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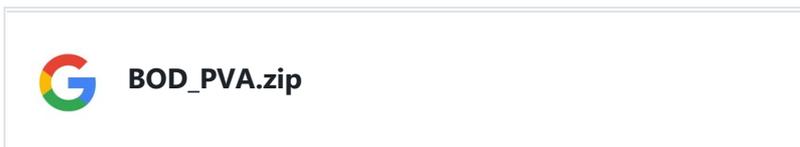
**From:** NE Bioregional Network <telopea\_tas@yahoo.com.au>  
**Sent:** Friday, 7 October 2022 9:06 AM  
**To:** TPC Enquiry; McCrossen, Samuel  
**Subject:** Break O Day LPS Direction 2 North East Bioregional Network  
**Attachments:** BOD\_priority\_vegetation\_overlay\_methodology.pdf; BOD\_PVA\_dissolve.zip

**Categories:**

Please find below and attached the North East Bioregional Networks response to the TPC direction 2  
The GIS data has been provided as a link due to the size of the file

North East Bioregional Network (Rep 81) 2	Provide a statement that further explains the methodology used to produce the Envirodynamics Priority Vegetation Area overlay mapping. The response must clarify the datasets and software used, how buffer distances and wildlife corridors were determined, and how the model differs from the standard Regional Ecosystem Model used by the Planning Authority to prepare the draft LPS.  Furthermore, provide a copy of the GIS layer for the proposed Priority Vegetation Area overlay mapping.
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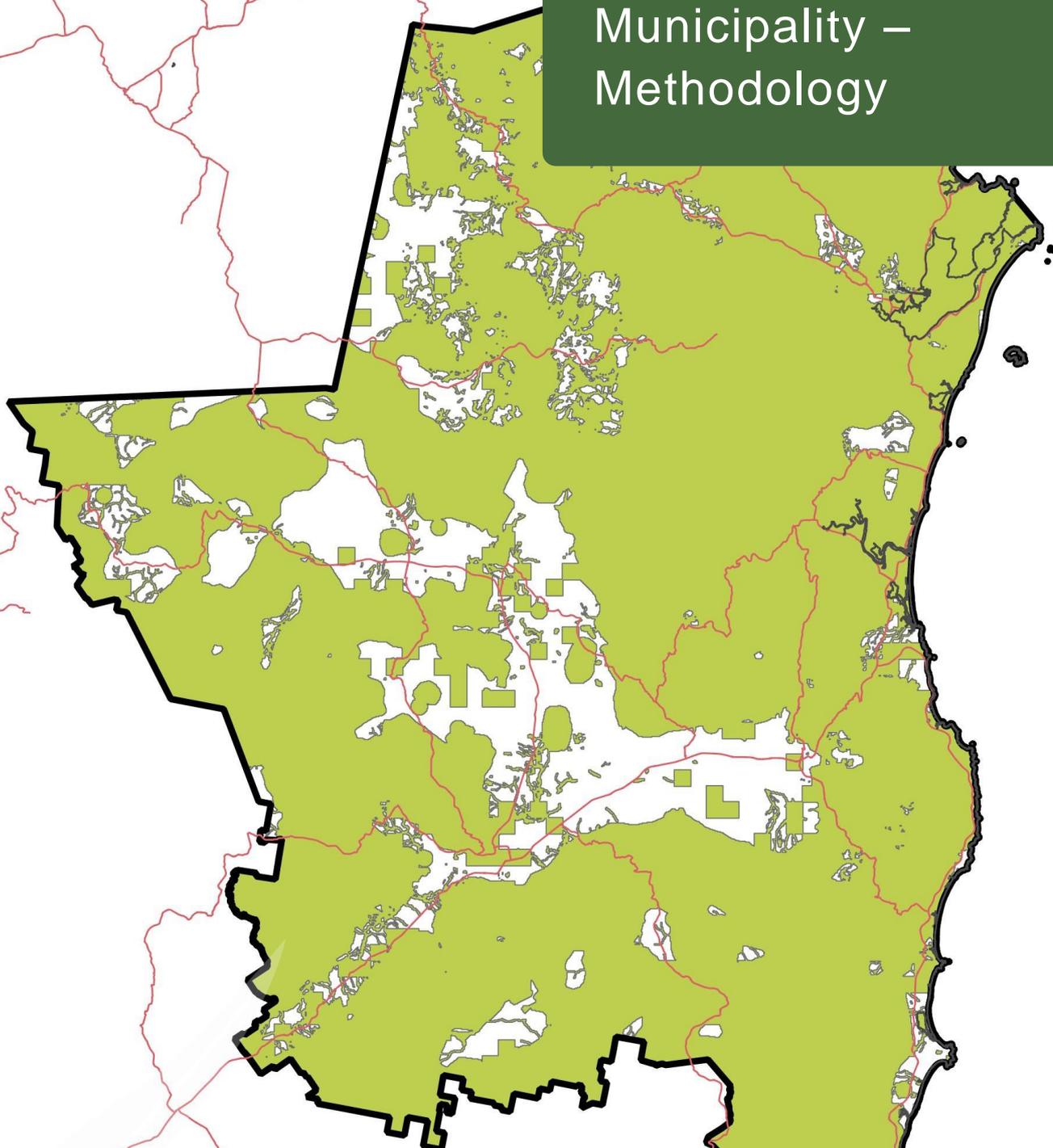
[BOD\\_PVA.zip](#)



