FLORA & FAUNA GUARANTEE

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE

FINAL RECOMMENDATION ON A NOMINATION FOR LISTING

Invasion of native vegetation habitat by Karamu *Coprosma robusta* Raoul

(Potentially Threatening Process)

File No.: FF/54/3799
DOCID107-417469679-742

Date of receipt of nomination: 18 March 2019

Date of preliminary recommendation: 16 July 2020

Date of final recommendation: 1 April 2021

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 'Invasion of native vegetation habitat by Karamu *Coprosma robusta* Raoul'.

Eligibility for listing as a potentially threatening process under the Flora and Fauna Guarantee Act 1988

The Scientific Advisory Committee has assessed the eligibility of this nomination in accordance with Section 16C of the *Flora and Fauna Guarantee Act 1988* (the Act).

This nomination was made to the Committee on 18 March 2019 in accordance with the Act and Flora and Fauna Guarantee Regulations 2011 (FFG Regulations 2011). Amendments to the Act came into operation on 1 June 2020 and the FFG Regulations 2011 have since been replaced by the Flora and Fauna Guarantee Regulations 2020 (FFG Regulations 2020). The SAC is therefore required to consider this nomination in accordance with the Act as amended and the criteria for determining eligibility for listing as prescribed in the FFG Regulations 2020.

The nomination provided the following description of the potentially threatening process (PTP):

Biology

Karamu is a fast-growing, highly invasive New Zealand native vascular plant to 6m that has gained a foothold in the Mornington Peninsula, Dandenong Ranges (Parks Victoria 2017), and Glenelg regions (VicFlora 2016). It forms dense thickets, creating a monoculture capable of destroying existing understory vegetation in 2–3 years (DPIPWE 2019; Agriculture Victoria 2019a). In the longer term it acts like a transformer - smothering existing vegetation communities and preventing growth of other flora (Agriculture Victoria 2019 a, b; MCCLG 2019). This potential is emphasised by recent experiences in Tasmania where Karamu has spread rapidly over substantial areas along the Derwent River, including across wetlands, and even into the water (DPIPWE 2019).

Karamu has been found to hybridise with native species (*Coprosma quadrifida*) and is considered to have high potential for hybridisation with other endemic species such as *Coprosma hirtella* (MCCLG 2019). It also has proved difficult to eradicate in Tasmania, requiring a comprehensive plan for removal and follow-up action – and as a result, Karamu recently has been declared as a noxious weed in Tasmania (DPIPWE 2019).

Status

In Australia, Karamu mostly has been confined to Tasmania and Victoria. In Victoria, it is listed as a major weed for the Yarra Ranges National Park (Parks Victoria 2019) and is rapidly spreading and hybridising on the Mornington Peninsula (MCCLG 2019).

Invasive Potential

Extensive New Zealand experience indicates Karamu is a robust, invasive species that is established "throughout coastal, lowland and lower montane habitats within shrublands and open sites within forest" (NZPCN 2019). Thus, Karamu has the potential to pose a threat to large tracts of Victoria, as is confirmed by the biodiversity risk assessment in White et al. (2018). They placed Karamu in the top 20 of all Victorian environmental weeds based on the following attributes: impact on natural systems; area of potential distribution remaining; potential for invasion; rate of dispersal; and range of susceptible habitat types. This ranking is higher than those for species currently listed under Potentially Threatening Processes, such as Coast and Sallow Wattles *Acacia longifolia* subsp. *sophorae* and *Acacia longifolia* subsp. *longifolia* (SAC 2016), and Sweet Pittosporum *Pittosporum undulatum* (SAC 1994). Karamu also was assessed by White et al (op. cit) as a higher risk than such widely advertised state prohibited weeds as Mexican Needle Grass *Nassella tenuissima*, and regionally prohibited or controlled weeds such as Gorse *Ulex europaeus*.

Fire Potential

Here there are two views: Karamu has been suggested as a "definite fire hazard" as it fills the understory up to 6m and thus can torch fire up to the crown much more efficiently than the sparse understory scrub in those EVCs most at threat of invasion (Agriculture Victoria 2019a); but in New Zealand it is considered to be a low fire hazard (Fire and Emergency NZ 2019).

Control and Removal Issues

Treatment of Karamu using combinations of spraying, cut and paint, drill and fill, and slashing can be quite effective at removing existing plants (MCCLG 2019). But new germination rapidly leads to re-establishment of dense seedling cover (MCCLG 2019; DPIPWE 2019). Thus, remedial action requires a substantial commitment of resources over several years.

