SUBMISSION TO THE SCIENTIFIC ADVISORY COMMITTEE (Vic): Preliminary recommendation for 'Salvage Logging of Burnt Forests' to be listed as a threatening process under the Flora and Fauna Guarantee Act (1988)

Submission by

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incorporating inputs from Forestry Australia members.

Forestry Australia – who we are:

Forestry Australia is a professional association of approximately 1,200 members. Our members have both high levels of scientific expertise and extensive operational experience in managing forests. They operate across all aspects of forest, fire and land management and tree growing throughout Australia. While some members manage forest harvesting operations or work for private forest companies, many others are academics; researchers; and scientists working in conservation, forest fire management, forest health and urban forest management, to name a few. Our members also include independent forest consultants and private landowners. As scientists, we advocate for good science, practical and effective solutions, and holistic and balanced outcomes for our forests.

Submission on the preliminary recommendation by the Scientific Advisory Committee (SAC) for 'Salvage Logging of Burnt Forests' to be listed as a threatening process under the Flora and Fauna Guarantee Act (1988)

Summary:

Based on this analysis of the Nomination, Forestry Australia believes that the SAC's final recommendation to the Minister for Environment and Minister for Agriculture should be that Salvage Harvesting of Burnt Forests is **not supported** for listing as a threatening process due to a plethora of **material errors and misleading statements** in the Nomination. This **Submission outlines in detail the evidence base for our claim in this regard**.

Importantly, the Nomination:

- Fails to adequately define what types of tree removal activities would constitute post-fire salvage harvesting;
- Fails to adequately define the nature, severity and extent of fire events that would constitute the activity being classified as "salvage harvesting of burnt forests"
- Fails to define the forest type that the process is concerned with e.g. public native forests, private native forests, commercial plantations, private plantings
- Fails to address that there is a regulated definition which encompasses a range of mitigating actions defined in the Code of Practice for Timber Production and the normative Schedule 1: Management Standards and Procedures for timber harvesting in Victoria's State Forests, as well as further site- and species-specific review and mitigating actions required through Regional Forest Agreements and Action Statements, amongst other tools.

Without these clear definitions, Forestry Australia is concerned that the proposed threatening process is not properly represented and that there is a real risk that its listing could create a range of negative unintended consequences. These include potential to:

- Limit or prevent salvage harvest and re-establishment of fire-killed commercial plantations;
- Limit or prevent tree removal for community safety and strategic firebreaks
- Limit or prevent active forest management aimed at forest health, including fast-tracking forest recovery and restoration of forest structure through ecological thinning
- Limit or prevent self-determination by Traditional Custodians regarding post-fire forest management needs.

Recommendation:

*Because **the Nomination contains significant flaws**, Forestry Australia recommends:*

> *that **the SAC reconsider its preliminary recommendation** that the nomination of Salvage Harvesting of Burnt Forests is eligible for listing as a threatening process.*

NOTE: Forestry Australia would welcome the opportunity to assist with further consultation on this or any other future processes and species that are relevant to forests and under consideration for listing by the SAC.

Please contact Forestry Australia to schedule discussions at hello@forestry.org.au

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1 Introduction

This document responds to the preliminary recommendation of a nomination for a listing titled '*Salvage Logging of Burnt Forests'* (Nomination No.897) (hereto referred to as the Nomination or Anon, 2023 as appropriate) as a Potentially Threatening Process under the *Flora and Fauna Act 1988* (Vic) (and revisions). It is assumed that the Nomination is a final version as at 2023 and the nominator is acknowledged but not identified. While the document was first considered in 2021 with 16 reported considerations (see Anon p.1), the last consideration is noted as 19 June 2023. The provided Nomination has been considered by the Scientific Advisory Committee (SAC) who have concluded that the information and inferences are reasonable and well supported (see Statement 1, Statement 2 and Statement 3).

Forestry Australia's submission is based on analysis, documented protocols for the State of Victoria and published information. Where the Nomination cites a publication, these are not listed in the references to this submission unless they are directly considered and used. In some cases where the Nomination relies on a secondary reference, we have considered and analysed the primary reference to fully understand the specific details of claims made within the Nomination. This is prudent and appropriate for any use of references as reliance on a secondary reference requires that the context is fully represented. For precision and transparency, the source reference page number is included for all references relied on. This document presents extracts of the Nomination as a boxed statement and then provides evidence from published information to address the claims made (e.g. as boxed evidence). Words highlighted in red in the boxes are to highlight a specific point.

The following is a detailed analysis of the Nomination resulting in evidence-based conclusions and recommendations.

Statement 1: A summary statement in regard to the quality of Nomination in defining the potentially threatening process as determined by the SAC (Anon, 2023, p.1).
'In the opinion of the Scientific Advisory Committee (SAC) the Potentially Threatening Process (PTP) is adequately defined and described. The nominated process is defined as 'Salvage Logging of Burnt Forests'.

Statement 2: A summary statement in regard to the eligibility of Nomination as determined by the SAC (Anon, 2023, p.1).
'The SAC has assessed the eligibility of this nomination in accordance with Section 16C of the Flora and Fauna Guarantee Act 1988 (the FFG Act) and the criteria for determining eligibility for listing prescribed in the Flora and Fauna Guarantee Regulations 2020 (FFG Regulations).'

Statement 3: A summary statement in regard to the quality and status of the published information relied on in Nomination as determined by the SAC (Anon, 2023, p.1).
'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.'

2 A need for a thorough review and response

The analysis provided in this submission documents the flaws in factual evidence and prejudicial omissions of evidence within the Nomination and therefore the flawed inferences drawn. Consider Evidence 1; it presents referencing for Lindenmayer *et al.* (2021). The full reference in the Nomination document is as per the author's statement that 'This report can be cited as' (Evidence 1 B). The preferred reference as presented does not reflect the document; that is, it presented the wrong title (Evidence 1 C). The correct reference is as presented in Evidence 1 D. The error in this reference should have been identified by the author of the Nomination. This is one example of the lack of basic rigor, which casts doubt on the conclusion drawn in Statement 3.

Evidence 1: The robustness of the Nomination citation process.		
A	As cited in the Nomination form (Anon, 2023, p.1)	*'Lindenmayer et al. 2021'*
B	As presented in the reference list (Anon, 2023, p.6	*'Lindenmayer D.B., Mackey, B., Gould S., Norman P. & Taylor C. (2021) How does climate affect bushfire risks in the native forests of south-eastern Australia? Bushfire Recovery Project Report No.1. Griffith University and The Australian National University.'*
C	The suggested citation of Lindenmayer et al. (2021, inside front cover)	*'Lindenmayer D.B., Mackey, B., Gould S., Norman P. & Taylor C. (2021) How does climate affect bushfire risks in the native forests of south-eastern Australia? Bushfire Recovery Project Report No.1. Griffith University and The Australian National University.'*
D	Correct citation	*Lindenmayer D., Mackey, B., Gould S., Taylor C. and Norman P. (2021). What are the ecological consequences of post-fire logging in the native forests of south-eastern Australia?. Bushfire Science Report No. 4: Griffith University and The Australian National University, https://www.bushfirefacts.org/'.*

3 Salvage harvesting defined

3.1 Lack of definition in the Nomination

While the Nomination refers to 'salvage logging', it **does not specifically define this term**. Statement 4 presents a partial definition in broad terms. This is at odds with the core requirement of Statement 1, that the potentially threatening process is adequately defined and described. The references relied on and cited by the Nomination in regards to salvage harvesting are generally broad and non-state specific, hence they ignore the State-specific definition and requirements imposed by law in the State of Victoria.

Statement 4: The Nomination form statement in regard to salvage harvesting in the absence of a definition (Anon, 2023, p.1).
'Logging to 'salvage' economic returns from areas affected by natural disturbances has become increasingly prevalent globally. This is particularly true in forest landscapes where salvage harvesting of burnt stands is widely practiced to offset some of the economic losses that occur when high-quality merchantable timber is damaged by fire.'

3.2 The State of Victoria definition

All public and private native forests, and plantation harvesting operations in the State of Victora are regulated by the Code of Practice for Timber Production 2014 (as amended 2022) (DELWP, 2022a); hereon referred to as the Code. Implementation of the Code is supported by Schedule 1: Management Standards and Procedures for timber harvesting operations in Victoria's State forests (DELWP, 2022b); hereon referred to as Schedule 1. Operations in private native forests and plantations are regulated by the Management guidelines for private native forests and plantations, Code of Practice for Timber Production 2014 (DEPI, 2014). The management guidelines for private native forests and plantations is silent on salvage harvesting, but Code requirements still apply. Salvaging harvesting of public forests in the State of Victoria is specifically regulated by the Code (DELWP, 2022a). **The Code provides a definition of salvage harvesting** (see Evidence 2). Therefore, when considering salvage harvesting in the State of Victoria, the processes and outcomes must be framed by the regulated definition and requirements specified in the Code and Schedule 1. **The Nomination fails to recognise this fact**.

Evidence 2: The legal definition of salvage harvesting in the State of Victoria based on the Victorian Code (DELWP, 2022a, p.20)
'salvage harvesting operation' means timber harvesting operations conducted to recover timber following wildfire, storms, floods, disease, insect attack or other events that cause significant tree mortality or damage'.

3.3 Recognition of different harvesting in the absence of a fire event

A key requirement in forest management relating to timber production is that any salvage harvest operation must comply with at least the requirements of the Code (see Evidence 3 and Evidence 4). The additional requirements on salvage harvesting are defined in Schedule 1, Section 8 Fire salvage harvesting (DELWP, 2022b, p.40 to 42). Therefore, **any consideration of salvage harvesting in the State of Victoria must apply the regulated definition and address the regulated elements**, which are in addition to requirements implemented through standard harvesting. This requirement is not addressed by the Nomination.

Evidence 3: The legal requirement in the State of Victoria in regard to salvage harvesting and compliance with the Code (DELWP, 2022a, p.41)
'2.3.1.4 In addition to the requirements outlined in this Code, Forest Coupe Plans for salvage harvesting operations must complement any additional recovery strategies and rehabilitation plans.'

