



Protection of Tree Geebung *Persoonia arborea*  
in the Central Highlands Forest Management Area:  
Expert Evidence Report for Supreme Court  
Proceeding S ECI 2020 02246

Expert (Stephen Mueck) retained by Warburton Environment Inc. (ABN 28 781 873 830)

This report has been requested by McMullan Solicitors on behalf of Warburton Environment Inc. and has been created for the sole purpose of obtaining legal advice. Accordingly, this report is subject to legal professional privilege.

## Biosis offices

### NEW SOUTH WALES

#### Albury

Phone: (02) 6069 9200

Email: [albury@biosis.com.au](mailto:albury@biosis.com.au)

#### Newcastle

Phone: (02) 4911 4040

Email: [newcastle@biosis.com.au](mailto:newcastle@biosis.com.au)

#### Sydney

Phone: (02) 9101 8700

Email: [sydney@biosis.com.au](mailto:sydney@biosis.com.au)

#### Wollongong

Phone: (02) 4201 1090

Email: [wollongong@biosis.com.au](mailto:wollongong@biosis.com.au)

### VICTORIA

#### Ballarat

Phone: (03) 5304 4250

Email: [ballarat@biosis.com.au](mailto:ballarat@biosis.com.au)

#### Melbourne (Head Office)

Phone: (03) 8686 4800

Email: [melbourne@biosis.com.au](mailto:melbourne@biosis.com.au)

#### Wangaratta

Phone: (03) 5718 6900

Email: [wangaratta@biosis.com.au](mailto:wangaratta@biosis.com.au)

## Document information

<b>Report to:</b>	McMullan Solicitors
<b>Prepared by:</b>	Stephen Mueck
<b>Biosis project no.:</b>	33448
<b>File name:</b>	33448.PersArb.Expert.Evidence.Final.03082020
<b>Citation:</b>	Biosis 2020. Protection of Tree Geebung <i>Persoonia arborea</i> in the Central Highlands Forest Management Area. Expert Evidence Report for Supreme Court Proceeding S ECI 2020 02246. Author: Mueck, S., Biosis Pty Ltd, Melbourne. Project no. 33448.
<b>Cover photo:</b>	Typical Wet Forest structure

© Biosis Pty Ltd

This document is and shall remain the property of Biosis Pty Ltd. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of the Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Disclaimer:

Biosis Pty Ltd has completed this assessment in accordance with the relevant federal, state and local legislation and current industry best practice. The company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report content or for any purpose other than that for which it was intended.

## Contents

<b>Name and address</b> .....	<b>1</b>
<b>Qualifications and experience</b> .....	<b>2</b>
Qualifications and training .....	2
Professional affiliations and memberships .....	2
Professional experience .....	2
<b>Area of expertise to make this report</b> .....	<b>3</b>
General expertise .....	3
Species-specific expertise .....	3
Limitations .....	3
<b>Other contributors to this report and their expertise</b> .....	<b>4</b>
<b>Scope of this report</b> .....	<b>5</b>
<b>Documents and materials considered</b> .....	<b>6</b>
Legislation and subordinate instruments .....	6
Databases and plans .....	6
Other reports, documents and publications .....	6
<b>Summary of expert opinion</b> .....	<b>7</b>
Tree Geebung .....	7
Response to disturbance .....	7
Targeted searches for threatened species .....	8
Responses to questions provided .....	9
<b>Limitations and qualifications</b> .....	<b>14</b>
Provisional opinions .....	14
Questions .....	14
Inaccuracies .....	14
<b>Declaration</b> .....	<b>15</b>
<b>Appendices</b> .....	<b>16</b>
Appendix 1: Curriculum Vitae for Stephen Mueck .....	17

### List of Figures

<b>Figure 1:</b> The modelled extent of Tree Geebung habitat and VBA records for this species within the Central Highlands of Victoria .....	<b>10</b>
--	-----------

---

## Name and address

---

Stephen MUECK

Senior Consultant Botanist

Biosis Pty Ltd

38 Bertie Street

Port Melbourne

VICTORIA 3207

## Qualifications and experience

---

### Qualifications and training

- Bachelor of Science (Hons), Monash University
- Masters of Environmental Science, Monash University

### Professional affiliations and memberships

- Australian Network for Plant Conservation (current member)
- *Pimelea spinescens* Recovery Team (current member)

### Professional experience

I have over 35 years of experience in vegetation assessment, management and research and an extensive knowledge of the vegetation of south eastern Australia. This includes over ten years of experience in senior scientific positions with what is now the Department of Environment, Land, Water and Planning (DELWP). While with the Department, I was coordinator of their Forest Flora Unit for 5 years during which I managed components of the Department's Silvicultural Systems Project. This included monitoring forest environments to assess the impact of timber harvesting practices on the flora of the Central Highlands and East Gippsland.