The SAC provides the following additional background information

Several assessments of the weed potential of Karamu in Australia have been made. DJPR (2019) provide ratings for various impact categories including social, abiotic, community habitat, fauna, pest animal and agriculture. The highest ratings given to Karamu are for its ability to invade undisturbed sites, fast growth rate, large number of fruit, long reproductive period, range of dispersal mechanisms and potential to disperse long distances. It has been identified as a very serious threat to damp and wet sclerophyll forest communities (Carr et al. 1992; Blood 2001; Muyt 2001). On the Mornington Peninsula it is rated as a 'very high risk' weed species (Schmidt et al. 2018) based on methodology in Carr et al. (1992).

The Advisory List of Environmental Weeds in Victoria (White et al. 2018) describe the impact of Karamu on natural systems as typically significant and that there is extensive potential for further spread within the State (White op cit.). Climate matching for Karamu in Tasmania suggests that it could potentially invade much of coastal Victoria (DPIPWE 2019).

Karamu has invaded some conservation areas in Victoria. For example, it has invaded the general area on the Mornington Peninsula where Dainty Maidenhair (*Adiantum capillus-veneris* – FFG Act listed) has been recorded, and it is thought to pose a direct threat to its survival (Queensland Government 2016). However there is conflicting information regarding the current threat Karamu is having on this fern (Molnar 2003) with some observers noting that Karamu may provide suitable shade viz. Adair & Groves (1998, Appendix) note that: '(*C. robusta* is a)…potential competitor but may offer some shade' and 'Weeds may limit dispersal of *Adiantum*.'

Birds are reported to be the main vectors for the spread of Karamu fruit and seeds in both New Zealand (eg. Burrows 1995; Williams & Karl 1996; Williams 2006; MacFarlane et al. 2016) and Australia. The likely native bird vectors in this respect are Silvereye (*Zosterops lateralis*), Red Wattlebird (*Anthochaera carunculata*) and Mistletoebird (*Dicaeum hirundinaceum*), with introduced species being Common Blackbird (*Terdus merula*) and Song Thrush (*T. philomelos*) (Cleland 1952, Loyn & French 1991). Williams (2006), working on spread of weeds in New Zealand, noted that 'The capacity of blackbirds to consume large numbers of fruit greater than 7–8 mm diameter, i.e. greater than commonly eaten by silvereyes, places blackbirds in a potentially important position as dispersers in a range of habitats.' Given that Blackbirds are a very common inhabitant of much of southern and north-eastern Victoria (Emison et al. 1987, DELWP 2019), and exhibit a high reporting rate in southern Victoria, the potential for spread of Karamu into other areas of the state is high. With respect to native species, Silvereyes are fruit specialists and are common throughout Victoria. In south eastern Australia Silvereyes have been found to be the most abundant consumers of *Coprosma quadrifida* fruits (French et al. 1992) and would be expected to consume fruit from similar species of *Coprosma* when it is encountered.

Decision by the Scientific Advisory Committee

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 16 of the *Flora and Fauna Guarantee Act*, and stated in Schedule 3 of the FFG Regulations 2020.

The nomination identified three FFG Regulations 2011 sub-criteria (5.1.1, 5.1.2 and 5.2.1) as its basis; the SAC's response to these is as follows. Equivalent criteria under FFG Regulations 2020 are Criteria 1 and 2 of Schedule 3.

Criterion 1.1

The potentially threatening process poses or has the potential to pose a significant threat to the survival of two or more taxa.

Evidence:

The nomination argued that:

- certain plant species (Table 1) were potentially threatened by the invasion of *C. robusta* into native vegetation

Table 1: Species identified in the nomination as at risk due to the invasion of *Coprosma robusta* in Victoria.

Scientific name	Common name	Victorian advisory listing (DEPI 2014)	FFG Act listed	EPBC Act listed
Acacia species including *Acacia melanoxylon* and *Acacia dealbata*[1]	Wattles	-	-	-
Acrotriche cordata	Coast Ground-berry	Rare	-	-
Adiantum capillus-veneris	Dainty Maidenhair Fern	Endangered	Listed	-
Caladenia thysanochila	Fringed Spider-orchid	Extinct	Listed	Endangered
Coprosma hirtella	Rough Coprosma	-	-	-
Coprosma quadrifida	Prickly Currant Bush	-	-	-
Corybas despectans	Coast Helmet-orchid	Vulnerable	Listed	-
Exocarpos syrticola	Coast Ballart	Rare	-	-
Glycine latrobeana	Clover Glycine	Vulnerable	Listed	Vulnerable
Leptospermum species[1]	Tea-tree	-	-	-
Ninox strenua	Powerful Owl	Vulnerable	Listed	-
Prasophyllum litorale	Coast Leek-orchid	Vulnerable	Listed	-
Pterostylis cucullata	Leafy Greenhood	Endangered	Listed	Vulnerable
Stackhousia spathulata	Coast Stackhousia	Poorly known	-	-
Non-threatened fauna such as thornbills (*Acanthiza*), wrens (*Malurus*), other insectivores.	-	-	-	-

