Michelle T. Casanova

Charophyte Services

PO Box 80 Lake Bolac, Vic. 3351

mt.casanova@federation.edu.au

Threatened species and communities risk assessment

RFA implementation

Review of methods for risk assessment of threatened species

With reference to the Regional Forest Agreements, I provide the following review of the method undertaken to assess risks to threatened species and communities. The following questions were provided for guidance and I address them in detail below.

1. Given the requirements of the RFAs, is the risk assessment method adequate and appropriate to inform whether interim protections and management actions are necessary?
2. Based on the examples you have been provided, do the methods result in the provision of information necessary to meet the RFA requirements?
3. How would you rate the expertise and experience of the assessors used in the examples you have been provided, and more generally across the assessments?
4. What could be added (further information, additional assessments, modelling etc.) to this process in order to assess and prioritise permanent protections and management actions as required by April 2022?
5. Any other relevant observations

Introduction and Review Question 5

The Regional Forestry Agreements

With respect to this particular review the pertinent parts of the Regional Forestry Agreements are that they are required to:

- Have regard for endangered species, indigenous values and ecologically sustainable management (among other things),
- Provide for the recovery of listed species and communities and mitigation of threatening processes,
- Provide protection (equivalent or greater than is currently afforded under the Commonwealth Statutory Conservation Planning Documents) for listed species and communities,
- Provide active management of listed species and communities,
- Make a risk assessment and determine whether additional interim or permanent protections and management are necessary, and
- They seek to genuinely partner with traditional owners to support the protection of country in their implementation (in the Introduction sections of RFAs).

Risk Assessments

The risk assessment process has been developed largely in relation to business risk and it has its supporters and detractors in its use in ecology (Aven 2012). Perhaps the most important detrimental aspect of risk assessments in ecology is that such assessments can err in telling us that we ought to

accept preventable environmental risks just because we cannot eliminate all risks (Shrader-Frechette 1995). In a business setting insurance can be taken out to mitigate the (financial) losses from acceptable risk. In life, once a species is extinct, there is no replacement for that loss. Similarly, the treatment of threats individually can ignore the complexity of indirect and cumulative effects (Riccardi and Simberloff 2009).

The risk assessment process as outlined for this project is slightly different from other methods I am familiar with: in this case threats or risks are identified, their likelihood is determined (rare, unlikely, possible, likely or almost-certain), the effectiveness of controls is determined (good satisfactory, poor or uncontrolled), the consequence determined (negligible, minor, moderate, major or extreme), and on the basis of those a matrix of rank of risk (high, significant, medium or low) is provided. This differs from other methods I have used in that there are more categories, in this method, of likelihood, and consequence, and it assesses the current effectiveness of controls. Usually an explicit statement of risk appetite is also given. In this case (from the presentation pdf), it appears that risks in the categories of Significant or High are worthy of mitigation, and those of Medium or Low are not, implying that the risk appetite with regard to species or community extinction in relation all risks is 'Medium'.
In effect, although the definitions of each category are provided, and there are many categories in each of the assessable characteristics of risk, it comes down to a yes-no answer (14 are in the 'yes – we accept the risk' category and 11 in the 'no – we will mitigate the risk' category) in relation to provision of mitigation.
Risk assessment in this context is not science, although it can incorporate some aspects of science in it (e.g. hypothesis generation), although that is not always explicit.
For the determination of categories in relation to risk assessments of threatened species, most analysts agree that it is important to include an assessment of the uncertainty caused by lack of information or misinformation (Reynolds and Mace 1999, Riccardi and Simberloff 2009, Aven 2015, Zeleňakova et al. 2020). Where species or communities have had an Action Statement or similar produced, and the species is well documented and its ecology and requirements are well-known, the uncertainty will be low. However, there are species that occur in the RFA regions that have not had Action Statements produced, or whose ecology is not well-known. In this case there will be a degree of uncertainty in relation to the whole process that should be acknowledged, or resolved.