Since becoming a senior botanist with Biosis Research in 1995, I have been senior scientist and project manager on a number of major investigations including assessments for Melbourne's new Wholesale Market, the Environmental Effects Statement for BHP's Eastern Gas Pipeline, preparation of management options for Mount Stirling and vegetation mapping for the Central Highlands and Western Regional Forest Assessment Areas. Forestry related projects that I have supervised/participated in include:

- Ecological advisor to the Plantations Establishment Advisory Group, which included Australian Paper Plantations, the West Gippsland Catchment Management Authority, local government representatives and the Friends of the Gippsland Bush.
- Certification team ecologist on the SmartWood Scoping Team reporting on Hancock Victorian Plantation's softwood and hardwood operations.
- Project ecologist on the EPA coupe audit team managed by GHD.
- Assessment of the ecological impact of the DELWP and Melbourne Water forest firebreaks establishment program within the Victorian Central Highlands.
- A review of special values protection for Rainforest for DELWP as part of their forest regulation and compliance reform and participation in the reviews relating to threatened species and habitat.

I have completed numerous flora surveys within most ecological vegetation classes in Victoria, undertaken conservation value assessments, worked on nature reserve design and management, prepared ecological design guidelines for developments and supervised and participated in both large and small scale ecological mapping exercises. I also have experience in preparing and implementing pest plant and animal management plans, am DELWP certified for vegetation quality assessments and have produced numerous plans and assessments for clients to achieve compliance with state and federal biodiversity legislation and policy. I have helped develop novel techniques for assessing and mitigating impacts to threatened flora and fauna. I also possess strong project management skills.

Further details about my qualifications and experience can be found in Appendix 1.

## Area of expertise to make this report

---

### General expertise

I have worked extensively with remnant native vegetation, including forest environments, in south eastern Australia for more than 35 years, conducting flora and fauna surveys and providing specialist advice on ecological management within these environments.

I have provided advice on the ecological management and rehabilitation of a broad range of environments including grasslands, woodlands, forests and wetlands. This work has included projects involving the provision of advice on mitigating the environmental impacts of proposed developments and the rehabilitation of these environments after impacts associated with construction works, such as road works and the establishment of other infrastructure.

I have provided advice in similar circumstances (i.e. protection and management of sensitive native vegetation retained as part of development) in a number of other instances.

I have authored Victorian Government technical reports investigating the floristic composition of dry, damp and lowland sclerophyll forest in East Gippsland (Mueck 1990a) and the composition of Mountain Ash and Alpine Ash forests in Victoria (Mountain Ash is a Wet Forest species) (Mueck 1990b). I have also contributed to a peer reviewed journal paper entitled "How old are Wet Forest understories?" (Mueck *et al.* 1996). References for these are provided in the section entitled "Documents and materials considered".

A similar experience to this current case involved providing advice to DELWP as part of their forest regulation and compliance review for the protection of rainforest. This included a review of the efficacy of current regulations in the conservation of rainforest and providing suggestions on how to improve the way DELWP manages the risk to this component of biodiversity within Victoria's forest estate.

### Species-specific expertise

Tree Geebung *Persoonia arborea* was a species targeted for research by my team of botanists when I was head of the Forest Flora Unit in the then Department of Conservation and Environment (now DELWP). My team collected specimen material for carbon dating and regularly inspected populations of Tree Geebung to evaluate flowering and fruiting cycles as well as other aspects of the ecology of this species, such as seed viability and population dynamics.

### Limitations

Information relating to the ecology of Tree Geebung is substantially greater than our understanding of many other rare or threatened species. However, our understanding of this species is far from comprehensive and a precautionary approach is still required when making decisions relating to its management and protection.

## Other contributors to this report and their expertise

---

I, Stephen Mueck, have researched and written this expert evidence report with the assistance of colleagues from Biosis Pty Ltd. While I have the relevant experience to comment on the ecology of this species, I was assisted in the preparation of this evidence by others. I discussed relevant matters with Michael Goddard (Senior Ecologist with Biosis) regarding the application of the Code of Practice, Management Standards and Procedures and Planning Standards for timber harvesting in Victoria (DEPI 2014a, 2014b and 2014c).

Mapping extracted from relevant data sources was prepared by Julian Turner (GIS Operator with Biosis).

I have therefore relied on input from current colleagues at Biosis in preparing this expert evidence report.

## Scope of this report

---

I have been requested by Mr John McMullan of McMullan Solicitors, counsel for Warburton Environment Inc., to provide expert evidence in relation to the survey for and protection of Tree Geebung *Persoonia arborea* in relation to timber harvesting activities in the State Forests of Victoria's Central Highlands.

More specifically, I have been asked to provide advice in relation to the actions of VicForests in relation to the protection and management of Tree Geebung during timber harvesting activities within Coupe 345-511-0004, also known as Pat's Corner.

In a letter provided to me and dated 9 July 2020 (Attachment 1), McMullan Solicitors posed a series of questions. Each of these questions is provided in this statement in ***bold italics*** and followed by my response.



## Documents and materials considered

---

The following is a list of the documents and materials that I have considered or otherwise used in preparing this report.

### Legislation and subordinate instruments

- *Conservation, Forests and Lands Act 1987* (Vic.).
- DEPI 2014a. *Code of Practice for Timber Production 2014*. Victorian Government Department of Environment and Primary Industries, Melbourne.
- DEPI 2014b. *Management Standards and Procedures for timber harvesting operations in Victoria's State forests 2014*. Victorian Government Department of Environment and Primary Industries, Melbourne.
- DEPI 2014c. *Planning Standards for timber harvesting operations in Victoria's State forests 2014: Appendix 5 to the Management Standards and Procedures for timber harvesting operations in Victoria's State forests 2014*. Victorian Government Department of Environment and Primary Industries, Melbourne.