1. Some species are listed at state or national level as threatened.

The SAC notes that for the nominated item to be supported for listing, two or more flora (or fauna) taxa need to be identified as threatened by the described process. Although several species were identified in the nomination document as being potentially threatened by the spread of Karamu, it is the opinion of the SAC that such threats to these taxa have not been clearly and adequately demonstrated. DJPR (2019) noted at the time of their assessment, there were no documented impacts to threatened flora or fauna species by Karamu, and that conversion of habitat is likely to lead to a reduction in numbers of individuals. The SAC acknowledges there is potential that Karamu is a threat to some taxa (threatened or otherwise) though argument for significant threats to the survival of two or more taxa are insufficient. The SAC may regard evidence of Karamu impacts where it demonstrates a clear threat to the survival of a taxon that is geographically restricted or comprises small, dispersed populations.

Criterion 1.2

The potentially threatening process poses or has the potential to pose a significant threat to the survival of a community.

Evidence:
The nomination (and nominator response to the preliminary recommendation) argued that:

- 'Left unchecked, Karamu poses a high-risk threat to the survival of entire communities' (Table 2)
- at least four Ecological Vegetation Classes (EVCs) (Table 2) were threatened by the invasion of *C. robusta*

Table 2: Ecological Vegetation Classes identified by nominator as threatened by the invasion of *Coprosma robusta*

EVC Number	Ecological Vegetation Class
29	Damp Forest
23	Herb-rich Foothill
201	Shrubby Wet Forest
858	Coastal Alkaline Scrub

The nomination identifies four Ecological Vegetation Classes as well as unspecified communities across Victoria in coastal, lowland and lower montane ecosystems. The SAC is of the view that the specific communities at risk have been insufficiently described in the nomination and argues that those described are too broad and widespread for consideration of potential impacts by Karamu. Subsequent correspondence from the nominator (19 August 2020) reports that the FFG Act listed community Coastal Moonah Woodland is also threatened by Karamu invasion. This community falls within some areas of Coastal Alkaline Scrub EVC. The nomination states its 'proven ability to smother entire communities', however the SAC views this as patch or site disturbance rather than a potentially significant threat to a defined community.

The origin of Karamu in Australia is attributed to horticulture with the first Australia herbarium collection from Tasmania in 1937 and the first Victorian collection from Mount Dandenong (Vic) in 1977 (Hosking et al. 2007, ALA 2019). Karamu has since demonstrated capacity to naturalise in some areas of Victoria, as described in the nomination. Its introduction to NSW is apparently more recent where it is known from a few sites (Hosking et al. 2007). Despite its capacity to spread, there is little evidence that Karamu has surfaced more widely over the last 30 years as a naturalised component of native vegetation in Victoria.

Criterion 2.1
The potentially threatening process poses or has the potential to pose a significant threat to the evolutionary development of two or more taxa.

Evidence:
The nomination argued that:

- 'Karamu therefore has the potential to pose an evolutionary threat to two or more taxa. It already has started hybridisation with *Coprosma quadrifida* on the Mornington Peninsula and is considered to have the potential for hybridisation with other species.'

The reproductive biology of Karamu in the context of hybridisation with Australian native *Coprosma* species has been the subject of a commissioned study by the Royal Botanic Gardens Victoria (2020). The study found that *Coprosma robusta* hybridises with *Coprosma quadrifida* on the Mornington Peninsula. A precautionary approach may allow for the consideration of potential evolutionary development impacts to *C. quadrifida* or *C. hirtella* based on evidence of hybridisation with *C. robusta*. Both *Coprosma* species nominated as being at risk are widespread species with large population sizes. The SAC considers it unlikely that development of hybrids within the limited areas of co-occupancy will manifest to a significant threat to the evolutionary development of these species. There are no native *Coprosma* species with small population sizes within the region of current Karamu distribution which would require further consideration.

Previous nominations of potentially threatening processes attributed to weed impacts mostly do not provide evidence of threats in relation to criterion 2.1. An exception is for *Rubus fruticosus* L. agg. which was nominated against and met the criterion due to its widespread and significant problem economically and ecologically in Victoria. It should be noted as a distinction from the current nomination that *Rubus fruticosus* L agg. represents a very large number of taxa of which several occur within Victoria (VicFlora 2016).