Listed species
Only listed threatened species and communities are considered with regard to this risk assessment process. Given that species are only listed when they are at risk of extinction throughout their range, and that listing depends on a nomination from the public or some interested body, it is possible, even likely, that there are species and communities that are at risk of broad-scale or local extinction (possibly from forestry activities) that are not currently listed, and so would not be considered. In this context the approach of only assessing listed species should be examined in relation to other State Government Policies and Strategies (e.g. Biodiversity 2037), and consideration given to the views of traditional owners in caring for country, since this is a commitment of the RFAs.

Review Questions 1 and 2
Based on the examples given (*Galaxias mcdowalli*: a fish; and *Euastacus bidawalus*: a crustacean both reviewed by Tarmo Raadik and one other), there appears to be thorough documentation of threatening events created by forestry activities on these particular species in their restricted freshwater stream habitats. In the case of these two species it appears that a Statutory Conservation Planning Document has been produced (at least to the degree of a RAMAS CAM assessment describing the species, threats and population information where known). Specific threats have been identified, and their individual likelihood, consequence and controls have been estimated. In the assessment spreadsheet there appears to be a degree of 'cut and paste' of mitigation activities

and assessment of their impact, rather than individual consideration for each species. This is reasonable in so far as forestry activities will result in similar in-stream effects on in-stream species, regardless of the species under consideration, but doesn't provide confidence that each species is well-known enough to distinguish the species-specific threats, habitat requirements or mitigations. There is no indication of variation in the risk appetite for different risks or compound risks (Isaac and Cowlishaw 2004). Forestry activities can involve a number of processes that provide threats, and many can be produced sequentially or simultaneously (fire and chemical retardants, disturbance and sedimentation) and this should also be considered.

If the risk assessment can state the degree of certainty about the information on which the assessment is based, and have concern for the risk appetite with regard to the role or importance of the species in the ecosystem (this might not be the same for every species or community) and the compounding of risk, then this method could be adequate and appropriate to inform whether interim protections and management actions are necessary (although 'necessary' in this context is a value-judgement rather than a statement of objective need). To the best of my knowledge the assessments of *Galaxias mcdowalli* and *Euastacus bidawalus* are adequate and appropriate to inform whether interim protections and management should be undertaken, depending on the risk appetite.

Review Question 3

The main reviewer, in the examples given to me, has a long familiarity with the species and probably knows them better than anyone. I do not know that the other reviewers of those examples are particularly informed about the species, ecology or habitat specifically, and in the second example, only the one reviewer was provided. It would be better to seek more widely for additional people who could provide input into the risk assessment (there are many people who work on fish outside of ARI, DELWP and Forestry, and even I know of at least one other person with a knowledge of Australian freshwater crustaceans). With regard to the statement that the users of the RFAs seek to genuinely partner with traditional owners it would be good to include consultation with traditional owners who had some knowledge of the freshwater systems and the species in them, to provide some input about the management of those systems in relation to extinction and threatening processes. Of the other reviewers, I can confirm that Peter Menkhorst is an ideal reviewer for birds.

Review Question 4

The degree of uncertainty or reliability of the information on which the assessment is based should be incorporated into the process (ideally an Action Statement for all the species and communities under examination would already exist, and if not, consideration of the precautionary principle be made). An explicit statement of risk appetite with regard to the role or importance of the species in the ecosystem (this might not be the same for every species or community) and the potential for compounding of risk should be provided. Obtaining the input of additional people who come from 'outside' Victorian Statutory Bodies and consultation with traditional owners, could enhance the risk assessment process.

References

Aven, T. (2012) Foundational Issues in Risk Assessment and Risk Management *Risk Analysis, Vol. 32, No. 10*

Aven, T. (2015) *Approach for selecting risk analysis methods*. John Wiley & Sons, Ltd.
doi: 10.1002/9781119057819.app3

Isaac, N.J.B. and Guy Cowlishaw, G. (2004) How species respond to multiple extinction threats. *Proc. R. Soc. Lond.* B 271, 1135–1141. Doi:10.1098/rspb.2004.2724

Reynolds, J.D. and Mace, G.M. (1999) Risk assessments of threatened species. *Trends in Ecology and Evolution,* 14*,* No. 6: 215-217.