Todd Dudley  
President  
**North East Bioregional Network**

Phone (03) 6376 1049  
Postal address: 24751 Tasman Hwy, RSD St. Marys 7215

Priority Vegetation  
Area mapping for  
Break O'Day  
Municipality –  
Methodology



## Introduction

Enviro-dynamics produced a Priority Vegetation Overlay analysis covering Break O'Day municipality in 2019/20. This methodology document provides the technical details of the spatial analysis process, including the source datasets. This report also provides a comparison between the methodology presented here and an alternative methodology, the Regional Ecosystem Model.

## Methodology

### Overview

To create a Priority Vegetation Area overlay we compiled relevant flora, fauna, vegetation and ecological datasets from the DPIPWE Natural Values Atlas (NVA), DPIPWE Conservation Information System (CIS) and Forest Practices Authority (FPA). The process involved simply overlaying all mapped biodiversity layers and therefore represents the known or expected presence of significant biodiversity features (identified in accordance with guidance provided by the Tasmanian Planning Commission). The analysis does not explicitly incorporate ecological processes such as migration, dispersal and population viability (e.g. wildlife corridors).

### Spatial Analysis

Analysis was based on a continuous grid of 50 m square cells (each 0.25 ha) covering the entire Break O'Day Municipality. This grid allowed multiple input datasets to be overlaid and the corresponding values assigned to each grid cell.

All data processing and analyses were undertaken using QGIS 3.10. The grid was created using the 'Create grid' function and clipped to the boundary of the municipality, resulting in a shapefile. The 356 336 hectare municipality was divided into 1 429 731 grid cells (including partial cells on the perimeter). Data analysis used shapefiles in the GDA94 projection.

Each of the 21 biodiversity layers (described below) were overlaid on the grid using the 'Join attributes by location' tool in QGIS. A field (column) for each biodiversity feature was added to the grid layer, indicating presence or absence of that mapped feature in each cell. The resulting matrix therefore contained presence/absence values for each of the 20 biodiversity features (columns) across the 1.429 million grid cells (rows).

The Priority Vegetation Overlay was created from this matrix by selecting all of grid cells (rows) which had no values (i.e. no biodiversity features present) and assigning these cells as 'Not PVA' (Priority Vegetation Area). The remaining cells, which had at least one biodiversity feature present, were therefore classed as 'PVA'.

Data validation was performed by randomly selecting grid cells and manually inspecting the input biodiversity features at that location to ensure they were correctly coded as present or absent in the row of the data matrix corresponding to that cell.

### Datasets

The datasets sourced for this project are described below, organised by the data source. In most cases, further processing of the datasets was performed as described below. Table 1 lists the final 20 datasets used in the analysis. Further technical details are provided in the Appendix.

### **LIST Local Government Areas**

Break O'Day municipality was extracted as a polygon feature from the dataset (2016 version).