Evidence 4: The legal requirement in the State of Victoria in regard to salvage harvesting and compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.40)
'8.1.1 Salvage General *8.1.1.1 Fire salvage prescriptions are in addition to all other prescriptions outlined in these Management Standards and Procedures and apply to all salvage operations within fire-affected forest until the beginning of the third winter following the wildfire, except where otherwise indicated.* *8.1.1.2 Timber harvesting operations conducted within fire-affected forest after the third winter following the wildfire revert back to the non fire salvage prescriptions within these Management Standards and Procedures.'*

4 Other important definitions

The Nomination title is presented in Statement 5. It is specific to salvage harvesting post disturbance by fire.

Statement 5: The title of the Nomination (Anon, 2023, p.5).
'Salvage Logging of Burnt Forests.'

4.1 Forest type

A fundamental flaw in the Nomination is a failure to define the forest types considered (see Statement 5). This is compounded by a lack of a specific definition in the Flora and Fauna Guarantee Act 1988 (Vic) and revisions (hereto referred to as the FFG Act), and the Regulations to the Act. The title is specific to burnt forests. A forest can be any type of natural forest or a plantation of any species (broadly softwoods or hardwoods).

For example, Victoria's Commissioner for Environmental Sustainability, through the State of the Environment and State of the Forests report, adopts the definition of 'forest' used by Australia's National Forest Inventory:

'An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20%. This includes Australia's diverse native forests and plantations, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.' (CES, 2023, p. 404).

As this Nomination stands, it would capture plantations burnt by fire. **Salvage harvesting in plantations established specifically for commercial tree production is very different from salvage harvesting in native forests**, and the fact that this differentiation is not acknowledged in the Nomination is problematic.

4.2 Damage agent

The Code identifies five broad causes of damage to forests (wildfire, storms, floods, disease and insect attack), following which salvage harvesting may occur, and has provision for other damage agents (see Evidence 20).

The Nomination form is limited to salvage harvesting after a fire event (see Statement 5). **The Nomination does not define the type of fire events that the threatening process refers to**. The main different types of fire: prescribed fire, cultural fire and wildfire, have very different ecological consequences, ranging from very positive to very negative, for forests that are burnt. These consequences also vary according to the extent, severity, intensity, patchiness and season of the fire event, to name a few factors of relevance. **Forestry Australia is of the view that fire as a damage agent should be limited to severe wildfire**.

It is also important to note that while the Nomination is limited to 'fire' as the damage agent, the Nomination makes use of references specific to the other damage events, such as insect attack and windthrow. The outcomes from the different damage events are not always fungible. The implications of this in relation to the Nomination are addressed in later sections where specific issues are identified.

4.3 Justification of salvage harvesting

The Nomination provides a statement of the authors' perceived justifications for salvage harvesting (see Statement 6). However, the full context of the source documents cited by the Nomination in relation to this are not objectively represented. Evidence 5 presents a quote from Lindenmayer and Noss (2006) on this matter and indeed they consider the justifications as questionable. An analysis of this source reference in regard to the evidence relied on for this statement is presented in Evidence 6; **none of the referenced material are relevant to Australia**. Lindenmayer et al (2021) does provide a comment on justifications for salvage harvesting, but the last element of this statement (in bold) is not attributed as based on any referenced sources and therefore is a matter of opinion (Evidence 7). The justifications provided in the Nomination for salvage harvesting have taken a **narrow view** and been made without a full consideration of the Australian context and without consideration of broader

objectives to support forest health (Evidence 8 & 9 below). This is important, as **the justification as provided in the Nomination is subjective** and clearly aimed at undermining the intent and full range of possibilities in regards to salvage harvesting.

Statement 6: The Nominations statement of the drivers of salvage harvesting of forests (Anon, 2023, p.1).
'Salvage logging is often justified on the assumptions that naturally disturbed areas have limited value for biota and that the impacts of logging are similar to the impacts of natural disturbance (Lindenmayer & Noss 2006, Lindenmayer & Ough 2006, Lindenmayer et al. 2012, Lindenmayer et al. 2021).'

Evidence 5: An example of a statement made in regard to the justification of salvage harvesting (Lindenmayer & Noss 2006, p.950).
'Questionable assumptions used to justify salvage include the perception that naturally disturbed areas have limited value for biota (Morissette et al. 2002), that damaged trees will attract insects that will attack adjacent undisturbed stands (Amman & Ryan 1991), and that dead trees create abundant fuels and an increased fire risk and threat to public safety (Ne'eman et al. 1997; Shore et al. 2003).'

Evidence 6: An examination of the references presented in Evidence 5 as a basis for the statement made in Evidence 5.

Reference	***Topic***
Morissette et al. (2002)	North American boreal forests post-fire salvage.
Amman & Ryan (1991)	USA in relation to insect infestation of fire damaged trees.
Ne'eman et al. (1997)	Natural forests in Israel.
Shore et al. (2003)	North American pine forests and insect damage.

Evidence 7: An example of a statement made in regard to the justification of salvage harvesting (Lindenmayer et al., 2021, p.1); 2 = Thorn et al. (2020), 3 = Lindenmayer & Ough (2006) & 4 = Donato et al. (2006).
'Post-disturbance logging, also referred to as salvage logging and post-fire logging, is conducted primarily for the purported aims of providing economic benefits [2,3] and reducing fuel loads [4] ***and is justified on the grounds that the impacts of logging are similar to the impacts of natural disturbance****.'*

4.4 Salvage harvesting to promote forest health

The Code and Schedule 1 provide specific regulation of the use of post-event salvage harvesting to address forest health issues (Evidence 8 and Evidence 9). The fact that these

potential recognised drivers have not been considered in the Nomination provides a skewed view focussed only the potential negative effects.

This issue, and the potential to derive positive forest health benefits from salvage harvesting links back to the issues with the lack of clear definitions, as discussed in Sections 3 & 4. Without clear definitions of the manner of harvesting, the type of forest and the nature of the fire, there appears to be a high chance that the listing would lead to negative consequences through limiting forest managers' ability to conduct post-fire harvesting that is designed to support forest health and recovery.

Evidence 8: The legal requirements in regard to natural forest health and salvage harvesting in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022a, p.58)
'3.2.3 Forest health *Maintaining forest health is important for ensuring the long-term ecological integrity and productivity of forests. Forest health can be promoted through stand management practices such as fire application, timber harvesting, including salvage felling and thinning and weed, pest and pathogen control. Some activities may require a permit from relevant planning authorities.'*

Evidence 9: The legal requirements in regard to plantation health and salvage harvesting in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022a, p.72)
'4.3.3 Plantation Health *Plantation health may be promoted through management practices such as thinning, salvage harvesting, weed, pest and disease control, to ensure the ongoing viability of the stand and avoid impacts on nearby landowners.'*

5 Initiation of a post-wildfire salvage harvest

5.1 Decision-making in regard to post-wildfire salvage harvest in the State of Victoria

The Nomination provides a statement on the salvage harvest process (see Statement 7). This **statement is incorrect**. The author makes use of categoric 'are' statements; '*then fire-damaged stands are clear-felled*' (Anon, 2023, p.1) which implies that post-wildfire salvage is an automatic process. Use of a blanket 'fire damaged', indicates that regardless of fire intensity and impact, a salvage harvesting event will occur. This is not correct. The process of undertaking a fire salvage is controlled by the Code and Schedule 1. The design of post-wildfire salvage commences at the stand level and includes a process to stratify forest stands based on fire impacts; see Evidence 11 and Evidence 12. The last sentence of Statement 7 contradicts the categoric statements with a proviso of fire intensity. The statement incorrectly states that the pattern of harvest varies with accessibility; a harvest is regulated by the Code and

Schedule 1. The Nomination (Anon, 2023, p.5) references Lindenmayer and Ough (2006). Evidence 10 presents a quote from this publication acknowledging the use of fire intensity mapping to define stands to be salvaged (see Evidence 11 and Evidence 12). This is a direct contradiction to the claims presented in Statement 7. Statement 7 claims that all post-wildfire salvage harvesting is as a clear falling operation. This is not correct as a range of harvesting intensity and silvicultural techniques may be used and the operation is regulated by the Code and Schedule 1 (addressed in Section 0), which are applied as minimum standards.

Statement 7: A statement of the nature of post-wildfire salvage harvesting of forests (Anon, 2023, p.1)
'Post-fire salvage logging resembles clear-felling, but the disturbance order is reversed. Stands are initially burned by wildfire, then fire-damaged stands are clear-felled with all merchantable timber removed. The intensity of harvest and size and pattern of logged areas vary according to accessibility and fire intensity.'

Evidence 10: An example of a statement made in regard to implementation of salvage harvesting (Lindenmayer & Ough 2006, p.1013).
'On this basis, we believe that areas where montane ash trees have not been killed and are beginning to recover after a wildfire should be added to other places (e.g., old-growth stands) that are exempt from salvage logging. Importantly, detailed fire-intensity mapping is now undertaken by the government of Victoria prior to salvage logging to ensure that stands of live trees, or those that are likely to resprout following the fire, are not harvested.'

Evidence 11: The legal requirements in regard to scheduling salvage harvesting in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.40).
'8.1.2 Salvage schedule priority *8.1.2.1 Undertake fire salvage harvesting operations in State forest areas designated as fire severity classes 1, 2 or 3 before salvage harvesting in fire severity classes 4 or 5. Table 24 Fire severity classification describes the Fire Severity Classification system.'*

Evidence 12: The defined fire severity classes as presented in Schedule 1 (DELWP, 2022, Table 24, p.145); a direct citation.