Ricciardi, A. and Simberloff, D. (2009) Assisted colonization: good intentions and dubious risk assessment. *Trends in Ecology and Evolution* 24 No.9. doi:10.1016/j.tree.2009.05.005

Shrader-Frechette, K.S. (1995) Comparative risk assessment and the naturalistic fallacy *Trends in Ecology and Evolution* 10:1.

Zeleňakova, M., Labant, S., Zvijakova, L., Weiss, E., Čepelova, H., Weiss, R., Fialova, J., Minďaš, J. (2020) Methodology for environmental assessment of proposed activity using risk analysis. *Environmental Impact Assessment Review*, 80. doi.org/10.1016/j.eiar.2019.106333

Dr Matt Dell
Senior Consultant Botanist
Coldstream VIC
admin@dellbotany.com.au
www.dellbotany.com.au

04/12/2020

Peer review of threatened species and communities risk assessment methods, Regional Forest Agreements

Prepared by Matt Dell, Senior Consultant Botanist

A review has been undertaken of DELWP methods and associated materials on the process of risk assessment for threatened species and communities, under Victoria's renewed Regional Forest Agreements (RFAs). This review responds to the following questions and is generally limited to how these apply to the plant taxa and communities being assessed under the RFAs.

- **Given the requirements of the RFAs, is the risk assessment method adequate and appropriate to inform whether interim protections and management actions are necessary?**

  The method follows a standard risk matrix approach with outcomes determined by an assessment of defined hazards and vulnerabilities, which inform the consequence of a hazard and overall risk. The likelihood of a hazard occurring is then assessed. The method generally explains the assessment process in sufficient detail. In my opinion, there is no overarching deficiency in using this type of risk assessment for the proposed purpose. Some potential areas for improvement or consideration include:

  - The assessment of interactions of risks is important and seldom considered in similar risk assessments. Other than making a statement about the interactions, there is little guidance in the methods about how the assessor may consider this to change the consequence rating. Likelihood needs to also consider the likelihood of the interaction occurring and how this affects the overall risk, compared with that of each hazard alone. The assessor is essentially modelling risk using each hazard under consideration, and the resulting models should treat expected or observed interactions under a separate assessment.
  - The method describes the scale at which the assessments should be made for species considerations. I have interpreted this to mean within the spatial overlap of a species' extent of occurrence and the extent of forestry operations, and no greater than the extent of a region. While it is encouraged that risk is applied at the scale of the hazard within a region, the scale of action should not be so small that it has little actual effect on mitigating consequences. A standard approach to prescribing actions should be applied with consideration to functions of the species within the landscape e.g. its mobility, dispersal and functional roles.
  - The method considers effectiveness of the management. The responses of this vary from administrative constraints to tractability issues. There is opportunity and it is recommended to separate these two themes. For example, the assessment may first ask how tractable is the hazard (i.e. can the hazard be managed?) and then secondly how effective is the management (e.g. which commercial treatments are available? has the treatment failed previously? are there financial constraints? is non-compliance adding to risk?).

- Confidence. If an assessor is relying on Habitat Distribution Models when rating confidence, model diagnostics need to be available. For example, if a model was made using MaxEnt then information including the AUC statistic (predictive accuracy) would need to be known in order to assign a confidence level based on the modelling. That is, not all the models perform equally and their use in planning should not be made without considering the level of uncertainty attached to each model. Currently the assessor is asked to consider if the extent of modelled habitat appears suitable but not whether the modelled extent has high or low predictive accuracy.
- It is assumed that risk assessments will be periodically reviewed and updated based on new information (e.g. every two years).

- **Based on the examples you have been provided, do the methods result in the provision of information necessary to meet the RFA requirements?**

  For plants and communities, one plant species assessment (*Callistemon kenmorrisonii*) and one community (Warm Temperate Rainforest (East Gippsland Alluvial Terraces)) was provided for review.