### Databases and plans

- Pat's Corner Forest Operations Coupe Plan.
- Pat's Corner Forest Operations Coupe Map.
- DELWP map showing location of Tree Geebungs identified by the public in Pat's Corner.
- Central Highlands Map, being the Central Highlands Land Tenure and Zoning Map (March 1998), downloaded from [www.agriculture.gov.au/forestry/policies/rfa/regions/vic-centralhighlands](http://www.agriculture.gov.au/forestry/policies/rfa/regions/vic-centralhighlands).
- DELWP's Victorian Biodiversity Atlas (VBA), including the 'VBA\_FLORA25, FLORA100 & FLORA Restricted' and 'VBA\_FAUNA25, FAUNA100 & FAUNA Restricted' datasets.
- DELWP's Habitat Importance maps.

### Other reports, documents and publications

- DEPI 2014. *Advisory List of Rare or Threatened Plants in Victoria – 2014*. Victorian Government Department of Environment and Primary Industries. East Melbourne, Victoria.
- Mueck S, Ough K and Banks JCG 1996. How old are Wet Forest understories? *Australian Journal of Ecology* 21(3), 345-348.
- Affidavit of James Murdoch Gunn for this case.
- Expert report and Final expert report of Dr. Sabine Kasel of the University of Melbourne filed by the Defendant in support of its summons dated 30 July 2020 for this case.

## Summary of expert opinion

---

### Tree Geebung

1. Tree Geebung is a large shrub or small tree growing to a height of about twenty metres. It has alternate, oblanceolate and minutely hairy leaves to 10 centimetres long and 16 millimetres wide. It produces cream flowers in summer which develop into an ovoid drupe to about 14 millimetres long and 12 millimetres wide. The seed is encased within a hard seed coat and appears to have substantial longevity within the soil.
2. Large mature plants (19 to 21 centimetres diameter near the base of the trunk) have been aged using radiocarbon dating at between 170 to 510 years old with a radiocarbon age of 240 +/- a standard deviation of 60 (Mueck et al. 1996). Dr Kasel suggests larger specimens within Pat's Corner are significantly younger than this based on tree ring counts. However the use of tree rings for *Proteaceae*, including *Persoonia*, is noted as problematic, given the presence of only partial latewood bands (which is typical of this family) and a lack of knowledge as to if these bands are annual (Mueck et al. 1996). No discussion is provided by Dr Kasel in relation to the conflict between the ages estimated by ring counts and those determined by radiocarbon dating.
3. Plants thought to be up to about 150 years old will flower but only produce small number of flowers each (i.e. tens of flowers per plant). Only relatively large specimens, thought to be older than 150 years old, flower prolifically (i.e. produce thousands of flowers per plant).
4. A significant proportion of the fruit produced by each plant (over 80%) has been observed to be parasitised by a wasp which destroys the seed.
5. The plant is fire sensitive (i.e. is generally killed by bushfire) and is considered an obligate seed regenerator, with seeds stored in a soil seed bank. The longevity of the soil seed store is unknown, but given the difficulties experienced in getting seed to germinate and the prolific germination observed after a disturbance event, it is considered to persist for considerable periods of time, at least in the order of decades. Seedlings have been observed in association with soil disturbance (e.g. along tracks) and after fire.
6. The species is often associated with the margins of the ecological vegetation classes (EVC) Cool Temperate Rainforest (EVC 31) and Wet Forests (EVC 30).
7. Tree Geebung is endemic to the central highlands of Victoria and its potential habitat covers a broad area of the Central Highlands Forest Management Area. While it has been widely recorded in this area, the existing records do not reflect its actual distribution at a fine scale (Figure 1).
8. Tree Geebung is considered vulnerable to extinction on a DELWP advisory list (DEPI 2014).

### Response to disturbance

9. The predominant natural disturbance within the Wet Forests of the Central Highlands is the occurrence of wildfire. In such an event, fire passes through the forest in a single process lasting in the order of minutes at any one point (potentially longer in small areas where coarse woody debris occurs).
10. While mature Tree Geebung would typically be killed by the fire, a low intensity fire which does not girdle the tree is survivable. Post disturbance the soil stored seed bank for Tree Geebung would be stimulated by this process and subsequently germinate to establish new individuals.