Severity class	***Severity type***	***Description***	
1	***crown*** *burn*	*90 – 100 % of eucalypt and non-eucalypt crowns are burnt.*	*an intense burn with widespread* ***crown*** *removal*
2	***crown*** *scorch*	*60 – 100 % of eucalypt and non-eucalypt*	*an intense* ***understorey*** *fire with complete* ***crown*** *scorch of most eucalypt and non-eucalypts.*

		crowns are scorched some crowns are burnt.	
3	*moderate **crown** scorch*	*30 – 65 % of eucalypt and non-eucalypt crowns are scorched.*	*a variable intensity of fire ranging from a warm ground burn with no **crown** scorch to an intense **understorey** fire with complete **crown** scorch of most eucalypt and non-eucalypts.*
4	*light **crown** scorch*	*1 – 35 % of eucalypt and non-eucalypt crowns are scorched.*	*a light ground burn with isolated patches of intense **understorey** fire and some **crown** scorch*
5	*no **crown** scorch*	*< 1 % of eucalypt and non-eucalypt **crowns** are scorched, **understorey** may be burnt or unburnt.*	

5.2 Implementation of a post-wildfire salvage operation within an identified stand

5.2.1 The implementation of a post-wildfire salvage harvest as claimed in the Nomination

It is important to consider the implementation of a post-wildfire salvage harvest operation in the stands determined to be harvested. The Nomination provides a statement of the process and outcome of implementation of a post-wildfire salvage in regard to the nature of trees removed (see Statement 8). The reference to the largest trees implies that a salvage harvest targets and removes such trees due to value. **This statement is incorrect** as it explicitly states that the harvest of an individual tree is determined by economic value. A first point is that the reference cited includes information from a range of countries and is not specific to Australia, nor Victoria. The process of post-fire salvage is regulated in Victoria defining which stands and indeed, the individual trees that can be removed, and these regulations prioritise, for example, the retention of habitat and large trees (see 5.2.2).

Statement 8: Statement of the process and outcomes of salvage harvesting of forests (Anon, 2023, p.1).
'Post-fire salvage logging involves the removal of particular trees or components of burnt forest stands that are often more uncommon in the landscape, such as the largest trees, because of their economic value (Lindenmayer et al. 2012).'

5.2.2 The legally required attributes of a post-wildfire salvage harvesting operation

The Code and Schedule 1 require that post-wildfire salvage harvesting operations have more stringent environmental protection requirements than harvesting in forests that have not been recently burnt by a wildfire event; see Evidence 13 and Evidence 14. Converse to Statement

8, the specific requirements in regard to design and implementation of a salvage harvest (as it relates to native forests) include the following **requirements to ensure important ecological and habitat values are retained**.

- **Evidence 15** in regard to habitat retention where salvage harvesting is excluded.
- **Evidence 16** in regard to the spatial arrangement of coupes to be salvage harvested.
- **Evidence 17** in regard to retention of habitat as part of a salvage harvest.
- **Evidence 18** in regard to retaining patches within stands of less severely fire-impacted elements of a stand to be salvaged.

Evidence 13: The legal requirement recognising the difference between routine and salvage harvesting in the State of Victoria (DELWP, 2022a, p.53)
'3.1.1.8 Characteristics of coupes for salvage of timber in forests damaged by fire, pests, pathogens or other events may differ from undamaged forests. A special (salvage) plan or an amended Timber Harvesting Plan must be developed, taking into account: *i. the need for urgency in timber recovery; and* *ii. the need to modify prescriptions, as required, to meet environmental care goals and address recovery strategies for other forest values such as fauna.'*

Evidence 14: The legal requirement placed on salvage harvesting in the State of Victoria (DELWP, 2022a, p.54)
'3.1.1.9 Salvage harvesting operations must take as much account of environmental care as any other timber harvesting operation.'

Evidence 15: The legal requirement in regard to protection of Ash habitat trees in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.42)
'8.1.9 Ash habitat tree exclusion areas *8.1.9.1 Retain an average of at least 5 habitat trees per hectare of net coupe area in exclusion areas of greater than 0.1 ha. Replaces Table 12 Habitat tree prescriptions. Prescriptions protecting trees of pre-1900 origin continue to apply for Central Highlands FMAs.* *8.1.9.2 Situate habitat tree exclusion areas to maximise retention of high priority habitat trees. Habitat trees have the following order of priority:* *a) large live hollow bearing trees;* *b) large live trees without hollows;* *c) large dead trees;* *d) small live trees; then* *e) small dead trees.* *Note: In the context of salvage harvesting operations, trees greater than 50 cm DBHOB are considered to be large. Replaces habitat tree selection criteria in Section 4.1, except where the Bendigo FMA standard applies or where all trees of a particular type (e.g. hollow bearing / dead) are protected.*

8.1.9.3 Situate habitat tree exclusion areas to maximise retained forest connectivity within the coupe.

8.1.9.4 Arrange the shape and location of habitat tree exclusion areas to reduce ongoing operational and weather related damage to habitat trees.'

Evidence 16: The legal requirement in regard to salvage harvesting coupe size and aggregation in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.40).

'8.1.3 Coupe size and aggregation

8.1.3.1 120 ha is the maximum coupe size for fire salvage operations in Alpine or Mountain Ash dominated forest. No size restrictions apply to aggregates of Alpine or Mountain Ash fire salvage coupes.'

Evidence 17: The legal requirement in regard to habitat retention and salvage harvesting in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.40).

'8.1.4 Habitat retention

8.1.4.1 Plan the coupe so there is no more than 200 m between areas of retained habitat. Retained habitat includes habitat tree exclusion areas, filters and buffers, green patch exclusion areas and any forest adjacent to the coupe.

8.1.4.2 Exclude machinery from a minimum of 15 % of the gross coupe area to facilitate the recovery of understorey species. All exclusion areas, protection areas, SPZs and stream filters that are additional to standard stream protection prescriptions within the coupe may count towards the 15 % of gross coupe area from which machinery is excluded. 20 m is the minimum width for machinery exclusion areas set aside exclusively for understorey recovery. Where present, locate in areas with evidence of tree ferns. Tree felling is permitted in these areas. Cording and matting may remain on landings after salvage harvesting operations (replaces Clause 7.2.2.5).'

Evidence 18: The legal requirement in regard to ash forest green patches in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.41)

'8.1.8 Ash Forest Green Patch Exclusion areas

8.1.8.1 Green patches are areas of forest within a fire affected area that are assessed through field checking to have fire severity class of 4 or 5 (See Section 8.1.2 and Table 24 Fire severity classification). Areas of fire severity class 4 or 5 must be at least 40 m wide to be a green patch.

8.1.8.2 Where less than 15 % of Ash dominated forest within a compartment is classified as fire severity class 4 or 5 all green patches greater than 0.5 ha are to be permanently protected during salvage operations to facilitate recruitment of future hollow bearing trees.

8.1.8.3 Where more than 15 % and less than 40 % of Ash dominated forest within a compartment is classified as fire severity class 4 or 5 protect all green patches greater than 5ha during salvage operations. Following salvage harvesting, further timber harvesting operations within these compartments are to be excluded until the forest regenerating from the fire reaches reproductive maturity typically by 15 years of age.

8.1.8.4 Green patches may be harvested where, within a compartment, more than 40 % Ash dominated forest is classified as fire severity class 4 or 5. Limit the total area of fire severity class 4 or 5 Ash harvested within a salvage coupe to 40 ha.'

5.2.3 The impact of post-wildfire salvage

The Nomination includes broad claims of the negative impact of post-wildfire salvage harvesting (see Statement 9). The extract is a direct cut and paste without appropriate recognition of the legal requirements in the State of Victoria. The statement is categoric in its assertion of impact; however, in a subsequent statement in the Nomination, the definitive statement in Statement 9 is contradicted with a 'can' (not definitive) statement as presented in Statement 10. Indeed, definitive statements are inappropriate as impact will depend on many factors, including time since fire, and other factors previously noted (see Section 4). In Evidence 19, one extract summarising the suite of 9 'ecologically defensible" mitigating management measures for salvage harvesting is provided The Code and Schedule 1 directly address the feasible suggested measures as proposed and they are legal requirements in the State of Victoria (see Section 0). Statement 10 recognises that there are differences between a routine and a salvage harvest operation. These differences are recognised and regulated by the Code and Schedule 1; see Evidence 3 and Evidence 4 which places a specific legal obligation to address such differences.

Statement 9: A statement of process and outcomes of salvage harvesting of forests (Anon, 2023, p.1).

'Post-fire salvage logging results in the immediate loss of vital habitat resources, disrupts natural processes of forest regeneration and reduces forest resilience. The mechanical disturbance of salvage logging damages surviving plants, soil and seed banks. It is a new type of disturbance that compounds the impacts of bushfire (Lindenmayer et al. 2021).'

Statement 10: The Nomination statement of processes and outcomes of salvage harvesting of forests (Anon, 2023, p.1&2).

'Conditions that precede logging, conditions under which logging occurs, the type and characteristics of trees logged, and the logging practices applied may all differ between salvage logging and conventional logging. These differences can have important influences on the maintenance of ecosystem processes and biodiversity (Lindenmayer & Noss 2006).'

Evidence 19: An extract regarding the 9 'ecologically defensible' salvage harvesting policies proposed as required to mitigate from the reference cited in Statement 10 from Lindenmayer & Noss (2006, Abstract).
'These policies should lead to salvage-exemption zones and limits on the amounts of disturbance-derived biological legacies (e.g., burned trees, logs) that are removed where salvage logging takes place.',

6 Potential impacts of a post-wildfire salvage harvest

6.1 An overall statement

The broad range of potential impacts of an un-regulated salvage harvest are noted in Statement 11. These potential impacts of salvage harvesting are understood, and the Code and Schedule 1 include prescriptive requirements to mitigate such risks (see Evidence 13 and Evidence 14). The Nomination fails to consider this point.

Statement 11: A broad statement from the Nomination in regard to post-wildfire salvage harvesting (Anon, 2023, p.2).
'Ecological impacts of salvage logging can be classified into two broad categories: impacts on habitats and species (including impacts on the physical structure of forest stands and aquatic systems) and impacts on key ecosystem processes (e.g. succession, hydrological cycles, nutrient cycling, and soil formation). They are often interrelated and can be additive or cumulative (Lindenmayer et. al 2012).'

