoes is shown to induce trophic cascades which can increase the population density of other potentially harmful species as well as cause declines in vulnerable native species and ecosystems.* - While there is some evidence in the literature that the removal of dingoes induces a trophic cascade leading to increased population density of other potentially harmful species, there is still no general agreement in the scientific community for this idea except possibly in the more mesic systems in central and northern Australia. Top-level predators dictating trophic and ecosystem functioning (as in the Yellowstone wolves narrative; Morgan et al. 2017) is a current topic for theoretical debate and conservation science - however it is neither universally accepted nor able to be defined as a primary factor dictating ecosystem structure and function. It remains an hypothesis and is not generally accepted to apply to all ecosystems. It is not the role of the SAC to assess ecosystem engineering proposals. The SAC believes that parallels drawn with other ecosystems and continents do not automatically demonstrate its applicability in Victoria for dingoes. Morgan et al. (2017, pp: 83-84) describe this logic as follows:

'It is likely that Australia lacks strong trophic top-down effects as both predator effects and herbivore impacts are frequently disrupted by the more powerful force of climatic instability, which interrupts and radically reconfigures trophic energy flows on an irregular but inevitable basis. More likely, in semi-arid and arid Australia, are inverse cascades where the stochastic limitation of resources at lower trophic levels causes temporary collapses in populations at higher trophic levels through prolonged drought. The general weakness of top-down effects in Australia explains the inconclusive examples of top-down control reported in various ecosystems.'

Further, while several studies do indicate foxes are reduced in abundance in the presence of dingoes, these studies are from arid areas in Australia (eg Queensland and Western Australia-see Letnic et al. 2011; New South Wales see Newsome et al. 2015) with limited and regional relevance to the Victorian context.

Trophic cascade hypotheses suggests the addition or removal of top predators leads to changes in the relative populations of predator and prey through the food chain, which can result in dramatic changes in ecosystem structure. In the context of dingoes/wild dogs/foxes/cats/threatened species, the hypothesis claims that removal of dingoes leads to increase in foxes/cats with negative impact on threatened species.

Some studies claim the persistence of indigenous rodents and marsupials is associated with the presence of dingoes/wild dogs and the absence or low abundance of foxes (Smith & Quin 1996, Johnson et al. 2007). A review article of Letnic et al. (2012) concluded in part that a large body of research indicates that dingoes/wild dogs regulate ecological cascades, particularly in arid Australia, and that the removal of dingoes/wild dogs results in an increase in the abundances and impacts of invasive mesopredators, most notably the red fox *Vulpes vulpes*. Although it is widely agreed that predation by red foxes and feral cats has been identified as a key factor contributing to the decline of native mammals and ground nesting birds (since European settlement: Dickman et al. 1993; Smith et al. 1994; Smith & Quin 1996; Kinnear, Sumner & Onus 2002; Short, Kinnear & Robley 2002), it is not universally accepted that removal of dingoes results in greater predation on small mammals as indicated by the trophic cascade hypothesis. Studies conducted in mesic regions have found mixed support for the hypothesis that dingoes/wild dogs suppress the abundance of foxes. Despite this, Lentic et al. (2012) regards this conclusion as equivocal and that no study demonstrates a clear relationship between fox and dingo numbers.

iii) *That less dingoes lead to “declines in vulnerable native species and ecosystems”*

Dingoes/wild dogs prey on threatened species (see for example Davis et al. 2015, Doherty et al. 2018), and the Committee is not convinced that the predator load on threatened species is reduced in the presence of dingoes. The nomination specifically lists quolls as species potentially threatened by the absence of dingoes in Victorian ecosystems. These species are both a mesopredator and a threatened species consumed by dingoes. The Glen et al. 2011 paper cited as evidence of higher quoll numbers where dingoes exist makes no reference to this assertion as it deals solely with dietary studies, not population numbers. Similarly, the other threatened native species listed by the nominator may be further threatened by return of dingo populations. This key issue is not sufficiently addressed by the nominators.

Ineligibility for listing as a potentially threatening process under the Flora and Fauna Guarantee

It is the view of the SAC that, on the evidence currently available, the nominated item does not satisfy at least one criterion of the set of criteria prepared and maintained under section 11 of the Flora and Fauna Guarantee Act, and stated in Schedule 1 of the Flora and Fauna Guarantee Regulations 2011.

Additional information

- The SAC assessed a nomination of the Dingo in 2007 and recommended it be listed as a threatened species (SAC 2007).
- Dingoes were subsequently added to the Threatened List under the Flora and Fauna Guarantee (FFG) Act (Victorian Government 2008), and as such are protected on most public land. However, they remain unprotected on private land as well as public land within 3km of both private land and land subjected to perpetual leases (Victorian Government 2010).
- Dingo controls are allowed on private land for the protection of livestock, however unregulated hunting and baiting has been proposed as negatively affecting dingo populations through direct killing and the fracturing of stable dingo packs (Wallach et al. 2009).

Documentation

The published information and research data provided to the SAC has been assessed. To the best of its knowledge, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported.

Advertisement for public comment

In accordance with the requirements of Section 14 of the *Flora and Fauna Guarantee Act 1988*, the preliminary recommendation was advertised for a period of at least 30 days.

The preliminary recommendation was advertised in:

- *Herald Sun* on 11 July 2019
- *Weekly Times* on 10 July 2019
- *Victorian Government Gazette* on 11 July 2019

Submissions closed on 12 August 2019.

Further evidence provided:

No public comments were received against the published preliminary recommendation and no evidence was provided to warrant a review of the SAC's preliminary recommendation that the potentially threatening process is ineligible for listing.

Final Recommendation of the Scientific Advisory Committee

The SAC concludes that on the evidence available the nominated item is not eligible for listing in accordance with Section 11 of the Act because no primary criteria or sub-criteria in the Flora and Fauna Guarantee Regulations 2011 have been satisfied.

The Scientific Advisory Committee makes a final recommendation that the nominated item not be supported for listing on Schedule 3 of the *Flora and Fauna Guarantee Act 1988*.

Selected references:

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- Johnson, C.N., Isaac, J.L. & Fisher, D.O. (2007) Rarity of a top predator triggers continent-wide collapse of mammal prey: dingoes/wild dogs and marsupials in Australia. *Proceedings of the Royal Society B-Biological Sciences* **274**: 341-346.
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- Morgan, H.R., Hunter, J.T., Ballard, G., Reid, N.C.H. & Fleming, P.J.S. (2017) Trophic cascades and dingoes/wild dogs in Australia: Does the Yellowstone wolf–elk–willow model apply? *Food Webs* **12**: 76–87.
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- SAC (2007) Final Recommendation on a nomination for listing: Dingo *Canis lupus* subsp. *dingo* (Nomination No. **789**). Flora and Fauna Guarantee Act Scientific Advisory Committee. Department of Sustainability & Environment, Melbourne.
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Endorsement by the Convenor of the Scientific Advisory Committee

Date



28 August 2019

Emeritus Prof Barbara Evans
Convenor