Schedule 4, 12(b)
As has been the practice of the SAC when considering new weed nominations given that the 'environmental weeds' nomination (SAC 1996) is already listed under the Act, Schedule 4 of the FFG Regulations 2020 (Criterion 6.1 of FFG

Regulations 2011) also had to be met for the SAC to support the listing of the current item. The Regulations require that the nomination for a potentially threatening process must describe the process in such a way that it is distinguishable from all other potentially threatening processes. The SAC's response on this issue is as follows:

Evidence:
'The invasion of native vegetation by environmental weeds' has previously been listed as a potentially threatening process (SAC 1996). The current nomination argued that 'Invasion of native coastal vegetation by *Coprosma robusta*' poses a serious ecological and economical problem in Victoria and that it has the potential to invade many areas of native coastal remnants, and thus warranted being listed in its own right, so that an action plan should be prepared specifically for the item.

The SAC has received several 'weed invasion' nominations since the first item was lodged in 1993. In its recommendations on these items (SAC 1994, 1996, 2005, 2011 & 2016), the Committee has usually determined that the invasion of native vegetation by certain weeds poses a significant threat to biodiversity and meet one or more FFG Act listing criteria. However, for some nominations the information on which species may pose the greatest threat and the level of their impact is often missing. In fact, the SAC understands that such information is only available for a few of the 3100+ naturalized plant species in Australia (Downey et al. 2010; Stow et al. 2014). As noted by Richardson et al. (2000, p. 116) '…better data on impacts is needed for many weed species, specifically information on the native species at risk and the processes by which these species are experiencing a decline.' This means that some nominations for listing of weed species have failed to meet any listing criteria under the Act and thus the Committee has rejected such items for listing (SAC 2003, 2008) and considered them already covered by the more general item 'The invasion of native vegetation by environmental weeds'. That PTP met the criteria for listing under the Regulations, on the basis that a range of taxa and communities were at risk from environmental weed invasion. Examples of taxa and communities at risk are provided in the environmental weeds PTP final recommendation report, however the PTP has a broader scope of potential threat to other taxa and communities. The recommendation for listing of 'The invasion of native vegetation by environmental weeds' was assessed only under FFG Regulations 2011 Criterion 5.1, and therefore did not assess how the PTP may threaten the evolutionary development of taxa or communities.

Additional information considered by the Scientific Advisory Committee

The SAC has previously assessed nominations of several other potentially threatening processes attributed to separate weed species impacts on biodiversity. The nomination 'Camphor Laurel trees as a threatening process in Victoria' (Nom. 663) was not supported by the SAC based on no evidence of PTP occurrence. The nomination of 'The invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg.' (Nom. 733) was supported for listing by the SAC as it met FFG Regulations 2011 criteria 5.1.1, 5.2.1 and 6.1. The nomination 'The invasion of native grassland by Serrated Tussock *Nassella trichotoma*' (Nom. 793) was not supported for listing by the SAC due to taxonomic anomalies in the nomination and because the nomination was considered to be already covered by 'the invasion of native vegetation by environmental weeds' (Nom. 360). The nomination 'Invasion of native vegetation communities by Tall Wheat-grass *Lophopyrum ponticum*' (Nom. 811) was supported for listing by the SAC as it met FFG Regulations 2011 criteria 5.1.1, 5.1.2 and 6.1. The nomination 'Loss of biodiversity as a result of the spread of Coast Wattle and Sallow Wattle into areas outside its natural range' (Nom. 877) was supported for listing by the SAC as it met FFG Regulations 2011 criteria 5.1.1, 5.1.2 and 6.1.

Following publication of the 'Invasion of native vegetation habitat by Karamu *Coprosma robusta* Raoul' preliminary recommendation, the SAC received one submission which did not support the recommendation. In formulating its final recommendation on this item, the SAC has considered in detail this submission, as well as additional information provided by the nominator. The SAC does not consider there to be additional compelling evidence to warrant a change to the preliminary recommendation that the nominated item is ineligible for listing.

Documentation
The published information provided to and sourced by the SAC has been assessed. To the best of their 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 Section 16D of the Act , the preliminary recommendation (PRR) was advertised for a period of at least 30 days.
The preliminary recommendation was advertised in:

- Herald Sun [Public Notices] on 19 August 2020
- Weekly Times [Public Notices] on 19 August 2020
- Victorian Government Gazette on 20 August 2020
- DELWP website

Public submissions closed on 21 Sept 2020.

Final Recommendation of the SAC

The SAC concludes that on the evidence available the nominated item is not eligible for listing in accordance with Section 16 of the Act because no primary criteria or sub-criteria in the Flora and Fauna Guarantee Regulations 2020 have been satisfied.

The Scientific Advisory Committee therefore makes a final recommendation that the nominated item is not supported for listing under the *Flora and Fauna Guarantee Act* 1988.

Endorsement by the Convenor of the Scientific Advisory Committee **Date**

21 April 2021

Dr. Michelle Casanova

Convenor

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