6.2 Ecosystem resilience

The Nomination presents a statement in regard to ecosystem resilience (see Statement 12). The statement is close to a *cut and paste* from the stated reference without appropriate recognition (Evidence 20). The statement is a quotation from Copper-Ellis et al. (1999) and the author of the Nomination has not referred back to the actual (primary) source document; this is an example of poor use of a reference. A key change is that the original statement (Evidence 20) does not mention resilience; it refers to 'ecosystem control'. The word control has very different meaning to resilience. Cooper-Ellis et al. (1999) refers to simulated hurricane blowdown in the US. The actual quote is presented in Evidence 21. Foster et al. (1997) addresses hurricane damage. There is a fundamental difference to a fire and wind damage event. Trees blown over by wind can have part of their root system in the ground and the trees can survive. Therefore, the statement by Cooper-Ellis *et al.* (1999) acknowledges that the main difference resulting from a hurricane event is that the trees are no longer vertical, hence the description of wildfire-damaged forest as a 'relatively intact system'. A key difference between wind and fire is that with a fire event, depending on species and the attributes of a fire, the trees can be killed and much of the other attributes of a site damaged or killed (see Jenkin, 2020,

commencing on page 34). Depending on the nature of the fire event, fire (especially severe fire) has the potential to cause impact and damage to all aspects of a stand.

Statement 12: The claims presented in the Nomination in regard to the nature of a post-wildfire forest (Anon, 2023, p.2).
'In contrast to the natural recovery of a disturbed ecosystem, salvage logging has the potential to convert a relatively intact system to a strongly modified site in which ecosystem resilience is reduced (Lindenmayer & Noss 2006)'.

Evidence 20: The statement in the source document (Lindenmayer & Noss 2006, p.953) referred to in Statement 12.
'In contrast to the natural recovery of a disturbed ecosystem, salvage harvesting has the potential to "convert a relatively intact system to a strongly modified site in which ecosystem control is reduced" (Cooper-Ellis et al. 1999:2693).'

Evidence 21: The actual statement by Cooper-Ellis et al. (1999, p.2693) cited by Lindenmayer & Noss (2006, p.953).
''Thus, the potential exists to convert the damaged area from a relatively intact systems to a strongly modified site in which ecosystem control is reduced (Foster et al. 1997).'

6.3 Hollow-bearing trees

The importance of the creation of hollows for dependent faunal species is noted in the Nomination (Statement 13). The Code and Schedule 1 specifically address protection of hollow-bearing trees (see Evidence 15, Evidence 17 and Evidence 22). For example, the regulated controls dictate that a salvage harvest must treat all hollow-bearing trees as 'alive' in regard to Leadbeater's Possum habitat Zone 1a. Schedule 1 provides regulated and highly prescriptive requirements to protect hollow-bearing trees (see Evidence 23).

Statement 13: An extract from the Nomination in regard to hollow bearing trees (Anon, 2023, p.2).
'In the montane ash forests of Victoria, wildfires can promote the development of cavities in large trees which provide sheltering, nesting, and foraging sites for more than 40 species of vertebrates (Gibbons & Lindenmayer 2002).'

Evidence 22: The legal requirements in regard to boundaries of different categories of forest in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.41)

8.1.7 Field determined values

8.1.7.1 Locate the boundaries of protection areas or management areas based on modelled or mapped values according to the process outlined in Figure 2 Field process for determining protection areas and management areas based on modelled or mapped values.

8.1.7.2 To determine the boundaries of a Leadbeater's Possum habitat Zone 1A assume all hollow bearing trees, even if dead, to be 'alive'.'

Evidence 23: An extract of the legal requirements of the Victorian Code of Practice Schedule 1 in regard to habitat trees (DELWP, 2022b, p.53&54); a direct citation.

Locality	***Forest type***	***Habitat tree retention rates***	***Comments***
Central Highlands FMAs	*Ash/HEMS*	*All live ash eucalypts originating before 1900.* *At least 40 trees per 10 ha for the length of the rotation in ash forests originating since 1900*	*Retain at least 1 potential hollow bearing tree where gaps between retained trees are greater than 150 meters,* *Retained trees should be a mixture of hollow bearing trees where present and other trees most likely to develop hollows in the short term.*
	Mixed Species	*40+ trees per 10 ha*	
East Gippsland FMA	*All*	*4 – 5 trees per ha*	*Count seed trees towards habitat tree numbers.*
Gippsland FMAs	*All*	*4 – 5 tree per ha*	*Count seed trees towards habitat tree numbers*
Horsham FMA	*All*	*10 trees per 10 ha* *5 potential habitat trees per 10 ha* *5 dead trees with hollows per 10 ha*	*Any additional trees above the 10 trees per 10 ha should be retained in place of potential habitat and dead trees.*
Midlands FMA	*All except Box Ironbark*	*3 trees per ha*	*Refer to Bendigo for Box ironbark prescriptions.*

Mid Murray FMA	*All*	*20 trees per 10 ha (≥50 cm but ≤100 cm DBHOB)* *Retain all trees (>100 cm DBHOB)*	
North East FMAs	*Ash/HEMS*	*4 – 5 trees per ha*	
	Mixed species	*4 – 5 trees per ha*	*Count seed trees towards habitat tree numbers.*
Otway FMA	*All*	*5 trees per ha (net coupe area) / 10 trees per ha (gross coupe area)*	
Portland FMA	*All*	*Retain habitat trees to a basal area of 2 – 4m²/ha*	*Group selection.*

'Table 12 Notes:

- *In all cases except the Otway FMA, habitat tree retention rates apply relative to the net harvested area retained within the net coupe area.*
- *The net coupe area is the gross coupe area, less areas required to be excluded from timber harvesting in accordance with the Code.*
- *Areas excluded from timber harvesting, including buffers, should be identified prior to the commencement of timber harvesting operations, roading and regeneration.*
- *Areas excluded from timber harvesting or retained areas may not be readily identifiable prior to timber harvesting operations but must be documented after timber harvesting operations have been completed (e.g. small rocky areas, small areas of steep slope or inaccessible areas), these areas may be counted as retained habitat within the net coupe area.*
- *The minimum number of trees required to be retained as habitat relative to the area harvested (net harvested area) is a product of the specified rate and the net harvested area. E.g., 20 ha net harvested area × 4 - 5 trees per ha = 80 - 100 trees to be retained has habitat.*
- This total number of trees retained as habitat can be dispersed across the coupe or retained in clumps, prioritising the types and arrangement of trees as relevant to section 4.1 of the MSP.'

6.4 Woody debris

The Nomination notes the biological importance of woody debris to a site (Statement 14). A wildfire can generate a pulse of fallen stems; logs are the result of harvesting and are recovered from stems. Logs are not a natural process. This is a statement from Lindenmayer and Ough (2006) cited (Evidence 24) without the Nomination author completely reflecting the

information (the detail and specifics) presented in Lindenmayer and Ough (2006). The importance of coarse wood debris is well understood in general (see MacNally et al., 2000a; MacNally et al., 2000b). A post-fire salvage harvest will recover the merchantable sections of trees legally allowed to be felled with harvest residues remaining onsite. The statement cites Lindenmayer and Ough (2006); however, Lindenmayer and Ough (2006) do not make reference to 'decades and even centuries' as claimed in Statement 14.

Statement 14: A statement from the Nomination form in regard to coarse woody debris (Anon, 2023, p.2).
'Similarly, wildfires may generate pulses of large fallen logs, and these have an array of ecological roles. The ecological benefits derived from large-scale disturbances can be lost or severely diminished by salvage operations for decades and even centuries (Lindenmayer & Ough 2006).'

Evidence 24: A statement of process and outcomes of salvage harvesting of forests (Lindenmayer & Ough, 2006, p.1008)
'Similarly, wildfires and windstorms may generate pulses of large fallen logs (Lindenmayer et al. 1999c), and these have an array of ecological roles (reviewed by Lindenmayer et al. 2002).'

6.5 Soil and water values

The Nomination provides comment on the potential impact of a post-wildfire salvage harvesting operation on soils (see Statement 15 and Statement 16). The statements linked to Lindenmayer et al. (2021) were considered and Evidence 25 presents an extract from that publication. The source references were also considered. An important point is that combined with the observation presented, solutions to mitigate adverse outcomes were proposed by Smith et al. (2011), Leverkus et al. (2020) and Bowd et al. (2019) (see Evidence 26 and Evidence 27 respectively). The Nomination appears to have failed to review the primary references and did not make use of this information. The need to mitigate risk to soil and water values is recognised by the Code and Schedule 1 (see Evidence 17) with specific requirements to manage for water quality (Evidence 29).

Statement 15: An extract from the Nomination in regard to disruption of site systems (Anon, 2023, p.2).
'Salvage logging often impairs key ecosystem processes such as hydrological regimes, soil profile development, soil compaction and nutrient cycling. The time taken for catchment water yield to recover increases when post-fire salvage logging occurs and can cause long term reductions in water yield. The combined effects of wildfire and salvage logging can also cause large increases in run-off, erosion and nutrient loss compared to burnt unlogged forest (Lindenmayer 2021).'

Statement 16: An extract from the Nomination in regard to the state of a site post-wildfire (Anon, 2023, p.2).

'Post-fire salvage logging occurs at a time when forest landscapes are most vulnerable to increased run-off, erosion and impacts on downstream water quality. For example, compared to long-undisturbed sites, mountain ash sites subject to compound disturbances consistently had the lowest values of a wide range of soil measures which affect ecosystem function and forest productivity (Lindenmayer et al. 2021).'

Evidence 25: An extract from the publication cited in Statement 16 indicating the actual statement from the source reference (Lindenmayer 2021, p.11); 67 = Smith et al. (2011), 68 = Leverkus et al. (2020) & 69 = Bowd et al. (2019).

'Post-fire logging occurs at a time when forest landscapes are most vulnerable to increased run-off, erosion and impacts on downstream water quality [67].

A global review found that post-fire logging has a negative effect on regulating ecosystem services [68].

For example, compared to long-undisturbed sites, Mountain Ash sites subject to compound disturbances consistently had the lowest values of a wide range of soil measures which affect ecosystem function and forest productivity [69].'

Evidence 26: The recommendations presented in Smith *et al.* (2011, Abstract) to mitigate the impact of a post-wildfire salvage harvest.

'It is recommended that post-fire salvage operations should avoid the formation of log drag-lines when using cable harvest techniques and maximise surface cover to limit increases to runoff, erosion and catchment sediment exports.'