### **Conservation Information System**

The Tasmanian Government's Conservation Information System (CIS) are available from the Natural Values Atlas at 1 km grid resolution. Complete and high-resolution polygon datasets were supplied directly by DPIPWE for this project. Explanation of these datasets is provided in DPIPWE (2014).

The following CID datasets were obtained:

- *Threatened native vegetation communities*
- *Distinctiveness of areas of threatened and uncommon plants*
- *Riparian zone vegetation*
- *Native vegetation in bioregions with <10% NRS reservation*
- *Contemporary refugia*
- *Glacial refugia*
- *Important Bird Areas*
- *Bioregional status of vegetation communities and under-reserved communities*

Note that *Reservation priority vegetation communities* from the CIS were not used and instead were produced from Tasveg as described below, using more up to date reservation information.

### **Tasveg**

Tasveg 3.0 was used in the identification of significant habitat for several threatened fauna species<sup>1</sup>.

### **Natural Values Atlas**

[www.naturalvaluesatlas.tas.gov.au](http://www.naturalvaluesatlas.tas.gov.au)

Observations of threatened species were obtained from this Tasmanian Government database. Point observations of flora species listed on either or both the TSPA or EPBCA were extracted from the database (using fields within the NVA database which the status of each taxon under those two legislative threatened species lists). Similarly, threatened fauna species observations were extracted.

The threatened flora and fauna layers were clipped to the break O'Day municipality, thus excluding all records from outside the municipality. Old (prior to 1950) and spatially uncertain (accuracy >250 m) observations were excluded based on the 'Observation Date' and 'Location Accuracy' fields in the NVA data.

Additional refinement of the threatened fauna observations involved removal of observations of wide-ranging mobile fauna species since these are not useful for conservation planning (e.g. an eagle seen flying overhead or a roadkill Tasmanian devil do not necessarily indicate any particular conservation value at that site). Therefore, only observations of breeding sites for wide ranging fauna (raptor nests or devil dens) were retained. Threatened fauna species with small home ranges were included. The following species were considered sedentary or localized and therefore likely to have important habitat accurately represented by point observations: *Antipodia chaostola* subsp. *leucophaea*, *Enchymus* sp. nov., *Galaxiella pusilla*, *Hoplogonus bornemisszai*, *Hoplogonus simsoni*, *Hoplogonus vanderschoori*, *Hydrobiosella sagitta*, *Litoria raniformis*, *Pseudemoia rawlinsoni*,

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<sup>1</sup> We note that Tasveg 4.0 has subsequently been released. The newer version includes small-scale and localised updates of vegetation mapping rather than substantial re-mapping. The differences between Tasveg 3.0 and 4.0 are unlikely to have much influence on the outcomes of this Priority Vegetation Area analysis. Tasveg 3.0 is also the basis of many of the CIS layers used at the time of the analysis.

*Pseudomys novaehollandiae*, *Tasmanipatus anophthalmus*, *Tasmanipatus barretti*. Note that modelled habitat for several of these species is also included in this project, as described below.

Each threatened flora observation was buffered by 100 m, resulting in a 100 m radius circle. Threatened fauna observations were buffered by 50 m.

### **FPA range boundaries**

Mapped range boundaries for selected threatened fauna species produced by the Forest Practices Authority. These polygon layers identify one or more range extents for each species ('known range', 'potential range', 'core range'). These were produced in around 2008 and do not indicate the suitability of habitat within the mapped range. A subsequent expert workshop in 2016 refined this habitat mapping by determining and validating methods for identifying suitable habitat for each species. While this improved habitat mapping is not publicly available, the published methodology allowed the datasets to be reproduced or approximated for eight species occurring in Break O'Day municipality. Grey goshawk habitat mapping had low accuracy (Yee & Koch 2016) and therefore was not included in this project.

FPA range boundaries for the following species were used:

- Giant velvet worm *Tasmanipatus barretti*
- Blind velvet worm *Tasmanipatus anophthalmus*
- Vanderschoors stag beetle *Hoplogonus vanderschoori*
- Masked owl *Tyto novaehollandiae castanops*
- New Holland mouse *Pseudomys novaehollandiae*
- Swan galaxias *Galaxias fontanus*
- Simsons stag beetle *Hoplogonus simsoni*
- Giant freshwater crayfish *Astacopsis gouldi*

A habitat layer for each species was created following the methods outlined in Yee & Koch (2016) and summarised in Table 1.