11. As long as the fire frequency and intensity is such that individuals can survive the fire and seedlings mature to replenish the soil seed store before being impacted by the next disturbance event, a population can persist in an area.
12. Timber harvesting provides a very different disturbance from fire. In an ecological sense, timber harvesting is actually a series of disturbances which occur over a relatively protracted period of time, often over months.
13. The first disturbance associated with timber harvesting is the actual harvest, which removes the overstorey and also has a significant impact on the understorey. This action is generally associated with extensive significant soil disturbance and, depending on the size of the coupe, could occur over numerous weeks or months.
14. After an area has been harvested, it can be subject to additional disturbances associated with rehabilitation works for internal roads and snig tracks and other preparation works for the regeneration burn. This second action, in combination with the first, can have a significant impact on the understorey species and result in significant species compositional changes, particularly to the abundance of species largely dependent of vegetative reproduction.
15. The third disturbance event is the regeneration burn, which can occur many months after the coupe has been prepared for this event. The burn is then capable of destroying any regeneration of understorey species that has responded to the previous two disturbances.
16. For Tree Geebung, the harvesting process provides very different triggers for its soil stored seed while resulting in the loss of any existing plants outside of protected areas.
17. Any seed or seedlings that survive the regeneration burn are then largely free to grow and become part of the new understorey.
18. However, as noted above, an individual Tree Geebung requires about 150 years to mature and to be capable of any significant contribution to the soil seed bank. Given that harvest rotation periods in these forests are designated to be between 80 and 120 years, any second rotation harvest would likely result in local extinction of Tree Geebung unless a proportion of the population is protected in unharvested areas.
19. Additional risk is also posed by other environmental modifications, such as edge effects to retained forest environments surrounding harvesting (edge effects) and climate change.

## Targeted searches for threatened species

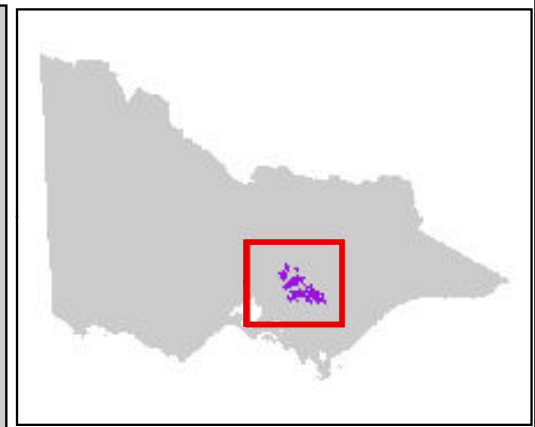
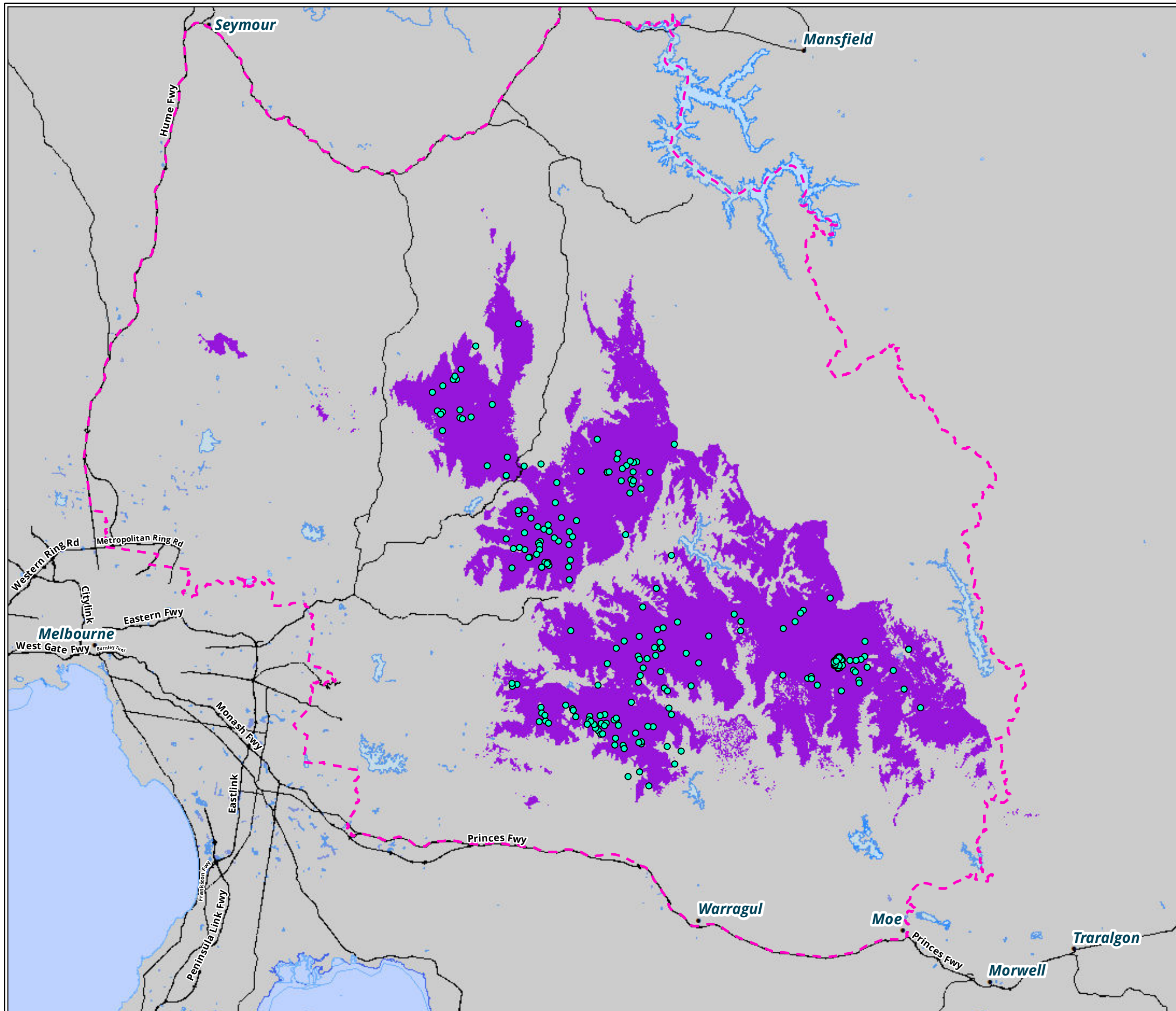
20. Documenting the presence or absence of a threatened species is a common requirement for regulatory compliance in biodiversity related matters. How to do this is often subject to specific guidelines based on variables such as seasonal observability (i.e. plants are often easier to see when they flower) and the visibility of the target within its environment. For example, targeted searches for an orchid species must occur when the species is in flower, otherwise these seasonal geophytes are basically invisible.
21. Search requirements generally detail the intensity of a search, which is generally done systematically, using more than one observer and walking at regular intervals across the habitat of the target. The spacing of transects is based on how far an observer can confidently detect individuals from their transect path. For example, in the case of the grassland sub-shrub Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*, transects are typically spaced at five metre intervals, with each observer scanning the environment 2.5 metres either side of their path.