Evidence 27: The recommendations presented in Leverkus *et al.* (2020, Abstract) to mitigate the impact of a post-wildfire salvage harvest.

'Salvage logging affected ecosystem services in a moderately negative way, regardless of disturbance type and severity, time elapsed since salvage logging, intensity of salvage logging, and the group of regulating ecosystem services being considered. However, prolonging the time between natural disturbance and salvage logging mitigated negative effects on regulating ecosystem services. Salvage logging had no overall effect on surface fuels; rather, different fuel types responded differently depending on the time elapsed since salvage logging. Delaying salvage logging by ~2–4 years may reduce negative ecological impacts without affecting surface fuel loads.'

Evidence 29: The legal requirements in regard to water quality in the State of Victoria, in compliance with the Code as defined in Schedule 1 (DELWP, 2022b, p.40&41).

'8.1.5 Water quality

8.1.5.1 Except in restricted access and special water supply catchment areas locate landings, where possible:

a) at least 40 m for slopes of 15° or less, or 60 m for slopes of greater than 15°, from any permanent stream, or wetland; and

b) at least 20 m for slopes of 15° or less, or 30 m for slopes of greater than 15°, from any temporary stream and any drainage line.

8.1.5.2 In restricted access and special water supply catchment areas locate landings, where possible:

a) at least 60 m for slopes of 15° or less, or 80 m for slopes of greater than 15°, from any permanent stream, or wetland; or

b) at least 40 m from any temporary stream drainage line.

8.1.5.3 Locate boundary tracks at least 40 m from any permanent stream or wetland.

8.1.5.4 Apply the buffer and filter prescriptions for sites with high or very high water quality risk as specified in Table 9 Minimum widths in metres for buffers (B) and filter (F) strips applicable to various waterway categories, in relation to water quality risk and slope.

8.1.5.5 Install drainage structures for all coupe and haulage infrastructure at an appropriate frequency to mitigate increased risks to water quality due to potential sediment loads associated with water flow in the fire affected terrain.

8.1.5.6 In restricted access and special water supply catchment areas establish a drainage structure between 20 m to 40 m upslope of where a road or vehicle route crosses any waterway.'

7 Assessment criteria

7.1 Assessment against Criterion 1.1

The Nomination form provides statements in support of an assessment against the FFG Act Criterion 1.1 (see Statement 18). This criterion requires consideration the threatening processes to two or more taxa.

Statement 17: An extract from the Nomination outlining the reference against which an assessment is tested (Anon, 2023, p.2).

'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.'

7.1.1 Potential impact at the species level

The Nomination cites a meta-analysis across 24 species (see Statement 18). The Nomination author has failed to identify direct quotations from the source document. The analysis by Thorn et al. (2018, p.282) included salvage harvest after wildfire, wind and insect damage (see Evidence 30). The methods limited the sampling to those providing comparisons between salvage harvesting and completely un-salvaged control plots. See Evidence 31 for a breakdown of the studies included. Note the prevalence of post-wind damage events. The impact of a wildfire event is very different in totality to a wind event (as noted) or insect damage event. A wildfire event will have an impact beyond the standing trees. It is likely that a site with wind or insect damage will have a higher level of dead wood with time as the damage agent has not consumed the wood materials on a site. This makes the Nomination claim regarding impacts of salvage harvesting on species richness (Statement 18) of limited relevance to a consideration of post-wildfire salvage harvesting.

Statement 18: An extract from the Nomination in regard to species richness (Anon, 2023, p.3).

'Thorn et al. (2018) conducted a meta-analysis across 24 species groups and found that salvage logging significantly decreases numbers of species of eight taxonomic groups. Richness of dead wood dependent taxa (saproxylic organisms) decreased more strongly than richness of non-saproxylic taxa.'

Evidence 30: The subject of the study undertaken by Thorn et al (2018, p.282).

'We followed guidelines for systematic literature reviews (Pullin & Stewart, 2006) to compile comparisons of species richness between salvaged and unsalvaged fire-, wind- or insect-affected forests.'

Evidence 31: A breakdown of the studies included in the meta-analysis by Thorn et al. (2018, p.284, Figure 2). Note the absolute dominance of post-wind damage events.

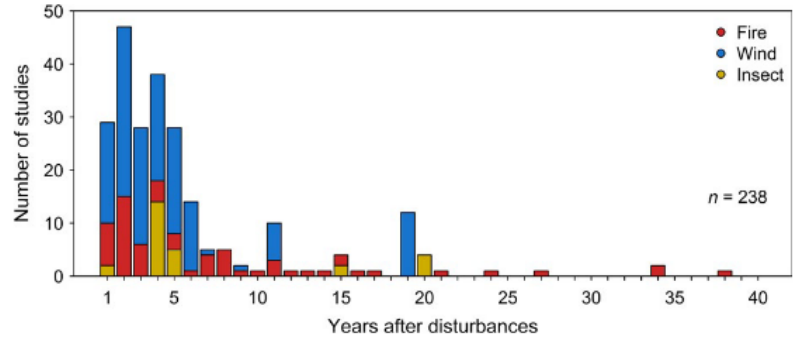

FIGURE 2 Distribution of studies investigating the effects of salvage logging on biodiversity after wildfire, windstorms and insect outbreaks according to the years after disturbance. [Colour figure can be viewed at wileyonlinelibrary.com]

7.1.2 Bird species richness

The Nomination references Lindenmayer et al. (2018) which reports on a study of bird species in *Eucalyptus regnans* (Ash) forests over an eight-year period (see Statement 19). The source reference provides suggestions to change harvesting patterns to increase the area of retained trees (Evidence 32), however the Nomination does not address these insights. All the suggested improvements are regulated and required in the State of Victoria. Schedule 1 dictates that post-wildfire salvage harvesting excludes green patches in Ash forests (see Evidence 18), exclude areas of habitat trees (Evidence 15), provides for habitat retention (see Evidence 17) and seeks to protect hollow bearing trees (Evidence 23). Therefore, when the regulated definition of salvage harvesting in the State of Victoria is considered, the Nomination statements presented in Statement 19 are redundant.

Statement 19: An extract from the Nomination in regard to bird species richness (Anon, 2023, p.3).
'Lindenmayer et al. (2018) found evidence of a gradient in bird species richness from highest richness in unlogged and unburned sites (least disturbed sites), and lowest richness in the most disturbed sites (sites subject to salvage logging without island retention). All forms of logging on burned sites impaired recovery in bird species richness relative to sites subject to high-severity fire. Alterations in stand structure and plant species composition (and hence modification in bird habitat suitability) due to logging are the most likely reasons for reduced bird species richness and delayed patterns of recovery.'

Evidence 32: Concluding advice as to how management of a post-wildfire salvage harvesting should be undertaken (Lindenmayer et al., 2018, Abstract)
'This study highlights the importance for native bird species of retaining patches of unlogged forest not only within otherwise clearcut forest, but also in areas that are burned and subject to salvage logging. We therefore suggest that the adoption of retention harvesting be expanded to include stands disturbed by wildfires.' 'Retention of uncut islands within logged areas increased bird species richness above that found in areas that had been clearcut.'

A statement in regard to the duration of the effect of salvage harvest is provided in the Nomination (see Statement 20). The source reference was reviewed, and the following is noted. The Nomination provides a direct cut and paste quote from the reference but fails to identify this (see Evidence 34). Lindenmayer et al. (2021, p.9) cited Loyn (1985) with the source information presented in Evidence 33 (Loyn, 1985, p.223). Schedule 1 requirements regulate that post-wildfire salvage harvesting excludes green patches in Ash forests (see Evidence 18), exclude areas of habitat trees (Evidence 15), provides for habitat retention (see Evidence 17) and seeks to protect hollow bearing trees (Evidence 23). This makes the Nomination stated concern as redundant.

Statement 20: An extract from the Nomination in regard to the duration of the effect of salvage harvest (Anon, 2023, p.3).
'These effects can be very long term with some species occurring only in the remaining patches of forest that are older than 200 years (Lindenmayer et al. 2021).'

Evidence 33: An extract from Lindenmayer et al. (2021, p.9) as the reference cited in Statement 20.
'The impacts of post-fire logging on bird communities differ from severe bushfire and conventional logging, with lowest bird species richness in sites that have been logged following fire [53]. These effects can be very long term with some species occurring only in the remaining patches of forest that are older than 200 years [58].'

Evidence 34: An extract from Loyn, (1985, p.224) as the reference cited by Lindenmayer et al. 2021; taken.
'A small group of birds was found locally in the few remaining areas of forest containing trees aged 200 years or more, and appeared rare elsewhere. They included three nocturnal hole-nesting species (Powerful Owl, Sooty Owl and Australian Owlet-nightjar: Appendix).'

7.1.3 The Glossy Black Cockatoo

The Nomination makes reference to the Glossy Black-Cockatoo (*Calyptorhynchus lathami*) and notes the percentage of habitat affected by the 2019-20 bushfires in Victoria (Statement 21). The information was cited from State of Victoria (2021) was inaccessible from the link in the reference. The report titled Victoria's bushfire emergency: biodiversity response and recovery (State of Victoria, 2020, p.83) was referenced by the Nomination (see Anon, 2023, p.3) indicated that *'64% of modelled habitat in Victoria within the current fire extent using HDM'* and *that '78% of habitat in Victoria within the current fire extent using VBA records'*; this is the area of habitat impacted by the 2019-20 bushfires in Victoria. In support of the Nomination, it was claimed that impacts to food source was a risk based on published information (Statement 22). This statement further links salvage harvesting to the risk due to impacts on stands and regeneration of the certain Allocauarina species and due to loss of hollows. As noted in Evidence 35 and 36, individuals of this species of bird have been observed eating alternative source seeds. The State of Victoria (2020) does not make reference to the loss of hollows. Schedule 1 regulates specific requirements to protect the habitat (food sources and hollows) of this species as presented in Evidence 37. The Nomination, while referencing the State of Victoria (2020), does not present this information, nor does it present the current regulated protections of this species.

Statement 21: An extract from the Nomination in regard to the Glossy Black-Cockatoo (Anon, 2023, p.3).