  The risk levels determined for the identified hazards to *Callistemon kenmorrisonii* appear adequate. For that species there may be consideration of other hazards that relate to small populations with restricted range, and with consideration to its habitat. This includes infection by Myrtle Rust and possibly loss of mature plants by flood damage. Flood damage could be assessed in the context of uncontrolled climate driven flooding, and as an interaction with forestry related hydrological changes. Identification of hazards is key to the assessment because these hazards form the context for assigning risk and provision of information for RFA requirements.

  For Warm Temperate Rainforest (East Gippsland Alluvial Terraces) the risk assessment proposes forest operations as one potential hazard, with the risk that the community is poorly mapped, and controls are therefore unlikely to be applied adequately across the landscape. The consequence of this in the assessment provided is 'minor'. If this hazard manifests, the consequence (i.e. timber is harvested from the community) would be major for the rainforest community at the scale of that action. The assessment regards the control measure to be adequate, but the knowledge of where to apply the control as inaccurate, based on mapping information. With the use of coupe level pre-harvest assessments, the likelihood may in fact be 'unlikely' if applied with best practice. Therefore, the assessment may better describe the risk as major consequence with an 'unlikely' likelihood of occurring. Following the 'likely' determination in the assessment provided, the outcome should be High risk. In my opinion the risk outcome for the second assessment (mechanical disturbance) is also too low given the assumptions made.

- **How would you rate the expertise and experience of the assessors used in the examples you have been provided, and more generally across the assessments?**

  The assessors used in the examples are professionally employed scientists or land managers with expertise in the relevant disciplines pertaining to each risk assessment. According to the details of assessors provided for this review all assessors are DELWP staff (either Arthur Rylah Institute or regional staff). Input on some species has been provided by Royal Botanic Gardens

Victoria staff. The expertise used for the preliminary assessments is sufficient pending review by other experts.

Each risk assessment should be either reviewed by a non-government expert (in the relevant discipline) or a separate risk assessment undertaken with the results averaged (or consensus made with further discussion). The methods describe a moderation workshop to review assessments and judgements made in the risk assessment. The moderation workshop should include government and non-government expert contributions for final assessments, including those who may have published research specifically on the relevant species or communities.

- **What could be added (further information, additional assessments, modelling etc.) to this process in order to assess and prioritise permanent protections and management actions as required by April 2022?**

Extent mapping of rainforest communities should be undertaken as a priority using a combination of remote and on-ground methods. A new spatial layer should be produced to assist planning over the next 20 years.

Targeted surveys for the relevant species should be undertaken where there are information gaps, to further validate habitat distribution models and provide a better record of the extent and condition of populations within and outside of timber harvesting areas.

Assessing consequence requires an evaluation of proportional impacts to populations. Population sizes are not known for most species under consideration. Significant investment is needed in understanding more about populations of target species, so that risk assessments are sufficiently accurate.

A monitoring handbook should be prepared which provides data standards for monitoring the effect of management actions. The contribution of management actions towards reducing hazards (threats), relative to other causal factors, is difficult to ascertain and requires a detailed monitoring design. A monitoring program with targets is essential for guiding how priorities will change over the 20-year period.

- **Any other relevant observations or comments**

Consequence –

It is important that current and future forestry operations and environmental conditions can be assessed with the appropriate levels of uncertainty that apply to each. Is it certain that future forestry operations will not change over the next 20 years, with regard to the extent of permitted areas, timber demand and prescriptions?

Some parts of the assessment are guided strongly by modelling (e.g. Habitat Distribution Models). Models of equivalent performance for future climates, forestry product demand and species population trajectories should be given equivalent consideration where available. This section of the methods should advise the assessor to record the basis or source for the assumptions that have been made.

The assessor is required to determine likelihood of probability of a hazard to cause a listed consequence over 20 years. This is the maximum limit of the assessment, as consequence levels have their own timeframes for consideration in the consequence table.