### **FPA mature habitat model**

This statewide dataset models the predicted density of mature forest habitat – areas containing mature eucalypt trees which provide important fauna habitat, particularly tree hollows (FPA 2016). For this project, the medium and high density mature habitat classes were selected.

### **GlobMap**

This dataset identifies potential foraging habitat for the swift parrot based on Tasveg mapping and ground-truthing (DPIPWE 2010).

Table 1. Datasets used in the spatial analysis process to identify Priority Vegetation Areas.

Layer	Source	Pre-processing and notes
Threatened flora locations	NVA	TSPA and EPBC listed flora point observations from NVA (Sept 2019) with location accuracy < 250 m and date > 01-01-1950. Points buffered by 100 m.
Threatened fauna locations	NVA	TSPA and EPBC listed fauna point observations from NVA (Sept 2019) with location accuracy < 250 m and date > 01-01-1950. Sedentary species <sup>2</sup> only selected, plus nest or den observations of other species. Points buffered by 100 m.
Giant velvet worm habitat	FPA	Range boundary intersected with all TASVEG 3.0 wet eucalypt forest and rainforest communities.
Blind velvet worm habitat	FPA	Range boundary intersected with all TASVEG 3.0 wet eucalypt forest and rainforest communities.
Vanderschoors stag beetle habitat	FPA	Range boundary intersected with all TASVEG 3.0 wet eucalypt forest and rainforest communities, or highland grassy sedgeland (MGH) or native forest (except <i>Eucalyptus sieberi</i> forest) on granite geology within 50 m of watercourses.
Masked owl – significant habitat	FPA	FPA mature habitat density (1 km radius) classes Medium and High intersected with dry eucalypt forest.
New Holland mouse habitat	FPA	FPA range boundary intersected with the eleven TASVEG vegetation types identified as constituting new holland mouse habitat by Lazenby (2009): Coastal scrub (SSC), Coastal heathland (SCH), Dry scrub (SDU), Coastal scrub on alkaline sands (SCA), <i>Eucalyptus amygdalina</i> coastal forest and woodland (DAC), <i>E. nitida</i> Furneaux forest (DNF), <i>E. sieberi</i> forest and woodland not on granite (DSO), Heathland on granite (SHG), <i>E. sieberi</i> forest and woodland on granite (DSG), <i>E. viminalis</i> Furneaux forest and woodland (DVF), and Heathland scrub complex at Wingaroo (SCW).
Swan galaxias habitat	FPA	FPA range boundary intersected with a riparian layer created by buffering watercourses 20 m either side.
Simsons stag beetle habitat	FPA	FPA 'suitable habitat' layer.

<sup>2</sup> The following species were considered sedentary or localized and therefore likely to have important habitat accurately represented by point observations: *Antipodia chaostola* subsp. *leucophaea*, *Enchymus* sp. nov., *Galaxiella pusilla*, *Hoplogonus bornemisszai*, *Hoplogonus simsoni*, *Hoplogonus vanderschoori*, *Hydrobiosella sagitta*, *Litoria raniformis*, *Pseudemoia rawlinsoni*, *Pseudomys novaehollandiae*, *Tasmanipatus anophthalmus*, *Tasmanipatus barretti*

Layer	Source	Pre-processing and notes
Giant freshwater crayfish habitat	FPA	FPA modelled giant freshwater crayfish habitat – select all watercourse segments with Medium or High suitability.
Mature habitat (tree hollow density)	FPA	FPA mature habitat density (1 km radius) classes Medium and High.
Swift parrot foraging habitat	DPIPWE	GlobMap layer used without further processing, noting that mapping was not undertaken for some areas of potential habitat.
Threatened native vegetation communities	CIS	Layer sourced from CIS, containing both State and Commonwealth listed communities.
Distinctiveness of areas of threatened and uncommon plants	CIS	Cells with CIS score > 0 (i.e. Med, High, Very High categories).
Riparian zone vegetation	CIS	Med, High, Very High categories of Integrated Conservation Value (ICV).
Native vegetation in bioregions with <10% NRS reservation	CIS	In Tasmania, the only bioregion with less than 10% area in the National Reserve System is the Northern Midlands, which includes the south-east of BOD municipality.
Reservation priority vegetation – bioregional	CIS	Communities with low levels of reservation at the bioregional level.
Reservation priority vegetation - statewide	CIS	Communities with low levels of reservation at the statewide level.
Contemporary refugia	CIS	Fire and disease refugia from National Estate data.
Glacial refugia	CIS	Glacial refugia from National Estate data.
Important Bird Areas	CIS	Locations identified as important habitat for birds.