22. The relevance of any particular threatened species to a site is typically based on the presence of potential habitat for that species and the presence of local records. In most contexts, local records are defined as records within the Victorian Biodiversity Atlas (VBA) within five or ten kilometres of the subject site.
23. The requirements for timber harvesting operations are documented by the Management Standards and Procedures for Timber Harvesting Operations in Victoria's State Forests 2014 (DEPI 2014b). These require VicForests to apply management actions for rare and threatened flora identified within areas affected by timber harvesting operations, as outlined in Appendix 3 Table 14 (rare or threatened flora prescriptions).
24. The standard for Tree Geebung is to '*protect mature individuals from disturbance where possible*'. No guidelines are provided as to what a mature individual is or on how to identify the presence or absence of the species within any particular area.
25. Details relating to the potential presence of Tree Geebung at Pat's Corner and the management actions proposed are outlined in the Pat's Corner Forest Operations Coupe Plan. This relied on the presence of known records of this species within 500 metres of the coupe.

## Responses to questions provided

***1. In your opinion, are there actions which must be taken in all coupes in the Central Highlands prior to commencement of timber harvesting operations in order to enable the effective application of the management action for Tree Geebung set out in Appendix 3 of Table 14 of the Standards ("Management action for Tree Geebung") throughout the Central Highlands? Please provide a full description of the actions, and give reasons as to why these actions are required and why they are universally required in the Central Highlands***

1. The required standard is to protect mature individuals of this species where possible. This indicates that all mature individuals need to be detected and then protected. While the caveat of 'where possible' is added, this does not suggest that protection will only occur where convenient or can be overlooked where protection is difficult or costly.
2. VicForests consider the application of the relevant management standards and procedures for threatened species when there is a database record within 500 metres of the relevant coupe. This implies that the documented records for that species provide information on the distribution of that species at that scale. This is not true, as the survey data identifying the locations of such species is far from comprehensive (Figure 1).
3. The absence of a record within 500 metres of any area of Wet Forest within the Central Highlands does not imply that Tree Geebung is not likely to be present. A better guide on the potential presence or absence of any threatened species from a defined area would be if that area was in or out of DELWP's habitat importance model for that species (Figure 1).
4. As Tree Geebung is a species found in association with the Wet Forests and Cool Temperate Rainforest margins of the Central Highlands, it is not unreasonable to suggest that it could occur in any of these vegetation types within this region, as identified by the habitat importance model (Figure 1).
5. It is therefore possible that Tree Geebung could occur in most, if not all, coupes within the Central Highlands.
6. As a result, it is appropriate to conduct a targeted survey for Tree Geebung in all areas of Wet Forest to be harvested within the Central Highlands.



- Legend**
- Central Highlands RFA boundary
  - Potential *Persoonia arborea* habitat
  - VBA record

**Figure 1** The modelled extent of Tree Geebung habitat and VBA records for this species within the Central Highlands of Victoria