'The FFG Act listed (Vulnerable) Glossy Black-Cockatoo (*Calyptorhynchus lathami*) is found mostly in East Gippsland and the 2019-20 bushfires are considered to have impacted 64% of the bird's modelled habitat, with 26% impacted by high severity fires (State of Victoria 2021).'

Statement 22: An extract from the Nomination in regard to the Glossy Black-Cockatoo (Anon, 2023, p.3).

'Glossy Black-Cockatoos feed almost exclusively on certain Allocasuarina seeds and the impact of the bushfires on their food source is likely to be severe (State of Victoria 2020). Compounding this impact with post-fire salvage logging could have serious consequences for the survival of the species, not only through impeding the recovery of Allocasuarina stands, but through the loss of hollow bearing eucalypt trees, which the birds rely on for breeding.'

Evidence 35: A statement of the impact of the 2019/20 Victorian wildfires on Glossy Black-Cockatoos with specific reference to food supply (State of Victoria, 2020, p.21).

'Most of the population in East Gippsland has been impacted; effect of fire on food (Casuarina seeds) likely to be severe. Has since been observed eating other sheoak species'

Evidence 36: A statement of the impact of the 2019/20 Victorian wildfires on Glossy Black-Cockatoos with specific reference to food supply (State of Victoria, 2020, p.63).

'Field assessments complete for Glossy Black-Cockatoo. A highlight was that a number of individuals were found feeding on alternative species of Sheoak for the first time recorded'

Evidence 37: An extract from the Victorian Code of Practice Schedule 1 (DELWP, 2022b, p.60) in regard to regulated requirements to protect the Glossy Black-Cockatoos (a direct citation).

Species name	***Value***	***Applicable FMAs***	***Management Actions***
Glossy Black-Cockatoo *Calyptorhynchus lathami lathami*	*Nesting site*	*Gippsland FMAs East Gippsland FMA*	*Apply a **management area** of 250 m radius over each nesting site.* *Within 250 m of nest tree, exclude **timber harvesting operations**, **road construction** and burning during the breeding season (December to May). Search the surrounding forest for other active nest sites (the species is known to nest in clusters). Apply a **protection area** with a 100 m radius around nest trees.*

			*Where Black She-oak **stands** are identified during **timber harvesting operations** (including post harvesting burning) new roading activities will be conducted in a manner that avoids damage to the **stand**.* *The definition of a Black She-oak **stand** is a group or groups of trees with a **basal area** equal to or greater than 10 m^2 in an area of 0.25 hectares.*

7.1.4 The Southern Giant Burrowing Frog

The Nomination identifies the Southern Giant Burrowing Frog (*Heleioporus australiacus flavopunctatus*) as a species of interest. It acknowledges that the species is *'encountered rarely and inconsistently, and there is no certainty about population trends'*. This statement is expanded-on by citation of observations of a post-wild-fire salvage harvesting operation (Statement 23). The Nomination does not provide an appropriate personal communication citation as required by referencing convention. The statement provided appears to be conjecture as to the outcomes rather than the results of scientific analysis. There was no consideration of what would have been the outcome without a salvage harvest. The importance of this species is recognised by the Code and Schedule 1; Evidence presents the regulated harvesting management requirements for this species (noted as *Heleioporus australiacus*). The Nomination fails to report on these regulated requirements.

Statement 23: An extract from the Nomination in regard to the Southern Giant Burrowing Frog (Anon, 2023, p.3).
'In early 2021, Clemann observed clear-fell salvage logging of Southern Giant Burrowing Frog non-breeding habitat (just upslope of pools containing tadpoles) at two sites in East Gippsland that had been severely burnt in the 2019-20 Black Summer fires (Clemann & Swan 2023). Forest-dependent threatened species such as Southern Giant Burrowing Frog, Watson's Tree Frog (Litoria watsoni) and Spotted Tree Frog (Litoria spenceri) are particularly susceptible to harm from both 'traditional' and post-fire salvage logging. Soil compaction and disturbance due to salvage logging likely detrimentally affects burrowing frogs such as the Southern Giant Burrowing Frog. When erosion control measures fail or are inadequate, increased loads of sediment entering water bodies can fill and destroy frog egg-laying sites. This salvage logging of recently burnt habitat is likely to accelerate and exacerbate losses of populations already compromised by disease and severe fires (Clemann & Swan 2023).'

Evidence 38: An extract from the Victorian Code of Practice, Schedule 1 (DELWP, 2022b, p.59) in regard to the regulated protection of the Giant Burrowing Frog (a direct citation).

Species name	***Value***	***Applicable FMAs***	***Management Actions***
Giant Burrowing Frog *Heleioporus australiacus*	*Population*	*Gippsland FMAs East Gippsland FMA*	*Where records of Giant Burrowing Frog are located on first-order streams or sites away from streams, apply a* ***protection area*** *of 50 ha (preferably the entire sub catchment unit).* *Where records of Giant Burrowing Frog are located on second or higher order streams, apply a* ***protection area*** *of 100 m width each side of the stream for 1km upstream and downstream of the detection site.* ***Note:*** *For the purposes of this prescription, a first order stream is the headwaters of a catchment and is the smallest stream mapped on the 1:100 000 Natmap series. Second order streams are the next level of stream further down the catchment. For first order streams the size of each catchment will vary, however target size is approximately 50 ha.* *For off stream records where evidence of this value is found in the field, apply a* ***protection area*** *of 50ha over the record or equivalent area of suitable habitat nearby.* *Avoid new roading in the* ***protection area****.* ***Note:*** *The* ***Secretary*** *intends to review this strategy when 50 sites are located in Victoria.*

7.1.5 Species diversity

The Nomination provides comment on species diversity post-wildfire salvage harvesting (see Statement 25). This citation failed to be precise; the reference is limited to understory species, not all species (see Evidence 28). The quotation in the Nomination adds to the causal activity (salvage harvesting) by including regeneration burns; this is not in the source reference. Curiously, the Nomination provides a conditional statement of 'are likely to' whereas the source reference states '*will be*'. The body of the paper presents a more definitive statement

(see Evidence 29). While the referenced material makes a definitive statement, the authors note that no studies have examined the impacts of post-wildfire salvage harvesting on plant communities (see Evidence 30). Another extensive statement is presented in the Nomination (Statement 26), but this statement is not supported by any referenced material.

Statement 25: An extract from the Nomination in regard to the impact of plant species diversity (Anon, 2023, p.4).
'Plant communities in post-fire salvage logged areas are likely to be dominated by a smaller suite of species (favouring taxa that are wind dispersed, have viable soil-stored seed remaining after salvage logging and regeneration burns, or have deep rhizomes) (Lindenmayer & Ough 2006).'

Evidence 28: An extract from Lindenmayer & Ough (2006 Abstract) as the reference cited in Statement 25.
'Understory plant communities in salvage-logged areas will be dominated by a smaller suite of species, and those that are wind dispersed, have viable soil-stored seed remaining after salvage logging, or have deep rhizomes are likely to be advantaged.'

Evidence 29: An extract from Lindenmayer & Ough (2006, p.1011) as the reference cited in Statement .
'In summary, plant communities in salvage-logged areas are likely to be dominated by a smaller suite of species, particularly by those that are wind dispersed, have viable soil-stored seed remaining after salvage logging, or have deep rhizomes.'

Evidence 30: An extract from Lindenmayer & Ough (2006, p.1009) as the reference cited in Statement 25.
'No studies have specifically examined the impacts of salvage logging on plant communities in montane ash forests of the Central Highlands. The response of many species of plants to salvage logging will vary depending on the intensity of salvage, intensity of wildfire, logging machinery used, composition and proximity of the surrounding vegetation (e.g., as a source of propagules), the interval between wildfire and salvage logging, and the seasons in which wildfire and logging occur. Therefore, we provide generalizations of the sorts of responses that might be expected (Table 1).'

Statement 26: An extract from the Nomination providing details of plant species attributes (Anon, 2023, p.4).
'Fire triggers the germination of fire ephemerals from the soil seedbank. Many of these taxa are short-lived and persistence relies on post-fire seed set with the taxa then dropping out of the system until the next fire (e.g. Irenepharus magicus). Salvage logging threatens this process as the germinants may not reach reproductive maturity before the salvage logging disturbance event and so are unable to replenish the soil seedbank. Other long-lived taxa (e.g. Persoonia arborea, P. subvelutina) germinate post soil disturbance events such as fire or logging, but do not reach reproductive maturity for several years. The second disturbance event of salvage logging threatens the recruitment of these fire-killed taxa and the lack of replenished soil seedbank provides a threat to their persistence (Table 1).'

7.1.6 Common persistent, resprout species

The Nomination provides a citation of the outcome of published analysis of post-wildfire salvage harvesting on the species composition with specific reference to 'resprout' species (see Statement 24). The referenced paper (Bowd, et al. 2018) was reviewed. The research utilised site data sets to correlate site history to species (Evidence 31). The conclusions regarding resprouting species is presented in Evidence 32. The citation presented in Statement 24 misrepresents the publication by claiming an absolute loss of such species whereas the publication notes a 'significant decline' in the individuals present. This is a material misrepresentation of the claimed outcomes.

Statement 24: An extract from the Nomination in regard to the impacts on common persistent resprout species (Anon, 2023, p.4).
'Bowd et al. (2018) found wet sclerophyll mountain ash sites that had been salvage logged supported no common persistent, resprout species (Dicksonia antarctica, Polystichum proliferum, and Olearia argophylla).'

Evidence 31: An extract from Bowd et al. (2018, Abstract) as the reference cited in Statement 24.
'….tested the influence of multiple disturbances, of varying intensity and frequency, on the composition and abundance of vascular plant communities and their respective functional traits (life forms and reproductive strategies) in the wet sclerophyll, Mountain Ash Eucalyptus regnans forests of southeastern Australia. Specifically, we quantified the effect of the type and number of disturbances (including fires, clearcut logging, and salvage logging) on plant community composition.'