In the consequence table, consider use of 'extreme effect' under extreme consequence rather than 'very serious'. Also 'significant reduction' is consistent with a major reduction in the major category. Duration of impacts does not necessarily correlate with severity and extent. For example, if an impact occurs at moderate level continuously within the extent of a species / community resulting in the impact enduring for 20+ years, does that give an extreme impact outcome?

Hazards –

'Native species impacts' is not strictly a hazard but more so a consequence.

It is unclear why some construction industry sectors are provided as specific examples e.g. renewable energy? Construction and maintenance considerations apply equally to all types of construction.

Extraction of water from catchments should be listed as a potential hazard, including extraction from bores for agriculture and other uses.

Vulnerability –

Temporary canopy loss should be added as a vulnerability and direct mechanism of impact. The effects of canopy loss are largely undocumented for most taxa and a precautionary approach should be taken in the risk analysis. It is acknowledged that a relatively small subset of species is the focus of the RFA risk analysis, along with some listed communities (87 species and ten communities).

It is understood that the assessments for this review are made in response to their listing under the EPBC Act and FFG Act and associated RFA considerations. It is also understood that other parts of the RFA assessment process deal more broadly with biodiversity management. Further investment should be made however to better understand how these species represent the forest ecosystems that they occupy. This includes how targeted management action may benefit or have adverse implications for other species. Using a species-focused approach in the past has resulted in risk management becoming outdated over time, with too much focus on values defined by superseded criteria and taxonomic concepts.

There could be an argument for the category of 'rare' to be above 'unlikely' in the likelihood table and overall risk. It presents that 'rare' is not easily determined by expert prediction (e.g. stochastic), has greater uncertainty and therefore would suggest an increased risk. Conversely, 'unlikely' is an estimate that a hazard will not cause the consequence, after all other factors have been considered.

There is an opportunity over time to define major ecosystem services, such as water supply, and also assess risks to these caused by various threats to forest vegetation.

Risk assessments using a risk matrix approach have an inherent requirement for subjective input, however this is unavoidable as several decisions must be made based on assessor's personal experience and their confidence in the data on which decisions are made. Parts of the method that rely entirely on subjective estimates should be moderated by at least one other expert.

John Woinarski

Independent review of Regional Forest Agreements 'Threatened species and communities risk assessment'

Context

Under the 2020 renewal of the five Regional Forest Agreements in Victoria, there is a requirement for the Victorian government to:

> "*undertake a risk assessment within six months from each Relevant Date* [in this case, from 1 April 2020] *and determine whether additional interim or permanent protections and management actions are necessary*;
>
> *where necessary, use reasonable endeavours to implement interim enforceable protections and priority management actions for the Listed Species or Community within six months from each Relevant Date* [in this case, from 1 April 2020]" (sections 25K (a) and (b) of the Central Highlands RFA).

This stipulation is newly inserted into the 2020 RFA renewal: 'risk' was not mentioned in the original (1998) RFAs. The wording and intention of the relevant clauses above are unhelpfully opaque, and 'risk assessment' is not defined in the Definitions section of the 2020 RFA. 'Risk' is also not linked explicitly to any objective that may be jeopardized if the risk is not contained.

The need for a substantial and comprehensive risk assessment, and consequential amendments to established management settings, is especially evident in the wake of the severe impacts on forest biodiversity of the 2019-20 wildfires. Species formerly considered secure under pre-existing protective mechanisms and regulations may now require urgent additional measures; and locations formerly considered of lower priority for the protection of threatened species (e.g., those not in the present CAR conservation reserve system) may now – because of the loss in fires of previously important populations – have much higher significance than previously and hence merit more protection.

My interpretation of the rationale and objective of the stipulations above is that the Victorian government is obliged to assess – for all Listed Species and Communities – the likelihood of near-term loss or decline under existing RFA-related management settings and, furthermore, if this likelihood is unacceptably high, to identify additional management and other mechanisms that could avert such loss (s 25K(a)). It is then required to ('use reasonable endeavours' to) implement those mechanisms (s 25K(a)). The Agreement's text does not specifically provide any threshold level of potential loss that would trigger the need for ameliorative response.