0 5 10 15 20  
Kilometres

Scale: 1:500,000 @ A3  
Coordinate System: GDA 1994 VICGRID94

7. As it stands, a record of Tree Geebung was identified by VicForests within 500 metres of Pat's Corner. While even appropriately conducted targeted surveys can overlook individuals, the subsequent identification of 30 individuals including numerous individuals within the harvest area of Pat's Corner would suggest the initial assessment which indicated no plants were present was inadequate.
8. The statement of evidence provided by James Murdoch Gunn suggests the initial assessment survey for Tree Geebung utilised a one hectare grid. This would have survey transects separated by 100 metres.
9. Any targeted survey needs to provide a result with a high level of confidence. While the target in this instance is an understorey shrub to small tree, detecting individuals is still considered difficult in their typical habitat. In this environment, an observer is generally hindered in viewing their surrounds by a dense understorey of a variety of understorey shrubs and tree-ferns (see cover photo). It is my experience that visibility in a Wet Forest environment for an observer on foot is typically restricted and even large shrubs can easily be overlooked. Any systematic survey in what is difficult terrain can be equally difficult. However, I would suggest that transect spacing should be a maximum of 30 metres, as I would expect an experienced observer to be able to detect this species from within about 15 metres in most instances.
10. The need for a detailed assessment is highlighted by the survey conducted by Dr. Kasel which detected the largest individual of Tree Geebung, an 18.5 metre high tree within the harvest area of Pat's Corner (PA 18), after the initial survey suggested the species was not present and other surveys detected numerous individuals.
11. Alternatively the use of a drone in this environment could be explored and would likely be an efficient and cost effective alternative. However, the logistics of flying under the eucalypt canopy and extent of searching required to detect individuals would need to be determined before this process could be used. This would require input from a drone pilot and an ecologist familiar with Tree Geebung.
12. Once detected, mature individuals need to be protected. However, there are no defined prescriptions for protection. The Forest Operations Coupe Plan suggests that mature plants would be protected by including them in harvesting exclusion areas 'where possible', although what is possible is not defined. The plan also indicates that any mature individuals identified during harvesting would be protected 'where practical'.
13. Protection implies that the mature individuals detected would not be impacted by harvesting operations, lost to the regeneration burn or subsequently impacted by any wind throw of trees during 'regeneration' of the coupe. This includes direct wind throw of individuals and indirect impacts from damage caused by wind thrown retained eucalypts.
14. No individual Tree Geebung can be considered protected if it is within the harvest area of a coupe. The likelihood of physical damage by machinery or tree movements during harvesting is relatively high. Similarly, the likelihood of death or damage during the regeneration burn in this environment is also high. As such, individuals could only be considered protected if they are contained within harvesting exclusion areas.
15. The extent of harvesting exclusion should be reasonably conservative and provide a high degree of confidence in achieving the desired outcome. It needs to consider the vulnerability of the edge of retained areas to tree fall, particularly wind throw, and the potential for impacts from the regeneration burn.
16. Dr Kasel provides a recommended harvest exclusion buffer of 15 metres. Dr Kasel bases this on studies indicating that most wind throw to understorey trees occurs well within this distance of the forest edge created by clearfelling operations. This fails to consider the risk associated with damage from wind thrown eucalypts which is highlighted in Dr Kasel's statement as *a major cause of tree mortality at the ecotone between harvested and intact forests*. It is also noted that *harvesting exposes both overstorey and understorey*

trees to winds that they are not adapted to which can lead to high rates of windthrow in the first few months and years after harvesting.

17. Dr Kasel also notes that windthrow in Tasmanian forests was influenced by the size of the retained patch with the degree of windthrow decreasing with increase in patch size that patches >1.5 ha were relatively resistant to windthrow (final statement page 6). Practically this would also depend on the shape of the retained area as long thin patches of retained forest would still be vulnerable to significant wind throw. The nominated area of at least 1.5 hectares suggests that to protect an isolated Tree Geebung in the harvest area of a coupe from potential damage by wind thrown eucalypts would require a harvesting exclusion buffer of about 70 metres.
18. While the inclusion of Tree Geebung within a broader expanse of harvest exclusion zone that is at least 100 metres wide and where the individuals are at least 15 metres from the exclusion zone edge provides a theoretically robust protection area given wind throw into such a larger area of retained forest is relatively resistant to canopy wind throw. However, prescriptions need to be written in a manner which requires little if any interpretation or room for confusion.
19. To conservatively manage the risks noted above, I would recommend a harvest exclusion buffer of at least 50 metres from any individual Tree Geebung. This is based on the approximate height of the canopy trees, the vulnerability of trees on the edge of retained forest to wind throw and the potential damage wind thrown eucalypts can do to the retained understorey. Such a prescription is unambiguous and can be universally applied and audited while also achieving the required result of providing a high level of confidence that mature Tree Geebung are protected. This level of protection is also considered important to secure populations of this vulnerable species within its restricted Central Highlands habitat and provides a clear precautionary approach to the management of biodiversity assets within a forest designated for timber production.

**2. If not, are there actions which must be taken in some coupes in the Central Highlands prior to commencement of timber harvesting operations in order to enable the effective application of the Management action for Tree Geebung throughout the Central Highlands? Please provide a full description of the actions, a full explanation of the method by which it can be determined whether the actions are or are not required in a specific coupe, and give reasons as to why these actions are required in certain coupes and not others.**

1. Presuming that all coupes in the Central Highlands are both Wet Forest and are covered by the habitat importance model for this species, then this question does not apply. The actions that I have documented in my response to the first question should apply to all Wet Forest coupes in the Central Highlands.

**3. If you have identified actions in your answer to either of the questions above which must be taken in all coupes or in particular coupes prior to commencement of timber harvesting operations, please set out the circumstances in which the actions you have identified would give rise to the need for further action in order to effectively apply the Management action for Tree Geebung, and the nature of such further action that would be required to achieve this objective. Please provide a full description of the circumstances that would give rise to the need for further action, and a full description of the further action that would be required and give reasons for your views.**

1. The Forest Operations Coupe Plan for Pat's Corner indicates that the contractor is to be made aware of this species and to make efforts to avoid disturbing individual trees that have not been placed in exclusion areas.