Evidence 32: An extract from Bowd et al. (2018, p.837) as the reference cited in Statement 24.
'In sites clearcut and salvaged logged in 2009–2010, common and keystone resprouting species including Cyathea australis, Dicksonia antarctica, Olearia argophylla, and Bedfordia arborescens declined significantly, whereas on-site seeder species such as Acacia dealbata increased (Fig. 8).'

7.1.7 Impact on plant communities

In citing Lindenmayer & Ough (2006), the Nomination suggests mechanical disturbance during post-wildfire salvage harvesting and the potential inclusion of a regeneration burn as part of site management (see Statement 25). The source reference was reviewed, and it does not include reference to a regeneration burn following salvage harvesting (Evidence 33). Further, as presented in Evidence 30, Lindenmayer and Ough (2006) note that there had been no studies examining the impact of salvage harvesting on plant communities. The Nomination provides a list of FFG Act listed ephemeral species (see Statement 26). The table caption claims that the FFG Act lists salvage harvesting as a 'significant threat' to the survival of these species. Neither the FFG Act nor the Threatened List (DELWP, 2022) specifically list salvage harvesting as a threat.

Statement 25: An extract from the Nomination in regard to the impact of activities on a site (Anon, 2023, p4).
'The extent of the impact on plant communities will depend on the extent and intensity of mechanical disturbance to the site and if the salvage logging is followed by a regeneration burn (Lindenmayer & Ough 2006).'

Evidence 33: An extract from Lindenmayer & Ough (2006, p.1011) as the reference cited in Statement 25.
'The extent of the impact on plant communities will depend on the extent and intensity of mechanical disturbance to the site.'

Statement 26: An extract from the Nomination in regard to post-wildfire salvage harvesting as a specific threat (Anon, 2023, p.4).
'Table 1: FFG Act listed fire ephemeral flora species for which salvage logging has the potential to pose a significant threat to their survival. '

8 Assessment against Criterion 1.3

8.1 Aggravation of the risk situation

The Nomination provides a statement in regard to the compliance of the nomination with the requirement of Section 16 (Statement 27). The evidence provided by the Nomination (Statement 28) has a focus on whether salvage harvesting mitigates or increases the risk of subsequent disturbance. The Nomination cites Leverkus et al. (2021) who analysed 96 publications on the impact of salvage harvesting on subsequent damage events and indicated variation between the damage agents (Evidence 34 and Evidence 35). Leverkus et al. (2021) relied on Leverkus et al. (2018) and Thorn et al. (2018) (see Evidence 36). Analysis of Leverkus et al. (2018, p.989, Table 1) indicated that of the 90 publications they considered from the early 1990s to 2016, there were 49 sites; USA = 58.6%, Canada 11.5%, Europe 29.9% and other 4.1%; none of the sites were in Australia. Of the 90 publications, 58.6% related to fire, 11.5% to insect damage and 25.3 % to wind damage (Leverkus et al., 2018, p.989, Figure 3). As noted, Thorn et al (2018) had a predominance of wind damage events (see Evidence). This prevalence of North American sites means that the subsequent damage agents following a salvage harvest are broader and different to the situation in Australia; for example, damage caused during winter due to snow. Given the nature of these risks as specific to the northern hemisphere (e.g. pine beetle caused mortality), fungibility with Victoria circumstance could be limited. The Nomination citing Leverkus et al. (2021) concluded that the impact will vary (Statement 28). Importantly, Leverkus et al. (2021) noted that where a salvage harvest is to occur, that risk can be mitigated by appropriate management requirements (Evidence 35 and Evidence 38). This is the situation in Victoria as regulated by the Code and Schedule 1. Statement 29 provides a summary statement with inconsistencies between the parts of the statement. While the first part indicates a conditional situation of risk based on local circumstance, the conclusion as to a threatening process ignores this contingency which includes the mitigating impacts of the Code and Schedule 1. This degree of variation is supported by Evidence 37 and Evidence 38.

Statement 27: An extract from the Nomination in regard to a component of the risk assessment (Anon, 2023, p.4).
'Criterion 1.3 any other circumstance that demonstrates to the satisfaction of the Committee that section 16 applies to the potentially threatening process.'

Statement 28: An extract from the Nomination in regard to the impact of a salvage harvest to subsequent events (Anon, 2023, p.4).
'In addition to the direct impact of salvage logging on taxa of concern, the potential for salvage logging to mitigate or increase the risk of subsequent disturbances is also relevant. Leverkus et al. (2021) reviewed examples of where salvage logging altered the risk of further wildfire, insect outbreaks, flooding, major erosional events, mass movement events such as avalanches and landslides, windthrow, browsing and microclimate stress. They concluded that the degree to which salvage logging mitigated or increased the probability of further disturbances such as these likely varies in space, time and magnitude.'

Evidence 34: A statement extracted from Leverkus et al. (2021, Abstract) as the reference cited in Statement 28.
'We reviewed the efficacy of salvage logging in mitigating the risk of subsequent wildfire, insect outbreaks, hydrologic disturbances, mass movements, windthrow, browsing, and microclimatic stress.'

Evidence 35: A statement extracted from Leverkus et al. (2021, Abstract) the reference cited in Statement 31.
'Based on 96 publications, salvage logging can reduce total ecosystem fuels but increase small ground fuels and produce drier fuels in the short term, reduce bark beetle host trees and beetle-tree connectivity (though with little evidence for outbreak mitigation), magnify erosion and flood impacts of disturbance but with uncertain watershed-scale implications, increase susceptibility to windthrow at artificially created stand edges, remove the protective function of deadwood in preventing rockfall and avalanches, alter browsing pressure by modifying forage availability and hiding cover for herbivores and predators, and increase microclimatic stress due to greater radiation and temperature fluctuations.'

Evidence 36: A statement extracted from Leverkus et al. (2021, p.2) as the reference cited in Statement 28.
'Our review encompasses Mediterranean, temperate, and boreal forests, in which most of the relevant literature is concentrated (Leverkus et al., 2018b; Thorn et al., 2018).'

Statement 29: An extract from the Nomination in regard to the risk of subsequent disturbance (Anon, 2023, p.4).
'Their key point is that the risk of subsequent disturbances due to the impacts of salvage logging will be highly contingent on local conditions (Leverkus et al. 2021). These contingencies are consistent with the conclusion that salvage logging is a potentially threatening process under the FFG Act.'

Evidence 37: A statement extracted from Leverkus et al. (2021, Abstract) as the reference cited in Statement 31.
'In summary, salvage logging does not necessarily prevent subsequent disturbances, and sometimes it may increase disturbance likelihood and magnitude.'

Evidence 38: A statement extracted from Leverkus et al. (2021, p.8) as the reference cited in Statement 31.
'The effects of salvage logging on natural disturbances vary in space, time, and magnitude and thus its efficacy in preventing subsequent disturbance highly depends on local conditions. Further, managing to avoid subsequent disturbances via salvage logging involves applying one disturbance, namely logging, to avoid another. Thus, beyond solely attempting to reduce the risk that such disturbances occur, management decisions should also address the risks associated with the disturbance of management itself.'

8.1.1 Risk of spread of disease

The Nomination identifies the risk of spread of pathogens, particularly soil borne diseases (Statement 30). The statement indicates the possibility of disease spread where the risk of disease is not known. This is recognised by the regulated management requirements for salvage harvesting, with a specific statement in Schedule 1 (Evidence 39). This makes it mandatory to conduct hygiene wash-downs before entry and exit of a fire salvage harvesting operation.

Statement 30: An extract from the Nomination in regard the risk of spread of disease (Anon, 2023, p.4).
'The potential to introduce Phytophthora cinnamomi (the causative agent of Phytophthora dieback: a state and nationally listed Threatening Process) through the process of salvage logging is possible; and the consequences on ecosystem recovery can be severe. P. cinnamomi can be introduced via spores on logging machinery and the subsequent soil disturbance that causes the development of pools of water where the spores can survive. Although there are mitigations (e.g. not introducing machinery from known Phytophthora localities) the introduction of spores from localities that are not known is possible.'

Evidence 39: An extract from the Victorian Code of Practice Schedule 1 in regard to management measures to reduce the risk of disease and weed spreading during a post-wildfire salvage harvest (DELWP, 2022b, p.41).
'8.1.6 Weeds and disease *8.1.6.1 Clean soil from all harvesting machinery (excluding trucks and passenger vehicles) before floating to or from a salvage coupe. Replaces Clause 4.4.1.1 where pre-harvest disease and weed infestations cannot be assessed due to fire effects.'*

9 A summary of other issues with the Nomination

9.1 Prejudicial omissions

9.1.1 Overall framework

The Nomination fails to acknowledge that in the State of Victoria, salvage harvesting of public native forests is regulated by the Code with salvaging harvest specific details provided in Schedule 1.

9.1.2 Within the documents cited by the Nomination

As is good practice, a report or publication should include conclusions and recommendations in regard to the topic of study. While the Nomination cited and in some cases with a simple cut and pasted extracts from a publication, they failed to acknowledge or include the prudent recommendations. The following are recommendations from within a sample of these cited publication. It is important to note that the recommendations are all part of the regulated approach to post-wildfire salvage harvesting in the State of Victoria.

- Evidence 40: A guide to mechanical operations during a post-wildfire salvage harvest.
- Evidence 41: A range of requirements to include in salvage harvesting policy to minimise impacts.
- Evidence 42: A decision making framework to assist with the planning and implementation of salvage harvest to minimise impacts.
- Evidence 43: The importance of maintaining green patches during a salvage harvest event to provide habitat.
- Evidence 44: The components of an ecologically defensible salvage policy.

Evidence 40: An example of a material point made in a publication cited in the Nomination but ignored by the same document; taken from Lindenmayer & Ough (2006, p.1011).
'That is, the physical disturbance associated with logging will uproot and damage vegetative propagules, particularly aboveground structures and shallow rhizomes, resulting in reduced survival. Careful mechanical logging during the salvage operation and the reduced need to clear already burned understory for visibility and safety purposes may reduce these impacts.'