## Discussion

This PVA analysis has many similarities with the Regional Ecosystem Model (REM) approach to identifying priority vegetation areas in Tasmania (Natural Resource Planning 2016). The REM uses a grid of 34 m wide hexagons whereas this project uses 50 m wide squares.

Both approaches include threatened species observations, threatened species habitat (including hollow-dwelling or mature forest habitat), vegetation conservation values (reservation status, threatened listing) and riparian vegetation. The REM includes its own proprietary modelling for habitat of many threatened fauna species and, in addition to threatened species, includes 'other priority species'.

The Enviro-dynamics model includes several biogeographic features from the CIS that are not included in the REM, i.e. Distinctiveness of areas of threatened and uncommon plants, Contemporary refugia, Glacial refugia, Important Bird Areas. Conversely, the REM incorporates landscape features not used in the Enviro-dynamics method such as clearing bias, connectivity, remnant vegetation and vegetation condition.

While the Enviro-dynamics model identifies biodiversity values (by applying thresholds where necessary to the input layers, i.e. selecting those features of conservation significance) and then uses a simple presence/absence analysis of these features, the REM uses a complex hierarchical scoring system for biodiversity features to which thresholds can then be applied to determine outputs.

The output of the two models is visually similar with relatively minor differences. Investigation of areas of difference between the two models might provide an insight into gaps in each model, such as biodiversity features that are not captured.

## References

- DPIPWE, 2010. *GlobMap, The swift parrot foraging habitat map*. Biodiversity Conservation Branch, Department of Primary Industries Parks, Water and Environment. Tasmanian Government. Hobart.
- DPIPWE (2014) *Business rules for the creation of spatial layers representing the conservation and reservation status of native vegetation communities*. Prepared by the project Working Group for the Prioritising Conservation on Private Land Project (Phase 1 – 2009), and for submission to the CIS. V2 – April 2014.
- DPIPWE (2018) General vegetation reserve report 2018. Accessed from <https://nre.tas.gov.au/Documents/General%20veg%20reserve%20report%20june%202020%20including%20threatened%20communities.xls>
- FPA (2008) *FPA planning guideline 2008/1. An internal planning framework developed by the Forest Practices Authority for the purposes of delivering management prescriptions through the threatened fauna advisor to avoid or limit the clearance and conversion of significant habitat for threatened forest fauna*. Forest Practices Authority, Hobart.
- FPA (2016) *Fauna Technical Note No. 2: Mature habitat availability map v2*. Forest Practices Authority, Hobart.
- Natural Resource Planning (2016) *Summary of the Regional Ecosystem Model of Tasmanian biodiversity*. Natural Resource Planning Pty Ltd, Hobart.
- Yee, M. & Koch, A. (2016) *Spatial habitat models of Tasmanian threatened fauna*. Forestry Tasmania & Forest Practices Authority, Hobart.

## Appendix 1 – Dataset processing

### Conservation Information System (CIS)

**Distinctiveness of areas of threatened and uncommon plants layer** – select all cells with CIS\_cat of med, high or very high (i.e. CIS\_score > 0)

**Riparian zone veg** – select all watercourse segments with Integrated Conservation Value (ICV) of med, high or very high: "ICV" = 'M' OR "ICV" = 'H' OR "ICV" = 'VH'

**Paleoendemic priorities** – not included, does not occur in BOD municipality.

**Native veg in bioregions with <10% reservation** – this is all native vegetation within Northern Midlands bioregion.

**Unreserved communities** – not included, does not occur in BOD municipality.

**Threatened veg communities** – used as is.

**Reservation priority communities (statewide)** — used as is.

**Reservation priority communities (bioregional)** — used as is.

**Contemporary refugia** — used as is.

**Glacial refugia** — used as is.

### Natural Values Atlas

#### Threatened Flora observations

Download state and national listed threatened species point observations from NVA (Sept 2019)

Exclude records with accuracy > 250 m or date earlier than 1950

Clip to BOD.