Note that I take the text to relate to the potential of near-term loss rather than decadal scale concerns given the short timeframe (6 months) for the risk assessment and implementation of remedial responses, and the explicit reference to 'interim' actions.

The text can also be read to discourage beneficial ameliorative responses unless these are 'necessary', although the construct of 'necessary' is not clearly contextualised, and the evidence available may often be insufficient to prove that an ameliorative action is 'necessary' to avert unacceptable loss.

The guidance document (DELWP 2020) notes that: 'The RFA does not set out any detail on how the risk assessment should be conducted' (p. 2).

Key review questions

The Department of Environment, Land, Water and Planning commissioned this independent review, and requested the review respond to the following questions:

> (1) Given the requirements of the RFAs, is the risk assessment method adequate and appropriate to inform whether interim protections and management actions are necessary?
>
> (2) Based on the examples you have been provided, do the methods result in the provision of information necessary to meet the RFA requirements?
>
> (3) How would you rate the expertise and experience of the assessors used in the examples you have been provided, and more generally across the assessments?
>
> (4) What could be added (further information, additional assessments, modelling etc.) to this process in order to assess and prioritise permanent protections and management actions as required by April 2022?
>
> (5) Any other relevant observations or comments

The request for review also emphasised that the focus should be on the process for risk assessment, rather than the outcomes, and did not explicitly include considerations of any suggested ameliorative responses, or of their likelihood of mitigating risks sufficiently.

Documents considered

DELWP (2020). *Threatened species and communities risk assessment: methods document. Process for assessing Listed Species and Communities Risk for the purpose of Victoria's renewed Regional Forest Agreements*. Final draft 16 September 2020.

2020 Regional Forest Agreements (West, Central Highlands, North-east, Gippsland, East Gippsland)

Excel spreadsheet showing a small number of examples of draft (unmoderated) risk assessments for species and communities

Evaluation

General

Note that this assessment is constrained by the incomplete nature of the information provided. The risk assessment process is not yet moderated or completed, and it is not possible yet to judge the extent to which the risk assessment process can provide compelling justification for the necessity of any specific interim or additional remedial action.

The risk assessment process primarily (or at least initially) involves the development of a large database comprising, for relevant Listed Species and Communities:

> (i) spatial information, including the total distributional extent, occupied area in each RFA, proportional area within the CAR conservation reserve system, proportional area in lands available for timber harvesting, and proportional area burnt in the 2019-20 wildfires. These data provide useful background information and are sourced from DELWP's excellent spatial databases.
>
> (ii) a listing of all hazards (threats); the manner in which those hazards may affect populations; the likelihood of the hazard occurring; the consequences to the population if the hazard occurs; and, hence, the magnitude of the overall risk for that hazard on that species. In standard risk assessment practice, likelihood and consequence are rated on an ordinal scale (extreme, major, moderate, minor, etc.), with these categories sufficiently well-described. Overall risk is then determined from a likelihood/consequence matrix. In some cases, this risk assessment is repeated for the same species in different RFAs, to cater for regional scale differences in the tenuousness of a regional population and differences among regions in threat manifestation. The assessor is also required to rate their confidence in the assessment they provide, although it is not clear how this level of uncertainty is then applied.
>
> (iii) a listing of existing management or controls for each threat, and an assessment of the effectiveness of such current management in mitigating the threat.
>
> (iv) suggestions for additional (i.e., not currently applied) mitigation measures. However, there appears to be no evaluation of the extent to which any proposed new measures would be effective at negating the threat, or over what extent any new measures should be applied.
>
> (v) some general comments about interactions among threats, and other contextual observations.

Typically, components (ii) to (v) of the database are populated (per species) by one to two experts and a regional management officer, with some subsequent moderation (in part presumably to reduce any idiosyncratic evaluations by individuals).