2. While overlooking individuals of a threatened species is always possible, the prescriptive action requiring mature individuals to be protected is not extinguished by any past oversight. Once in the operational area with harvesting machinery, it is highly unlikely that the contractors would be able to avoid any significant impact to an isolated small tree or shrub.
3. If an individual is detected in the operational area after the coupe boundaries have been defined, then works in that area would need to cease and the operational boundary redefined to include adequate protection for that individual. Otherwise the requirements of the management standard would not be satisfied.

**4. In your opinion, would the instructions provided in the Forest Operations Coupe Plan, referred to in paragraph 11 above, if followed, be likely to result in effective application of the Management action for Tree Geebung in Pat's Corner coupe. Please give reasons for your answer**

2. Instructions provided in the Forest Operations Coupe Plan for Pat's Corner would not satisfy the requirements of the prescribed management actions.
3. In the first instance, it is unlikely that retention of any Tree Geebung within the harvest area of a coupe would result in the effective protection of that individual.
4. 'Where practical' is not the same as 'where possible'. Once harvesting commences, it is almost always likely to be impractical to protect an individual plant from the contractor's perspective, while also still being possible. While it may be inconvenient and difficult, the requirement is to protect where possible.

**5. If not, please set out the actions which in your view would be likely to result in effective application of the Management action for Tree Geebung in Pat's Corner coupe. Please give reasons for your answer.**

5. Once detected, a previously undetected Tree Geebung within the operational area of a coupe would need to be protected from any physical damage associated with the harvest operation and subsequent coupe management activities. This would involve the creation of an additional exclusion area, to be documented on the coupe plan and marked out on the ground. This could potentially exclude other areas of the coupe as access could be blocked. However, it is still a possible outcome, even if it may not be practical for harvesting operations.



---

## Limitations and qualifications

---

### **Provisional opinions**

In relation to management of Tree Geebung during forestry operations, I have not provided any provisional opinions that have not been fully researched as described.

### **Questions**

In relation to these matters, I have no questions that fall outside my area of expertise.

### **Inaccuracies**

To the best of my knowledge, this report is complete and accurate.

## Declaration

---

I have read the expert witness code of conduct and confirm that I understand it and agree to be bound by it.

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Court.

A handwritten signature in black ink, appearing to read 'Stephen Mueck', with a long horizontal stroke extending to the right.

**Stephen Mueck**

03 August 2020

---

## Appendices

---

---

## Appendix 1: Curriculum Vitae for Stephen Mueck

---

## Position

### Senior Consultant Botanist

## Qualifications

BSc (Hons), MEnvSc

Vegetation Quality Assessments (Habitat Hectares): HH173



## Professional experience

Stephen has over 35 years experience in vegetation assessment, management and research and an extensive knowledge of the vegetation of south eastern Australia. Since becoming a senior botanist with Biosis Research in 1995, Stephen has been senior scientist and project manager on a number of major investigations. He has prepared numerous flora surveys, undertaken conservation value assessments, worked on nature reserve design and management, prepared ecological design guidelines for developments and supervised and participated in both large and small scale mapping exercises.

Stephen also has experience in preparing and implementing pest plant and animal management plans, is DELWP certified for vegetation quality assessments and has produced numerous plans and assessments for clients to achieve compliance with state and federal biodiversity legislation and policy.

He has helped develop novel techniques for assessing and mitigating impacts to threatened flora and fauna. He possesses strong project management skills. He has assisted in calculating and identifying the offset requirements for a number of larger Victorian projects including Melbourne's Wholesale Market, Esso's Longford pipeline, the upgrade of the Western Highway (Ararat to Stawell) for VicRoads and MAB's Alliance Business Park at Epping

## Key project experience

**Project Manager / Botanist** Offset Strategy for the Longford Pipeline. Report for Esso Australia, prepared in consultation with Advisian (four offset sites assessed and registered).

**Project Manager / Botanist** Assessment of the ecological values and offset requirements for the Deer Park Bypass including assessment of impacts to private landowners, interactions with Victoria's Valuer General, defining prescribed offsets and sourcing the offsets to ensure project compliance for VicRoads.

## Expert witness

Statement prepared and evidence provided in the Supreme Court of Victoria regarding the influence of biodiversity legislation and policy on the purchasing decision making of an informed developer in relation to compensation for the compulsory acquisition of land for the Melbourne Wholesale Market (S CI 2006 08035).