Buffer each observation by 100 m.

#### Threatened Fauna observations

Download state and national listed threatened species point observations from NVA (Sept 2019)

Excluded records with accuracy > 250 m or date earlier than 1950

Selected observations only:

- threatened raptor nests (WTE and WBSE only in BOD)
- dens (devils only present)
- sedentary/localised species

#### Localised species

"SPECIES\_NA" = 'Antipodia chaostola subsp. leucophaea' OR "SPECIES\_NA" = 'Enchymus sp. nov.'  
OR "SPECIES\_NA" = 'Galaxiella pusilla' OR "SPECIES\_NA" = 'Hoplogonus bornemisszai' OR

"SPECIES\_NA" = 'Hoplogonus simsoni' OR "SPECIES\_NA" = 'Hoplogonus vanderschoori' OR  
"SPECIES\_NA" = 'Hydrobiosella sagitta' OR "SPECIES\_NA" = 'Litoria raniformis' OR "SPECIES\_NA"  
= 'Pseudemoia rawlinsoni' OR "SPECIES\_NA" = 'Pseudomys novaehollandiae' OR "SPECIES\_NA" =  
'Tasmanipatus anophthalmus' OR "SPECIES\_NA" = 'Tasmanipatus barretti'

#### *Dens and Nests*

"OBSERVAT\_2" = 'Den' OR "OBSERVAT\_2" = 'Nest'

delete nest/den observations earlier than 01 JAN 2000

Clip to BOD and buffer by 50 m.

## Threatened Fauna habitat

FPA range boundaries (FPA planning guideline 2008/1) modified with selected habitat based on  
*Spatial habitat models of Tasmanian threatened fauna* (STT 2016).

- Giant velvet worm  
Tasveg W\_\_, R\_\_ intersect with GVW potential range
- Blind velvet worm  
Tasveg W\_\_, R\_\_ intersect with BVW known range
- Vanderschoors stag beetle  
Tasveg W\_\_, R\_\_, MGH or (if riparian) any native forest within 50 m of class 1-4 streams on  
granite but not E. sieberi forest (Tasveg DSG, DSO), intersect with VSB potential range
  - VSB potential range
  - Geology\_region: "SIMPLEDESC" = 'Granite' OR "SIMPLEDESC" = 'Granite & other  
granitic rocks' OR "SIMPLEDESC" = 'Granitic rocks'
  - "VEGCODE" LIKE 'R%' OR "VEGCODE" LIKE 'W%' OR "VEGCODE" = 'MGH'
  - or Buffer 50 m streams rivers (LIST hydlines clipped to BOD: "HYDLNTY1" =  
'Watercourse' OR "HYDLNTY1" = 'Water Line') and intersect with ( "VEGCODE" LIKE  
'D%' OR "VEGCODE" LIKE 'N%') AND NOT ("VEGCODE" = 'DSG' OR "VEGCODE" =  
'DSO' )
- Grey goshawk (model has low accuracy so not used in analysis)  
Tasveg blackwood NAR, NAF or Melaleuca swamp forest NME, NLM, NLE, NLA or Tasveg  
W\_\_, R\_\_ within 200 m of river/waterbody
- Masked owl – significant habitat  
Mature Habitat Availability (MHA) – high or medium = >20% mature euc crown cover (NB:  
STT report does not specify which radius MHA layer was used, assume it is 1 km)  
MHA – high or medium ("DENS\_CLASS" > 4 AND "DENS\_CLASS" < 99) and Tasveg  
"VEGCODE" LIKE 'D%'
- Simson stag beetle – 'suitable habitat layer'

### Mature habitat availability (FPA)

- thresholds in Fauna Tech Note 2 for MHA classes are **Low** <20% crown cover mature  
eucalypt, **Med** 20-40%, **High** >40%
- include med and high classes as priority habitat ("DENS\_CLASS" > 4 AND  
"DENS\_CLASS" < 99)