This is a standard and generally appropriate approach to risk assessment and consideration of mitigation options.

However, I have some reservations about the approach and its implementation. Little or no consideration appears to have been given to existing population trends. Monitoring indicates that at least some Victorian forest-dependent threatened species are undergoing rapid decline (Lindenmayer *et al.* 2020): self-evidently for such species, the existing protective and other mechanisms are inadequate to maintain existing populations, let alone ensure recovery. Where known, information about population trends should have been foundational for any risk assessment that aims to evaluate whether existing management mechanisms are working effectively, or whether instead 'additional interim or permanent protections and management actions are necessary'. The risk environment for a species experiencing ongoing rapid population loss is very different to, and merits more prioritisation than, that of a species with stable population.

A related concern is that the draft risk assessment is largely based on the (at best semi-quantified) opinions of a very small set of contributors. It is well established that individual experts have subjective biases and differences in perspectives, and that evaluations (such as those populating this risk assessment) will be much more robust if they are informed by, and levelled across, multiple experts (Hemming *et al.* 2018).

Furthermore, much of the scoring given in the spreadsheet is not explicitly sourced to published literature or other explicit data; and without such linkages it is difficult to interrogate the components of the risk assessment, or for the scoring system to be readily repeatable.

Almost all of the experts used in the risk assessment appear to be internal staff of DELWP. I acknowledge the recognised expertise of these staff members, but such reliance on internal opinion can't be best practice, and risks the outcome being open to criticism as captured, self-interested and/or narrow. I note that I don't believe that the assessment is in any way biased, but the reliance on internal experts would allow for such supposition by others. I recognise the step of independent scrutiny (this assessment) goes some way to addressing this concern, but I note that this scrutiny is limited mainly to the process rather than the assessments themselves, or of the outcomes that may follow from the assessments.

Furthermore, the risk assessment process is based mostly on a pre-set series of hazards (threats). But I suspect that in some cases, the factor(s) driving decline for at least some species may be unknown; and there is little scope in this process for providing any relief for species that are declining but for which the cause of that decline is not yet well established. The approach used appears to presuppose that all threats (hazards) are known.

The risk assessment process provides opportunity for experts to note interactions among hazards (threats). Such interactions are likely to be commonplace, and may substantially compound the individual effects of single threats, and mean that actions taken to mitigate only one threat may be futile (Legge *et al.* 2019). Yet, the risk assessment process, as used, does not appear to provide appropriate assessment and responses for such interactions, other than to note them.

I also have concerns that the risk assessment process may be a blunt tool for its purpose, to prioritise and direct additional management actions that can, with confidence, be applied in the near future to make up for the shortcomings in the current RFA management settings. The problem is

that the risk assessment process doesn't provide a numerical evaluation, for any species, of the extent to which current settings impair population viability or the extent to which any proposed actions would improve the conservation outlook (it is not clear for example, whether proposed additional interim actions are achievable or can be relied upon to work); or allow for explicit prioritisation across species in need for additional interim protection.

Finally, the risk assessment process appears to consider only species (and communities) listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act) or the Victorian *Flora and Fauna Guarantee Act*, and that may be affected by forestry operations. I read the RFA provisions differently to apply also to species listed as Migratory (but not necessarily threatened) under Part 13 Division 2 of the EPBC Act. Listed migratory species are Matters of National Environmental Significance, so need to be considered by the RFAs. If that is the case, then the risk assessment undertaken to date inappropriately omits some species, such as rufous fantail, satin flycatcher and black-faced monarch.

Specific responses to questions posed

(Q1) Given the requirements of the RFAs, is the risk assessment method adequate and appropriate to inform whether interim protections and management actions are necessary?