Evidence 41: An example of a material point made in a publication cited in the Nomination but ignored by the same document; taken from Lindenmayer & Ough (2006, p.1012).
' The montane ash forests of the Central Highlands of Victoria have been subject to extensive salvage-logging operations such as those in 1939 and 1983. The impacts of conventional clearfell logging methods and the potential effects of salvage logging were not well understood in those times. Nevertheless, the significantly improved current understanding of the biota and dynamics of montane ash forests should be used to inform more ecologically sustainable logging practices, including those applied in salvage-logging operations. In particular, salvage harvesting policies should make provision

(1) for varied salvage-logging intensity, even within large areas of intensely burned forest;

(2) increased retention of biological legacies such as large living and dead trees, large logs, and thickets of unburned or partially burned understory vegetation;

(3) minimized mechanical disturbance;

(4) minimized seedbed preparation;

(5) consideration of timing and season of salvage logging; and

(6) gathering of data to better quantify impacts of salvage logging.

If salvage operations are well planned and carefully managed, both spatially and temporally, they may have reduced impacts on stand structure, plant species composition, and biota in comparison with conventional clearfelling operations that take place in the absence of wildfire. This was the case for more recent salvage harvesting events such as those associated with the 2003 Alpine fires in eastern Victoria, where modified logging prescriptions took account of some of the issues raised above.'

Evidence 42: An example of a material point made in a publication cited in the Nomination but ignored by the same document; taken from Leverkus et al. (2021, Abstract).

'We propose a decision-making framework to evaluate the suitability of salvage logging to manage subsequent disturbances. It contemplates the likelihood and impacts of both salvage logging and the subsequent disturbances.'

'Forecasting the suitability of salvage logging for management goals requires assessing the mechanisms through which salvage logging effects operate under local conditions, balanced with its impacts as a disturbance itself. Managing to foster the highest-priority functions and services –such as biodiversity conservation, pest mitigation or economic return– across different parts of disturbed forest landscapes based on decision-making procedures such as the one proposed may constitute the best response to uncertain subsequent disturbances.'

Evidence 43: An example of a material point made in a publication cited in the Nomination but ignored by the same document; taken from Lindenmayer et al. (2018, Abstract)

'This study highlights the importance for native bird species of retaining patches of unlogged forest not only within otherwise clearcut forest, but also in areas that are burned and subject to salvage logging. We therefore suggest that the adoption of retention harvesting be expanded to include stands disturbed by wildfires.'

'Retention of uncut islands within logged areas increased bird species richness above that found in areas that had been clearcut.'

Evidence 44: An example of a material point made in a publication cited in the Nomination but ignored by the same document; taken from Lindenmayer & Noss 2006 p.955)

'Components of an ecologically defensible salvage policy include the following measures.

(1) Exclude salvage logging entirely from some areas (Hutto 1995, 2006), such as nature reserves and water catchments (e.g., Land Conservation Council 1994), extensive areas of old-growth forest, and places with few or no roads (Trombulak & Frissell 2000). Sensitive sites such as steep slopes and fragile or highly erodable soils also should be exempt from salvage harvesting (Minshall 2003; Karr et al. 2004).

(2) Ensure that unburned or partially burned patches within the perimeter of a disturbed area (e.g., see De Long & Kessler 2000) are either exempt from salvage or subject to low-intensity harvesting with high levels of legacy retention.

(3) Ensure that certain biological legacies are retained in salvage-logged areas such as fire-damaged trees (Hutto 1995; Nappi et al. 2004) and large (damaged or undamaged) commercially valuable trees (Morissette et al. 2002). These often have either high habitat value (e.g., for foraging by wood peckers; Nappi et al. 2003) or a high probability of remaining standing for a prolonged period (Gibbons & Lindenmayer 2002).

(4) Modify salvage policies to limit the amounts of biological legacies that are removed from particular sorts of areas (Hobson & Schieck 1999)—such as from burned old-growth stands within wood-production zones as currently occurs in some parts of northwestern North America (e.g., Forest Ecosystem Management Team 1993).

(5) Schedule salvage logging so that effects on natural recovery of vegetation are limited (e.g., Roy 1956 in McIver & Starr 2000; van Niuewstadt et al. 2001). This suggestion is related to a need to appraise the ability of disturbed stands to recover naturally (Cooper-Ellis et al. 1999) and, hence, the ecological desirability of programs to replant fire-damaged areas (Noss et al. 2006).

(6) Related to the points above, ensure the future maintenance or creation of particular habitat elements for species of conservation concern within burned areas potentially subject to salvage logging, such as some woodpeckers (Hutto 1995; Smucker et al. 2005), rare forest carnivores (Bull et al. 2001), cavity-using mammals (Lindenmayer & Ough 2006), invertebrates (Hoyt & Hannon 2002), and plants (Scott 1985).

(7) Ensure adequate riparian buffers are in place to protect aquatic ecosystems within areas where salvage harvesting operations occur (Minshall 2003),and retain structures such as logs and logging slash on the ground to limit soil erosion (Shakesby et al. 1993).

(8) The effects of ground-based logging on soil and water in post disturbance environments can be great; thus, this type of harvesting should be limited and, whenever possible, replaced with cable or helicopter systems for removing fire-burned trees.'

9.1.3 Specific points

The following specific points are presented in regard to the Nomination.

- References relied on: An internet search on fire salvage provides a plethora of references with varying degrees of robustness. Indeed Leverkus et al. (2018 Abstract) reported retrieving 4,341 references. The Nomination relies on 13 references cited including one reference incorrectly cited. Of the 13 references cited, the Nomination includes eight by the one author either as the primary author or as contributing author.
- Selective citation from specific references: The Nomination while citing specific aspects from a reference, ignores other material evidence relevant to the nomination. For example and as noted, ignoring the various recommendations as to how to improve the implementation of a salvage harvest operation.
- Referencing: The Nomination has relied on secondary references rather than sourcing the primary references to ensure that context is fully understood. The Nomination includes cut and paste of statements from source documents without specific acknowledgement of this treatment. This is contrary to State Government policy[1] to comply with the Australian Government Style Manual[2] in particular referencing and attribution. The specific requirement is '*to Include page numbers in the in-text citation only when the work has page numbers and you're including a direct quotation'*[3]. The Nomination does not include personal communications appropriately cited.
- Misrepresentation: As noted, there are documented cases in the Nomination where the author has misrepresented the source document by changing statements from conditional to absolute.
- Reference fungibility: There is an issue with the specific fungibility of referenced information to Victorian circumstances where this information is used as evidence in support of this specific nomination.
- Damage agents: The Nomination does not distinguish between damaging agents (e.g. fire, wind and insect) that result in a need for a post-event salvage harvest. These are material errors as the impacts and outcomes of the different damage agents are significantly different.

10 Conclusions and recommendations

Based on this analysis of the Nomination, Forestry Australia believes that the SAC's final recommendation to the Minister for Environment and Minister for Agriculture should be that Salvage Harvesting of Burnt Forests is **not supported** for listing as a threatening process due to **material errors and misleading statements** within the Nomination.

Evidence 45 presents a summary of an assessment of the conclusions reached by the SAC based on the detailed analysis presented in this submission. The Nomination as prepared is factually incorrect on the fundamental principle that a post-fire salvage operation is a free-for-all and unregulated activity, where all potential damaging actions and activities can

[1] See https://www.vic.gov.au/victorian-government-style-guide accessed on the 6/12/2023.
[2] See https://www.stylemanual.gov.au/
[3] See https://www.stylemanual.gov.au/referencing-and-attribution/author-date#include_author_and_date_in_text_and_list_full_details_later

occur. This is not correct as all salvage harvesting operations in the State of Victoria are regulated. For post-wildfire salvage harvesting in public native forests, this regulation includes specific and detailed requirements to mitigate risk.

Importantly, the Nomination:

- Fails to adequately define what types of tree removal activities would constitute post-fire salvage harvesting;
- Fails to adequately define the nature, severity and extent of fire events that would constitute the activity being classified as "salvage harvesting of burnt forests"
- Fails to define the forest type that the process is concerned with e.g. public native forests, private native forests, commercial plantations, private plantings
- Fails to address that there is a regulated definition which encompasses a range of mitigating actions defined in the Code of Practice for Timber Production and the normative Schedule 1: Management Standards and Procedures for timber harvesting in Victoria's State Forests, as well as further site- and species-specific review and mitigating actions required through Regional Forest Agreements and Action Statements, amongst other tools.

Without these clear definitions, Forestry Australia is concerned that **the proposed threatening process is not properly represented** and that there is a real risk that **its listing could create a range of negative unintended consequences**. These include potential to:

- Limit or prevent salvage harvest and re-establishment of fire-killed commercial plantations;
- Limit or prevent tree removal for community safety and strategic firebreaks
- Limit or prevent active forest management aimed at forest health, including fast-tracking forest recovery and restoration of forest structure through ecological thinning
- Limit or prevent self-determination by Traditional Custodians regarding post-fire management needs.

Evidence 45: A report against the stated SAC assessment of the compliance of the Nomination, based on the evidence documented in this analysis.	
Statement 1: A summary statement in regard to the quality of Nomination in defining the potentially threatening process as determined by the SAC (Anon, 2023, p.1).	The Nomination fails to specifically define post-fire salvage harvesting, ignores the regulated definition for the State of Victoria, fails to be specific as to the type of forests included and the nature of the fire event as a precursor to the threatening agent.
Statement 2: A summary statement in regard to the eligibility of Nomination as determined by the SAC (Anon, 2023, p.1).	The Nomination fails to present robust evidence as part of reporting against Criterion 1.1 and 1.3. The evidence in regard to Criterion 1.1 ignores the requirements regulated by the Code and Schedule 1 in mitigating a range of risks identified in the publications cited.

	The evidence provided in regard to Criterion 1.3 is heavily reliant on northern American evidence which includes wind and insect damaged stands.
Statement 3: A summary statement in regard to the quality and status of the published information relied on in Nomination as determined by the SAC (Anon, 2023, p.1).	The Nomination includes materially misleading representation of some references changing conditional to absolute statements, failing to seek the primary reference, failing to fully understand and define the context of some citations, and omitting advice within the references as to how to mitigate any risks. Further, the Nomination makes use of cut and paste sections from references without appropriate citation of this. A final point is that the Nomination has relied heavily on an individual reference and failed to notice that the citation used was wrong.

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