### Other project experience

<b>Project Manager / Botanist</b>	Post-construction (2006/2007) audit of strategic firebreaks for Melbourne's water catchments: Flora and terrestrial fauna values. Report for Department of Sustainability and Environment.
<b>Ecologist</b>	EPA (Victoria) forest management audit team assessing the operations of the Department of Sustainability and Environment in state forest according to the Code of Forest Practices with GHD.
<b>Senior Botanist/ Site Manager</b>	Biosis Research managed three grassland reserves (totaling about 60 hectares) for four years (1999-2002). The reserves were established within an industrial subdivision for Cedar Woods Properties and AMP. Tasks included vegetation and rare species monitoring and the planning and coordination of pest plant and animal control works.
<b>Team Leader/Botanist</b>	describing and assessing the vegetation of the Twelve Mile Mineral Sands Project, at Garnpang and Birdwood Stations, Pooncarie, New South Wales, and identifying impact mitigation options for this proposed development of over 160 km <sup>2</sup> (2000 for RZM).
<b>Expert Witness Testimony:</b>	provided expert witness statements for numerous clients and appeared before both panels and VCAT to provide evidence. This has involved proposal to develop residential and industrial subdivisions, quarries, mines, roads, powerlines and, power stations. He has also prepared evidence statements for the Department of the Environment, (DoE) for compliance actions under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
<b>Senior Botanist</b>	description and mapping of the past and present vegetation communities within the South West Regional Forest Area (2.7 million hectares) (1999 for the Department of Natural Resources and Environment, Victoria).
<b>Project Manager / Botanist</b>	Flora and fauna assessment and reporting to inform the approvals process for the industrial subdivision of Ajax Road Altona for Axxcel Management Services.
<b>Project Manager / Botanist</b>	Site assessments, project management and preparation of documentation for the preparation of a Precinct Structure Plans at Lindum Vale for the Metropolitan Planning Authority (PSP 1202).
<b>Project Manager / Botanist</b>	Management of compliance conditions associated with the EPBC Act approval and Planning Permit requirements for an industrial subdivision at Maidstone Street Altona. This included sourcing and registration of offsets, onsite reserve management and the translocation of threatened flora.
<b>Project Manager / Botanist</b>	Site assessments, project management and preparation of documentation for the preparation of a planning permit application and preliminary information documentation under the EPBC Act for the rezoning of land for Shell at Kalkallo.

### Other qualifications and training

Construction Induction (OH&S) Red/White Card

Rail Industry Safety Induction Card

First Aid (CPR) training

### Publications

Stephen has written over 800 consultant's reports and published 15 other published reports and journal papers:

**Mueck S**. 2012. Forest Ecology – A Victorian Perspective: Abstract from a paper presented to the FNCV Biodiversity Symposium 2011. **Vic. Nat.** 129(5): 180.

John Turner, Marcia Lambert, David Flinn, **Steve Mueck**, Glen Kile 2005. An analysis of Australian research on indicators of sustainable forest management. Research Paper presented by John Turner at the International Union of Forestry Research Organisations (IUFRO) World Congress, 2005. Session 154: 'Research demonstration: Evaluation of sustainable forest management'.

**Mueck S G** 2000. Translocation of Plains Rice-flower *Pimelea spinescens*, Laverton, Victoria. *Ecological Management & Restoration* **1(2)**: 122-127.

Peel W 1999. Rainforest and Cool Temperate Mixed Forests of Victoria. DNRE, Melbourne. (Stephen has made significant contributions to this document i.e. he is the author of all the two-way tables).

**Mueck S**, Ough K & Banks J C G 1996. How old are Wet Forest understories? *Australian Journal of Ecology* **21(3)**: 345-348.

Loyn R, **Mueck S** & Ough K 1994. Vertebrate Pest Animals and Pest Plants. In: Joint ANZECC-MCFFA National Forest Policy Statement Implementation Sub-committee, The development of consistent nationwide baseline environmental standards for native forests, Draft Report.

**Mueck S**, Loyn R H, Ough K & Murphy A 1994. Research and development of ecologically sustainable systems of silviculture in Victoria's Mountain Ash forests. International Forest Biodiversity Conference, Canberra.

Turner L A & **Mueck S** 1992. The vegetation of the Sardine, Rich and Ellery Forest Blocks, Orbost Region, Victoria. DCE, VSP Technical Report No.9.

**Mueck S** & Peacock R J 1992. Impacts of intensive timber harvesting on the forests of East Gippsland, Victoria. DCE, VSP Technical Report No.15.

**Mueck S** 1990a. The Floristic Composition of Mountain Ash and Alpine Ash Forests in Victoria. Silvicultural Systems Project, Technical Report No. 4, Department of Conservation and Environment, Kew.

**Mueck S** 1990b. The Floristic Composition of Dry, Damp and Lowland Sclerophyll Forests in East Gippsland. Timber Industry Strategy, Department of Conservation, Forests and Lands, Kew.

Gillespie G R, Henry S R, **Mueck S**, Scotts D & Westaway J 1990. Flora and Fauna of the Pheasant Creek and Upper Buenba Forest Blocks, Alpine Area, Victoria. Department of Conservation, Forests and Lands, Ecological Survey Report No. 29.

Westaway J, Henry S R, Gillespie G R, Lobert B O, Scotts D & **Mueck S** 1990. Flora and Fauna of the West Errinundra and Delegate Forest Blocks, East Gippsland, Victoria. Department of Conservation, Forests and Lands, Ecological Survey Report No. 31.

Westaway J, Cherry K, Duncan P E, Gillespie G R, Henry S R, & **Mueck S G** 1990. Flora and Fauna of the Lower Wilkinson and Fainting Range Forest Blocks, Gippsland, Victoria. Department of Conservation, Forests and Lands, Ecological Survey Report No. 27.

Gell P A & **Mueck S G** 1987. Applications of Isolate Biogeographic Theory to the Delineation and Management of Mallee Nature Reserves. Proceedings of 21st Congress, Institute of Australian Geographers, University of Western Australia. May 1986.

### **Professional affiliations and memberships**

Australian Network for Plant Conservation (Current member)

Native Fish Australia (Member 1990 –1995)

Pimelea spinescens Recovery Team (Current member)