> A: The assessment method generally follows standard practice for rating risk concern of identified hazards, according to their likelihood and consequences. It then evaluates (categorically rather than quantitatively) the extent to which risks are controlled through existing mechanisms and – where the existing mechanisms are insufficient – then describes some additional candidate actions that may be (more) effective. Broadly, it may indicate those species for which current risks are of concern, and hence where additional actions may be beneficial.
>
> However, no threshold, or step in the risk assessment process, is provided to discriminate between additional actions that may be beneficial vis-à-vis those that are *necessary*. Little or no information is given on existing population trends, which is a shortcoming, as such data would provide more robust evidence on the extent to which existing protections and management actions are sufficient or need to be augmented.

(Q2) Based on the examples you have been provided, do the methods result in the provision of information necessary to meet the RFA requirements?

> A: Note that very few examples have been provided, and it is not clear whether those examples represent the final assessments for the species.
>
> The risk assessment process may provide, for listed species and communities, a useful tabulation of threats and their magnitude, current protections and management actions and the extent to which these current settings mitigate threats, and some notes on options for additional actions that may improve the control of some threats. It is possible that such tabulation may then be used to prioritise species that most need more help, and additional actions that may be most beneficial. However, I'm not entirely convinced that the tabulation will provide a sufficiently sharp and explicit tool for justifying required additional conservation actions or for changes in the existing regulations, conservation reserve system or other settings – i.e., to meet the RFA requirements. Rather, the risk assessment process

appears to be a useful mechanism to collate some relevant background information, but not a mechanism for structured decision making.

(Q3) How would you rate the expertise and experience of the assessors used in the examples you have been provided, and more generally across the assessments?

A: Almost all of the assessors are in-house experts. Happily, DELWP (including ARI) has personnel with vast experience and knowledge of most of the listed species and communities, and at least some of the draft assessments provided for this review demonstrate that this expertise has been well collated and used.

However, I have serious misgivings about the small number of people providing the information for each species. It does not make for a robust assessment. With 1-2 assessors, it is particularly challenging to explore the sensitivity of the risk assessment – e.g., what would change in terms of a recommendation for new conservation actions if additional information, not known to the assessor, would justify a consequence rating for a given hazard for a given species of 'major' rather than the 'minor' categorisation given by the assessor.

Furthermore, reliance on in-house expertise exposes the assessment to potential claims of agency capture.

(Q4) What could be added (further information, additional assessments, modelling etc.) to this process in order to assess and prioritise permanent protections and management actions as required by April 2022?

A: As indicated by the fragmentary and incomplete material provided for this review, and the proximity to the completion date stipulated in the RFAs, the timeline available for this initial risk assessment process – and consequent evaluation and determination of need for additional protective measures – appears to have been too short.

April 2022 would allow for a more open, robust and considered approach, informed by a broader expert base and more explicitly by data (notably population trend information, and far more explicit and numerical evaluation of the efficacy of current and new management actions) and less reliant on potentially subjective opinion.

(Q5) Any other relevant observations or comments

A: I acknowledge the complexity and magnitude of the task imposed by the RFA, and the commendable efforts made by those undertaking the risk assessment. Much useful information has been distilled, and this may well help improve the conservation outlook of, and management direction for, many forest-dependent listed species and communities.

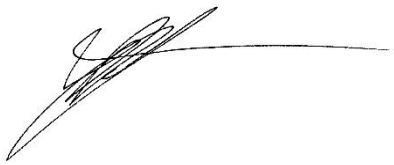
References cited

Hemming V, Burgman MA, Hanea AM, McBride MF, Wintle BC (2018) A practical guide to structured expert elicitation using the IDEA protocol. *Methods in Ecology and Evolution* **9**, 169-180.

Legge S, Smith J, James A, Tuft K, Webb T, Woinarski J (2019) Interactions among threats affect conservation management outcomes: livestock grazing removes the benefits of fire

management for small mammals in Australian tropical savannas. *Conservation Science and Practice* **1**, e52.

Lindenmayer DB, Blanchard W, Blair D, McBurney L, Taylor C, Scheele BC, Westgate MJ, Robinson N, Foster C (2020) The response of arboreal marsupials to long-term changes in forest disturbance. *Animal Conservation*.



Professor John Woinarski
25 September 2020.