

Map User Notes: Farm tree species (*Eucalyptus globulus*, *Eucalyptus nitens* and *Pinus radiata*) suitability map (Using Climate Futures Projections)

Summary:

The mapping aims to classify land suitable for growing farm tree species according to 4 suitability classes: “1.0 Well suited”, “2.0 Suitable”, “3.0 Moderately suitable”, and “4.0 Unsuitable”. These are produced from a set of pre-determined rules in accordance to a suitability matrix (refer to table on page 2) developed from a database of hundreds of measures of farm tree species productivity across Tasmania.

[Climate Futures](#) projections were incorporated into the suitability mapping framework to assess projected changes to frost risk severity and mean annual rainfall for years [2030](#) and [2050](#) (refer to [metadata](#) for more information). This compliments the current [Farm tree species suitability map](#) developed as part of the ‘[Water for Profit](#)’ program which was based on recent historical climate observations (Refer [here](#) for more information).

How is suitability determined?

The overall suitability rating is determined using a most-limiting-factor approach, where the lowest rated parameter becomes the overall suitability rating. As an example, a location may possess the following characteristics, and how they fit the criteria for *E. nitens*:

<u>Soil/Climate parameter</u>	<u>Characteristic</u>	<u>Rating <i>E. nitens</i></u>
Soil depth	100 cm	Well suited
Depth to sodic layer	100 cm	Moderately suitable
pH (100-200 cm)	5.4	Suitable
EC _{SE} (100-200 cm)	1.5	Moderately suitable
Texture (% sand, 100-200 cm)	33	Suitable
Annual rainfall (mm)	677	Moderately suitable
Exchangeable calcium (0-15 cm)	10	Well suited
Frost days (<0°C)	35	Well suited
Drainage	Well drained	Well suited
Overall rating		Moderately suitable

In this case, the overall suitability is classified as ‘Moderately suitable’ for *E. nitens*. This is due to Depth to sodic layer, ECSE and annual rainfall limiting the classification to this rating. Alternatively, if for example, the same parameters fell within the ‘Well suited’ criteria, the overall rating would then revert to ‘Suitable’, due to pH and Texture now limiting the rating to this classification (refer to suitability matrix on page 2 for rule-set). A “1.0 Well suited” rating is achieved if all attributes are rated ‘Well suited’.

Note that local knowledge is really important regarding soils, microclimates and pests. Some areas in the unsuitable regions may actually support these species in some circumstances, while other suitable areas may be unsuitable due to factors that are not considered by this model. Note also that designated conservation/protection areas as well as existing urbanised/residential zones and major waterbodies were automatically classified as “4.0 Unsuitable”.

Definitions of Suitability Classes (in relation to the suitability matrix)

1.0 Well suited: Land having no significant soil or climatic limitations to sustained forest production.

2.0 Suitable: Land having only minor soil or climatic limitations that will not significantly reduce productivity

3.0 Moderately suitable: Land having soil or climatic limitations that is likely to impact on sustained productivity

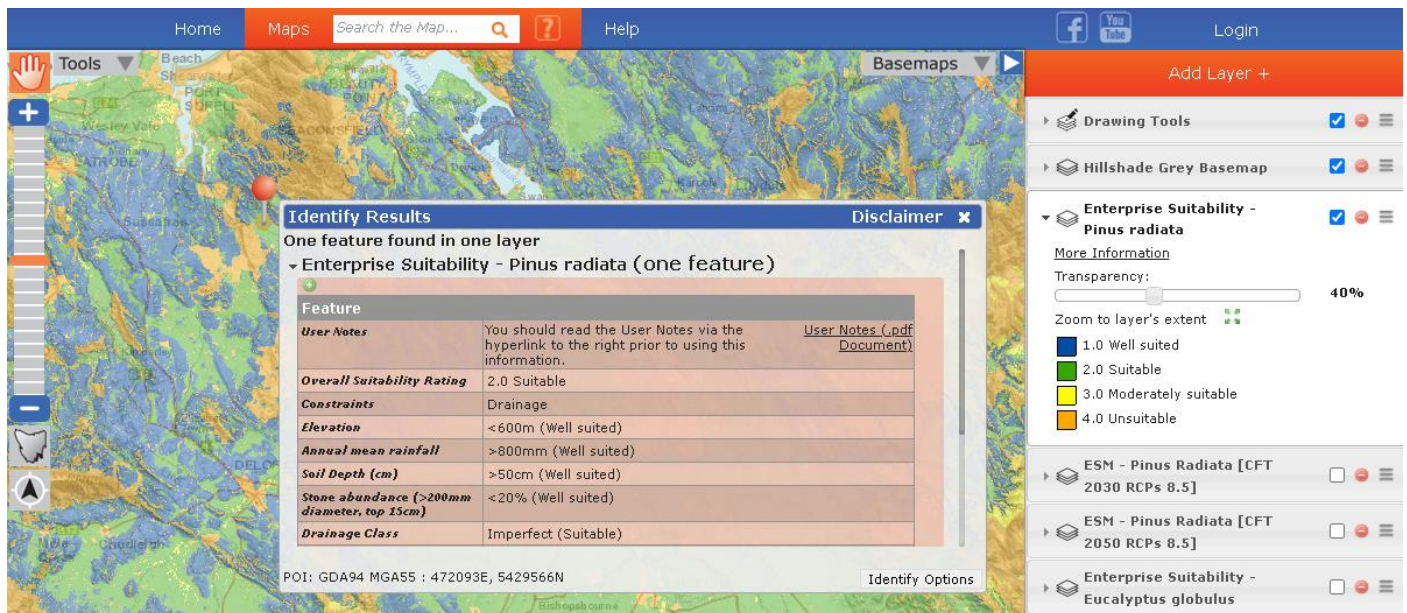
4.0 Unsuitable: Land having soil and climatic limitations that are too severe for farm tree production and will so reduce benefits, or increase required inputs.

Suitability matrix rulesets applied to the 3 farm tree species

Species	Rating	Soil depth	Depth to sodic layer	pH (100 – 200cm depth)	Electrical conductivity (ECse) dS/m (100 – 200cm depth)	Soil texture (% sand) (100 – 200cm depth)	Soil drainage	Exchangeable calcium (0 – 15 cm depth)	Stone abundance % (>200mm diameter)	Frost (annual mean number of Tmin days <0°C) (using Climate Futures Projections)	Annual mean rainfall (using Climate Futures Projections)	Elevation (surrogate for frost sensitivity and mean minimum temperatures)
<i>E. nitens</i>	1.0 Well suited	>60cm	>140cm	5.5 - 7	<1.2	35 - 55%	Moderately to excessively well drained	>5ppm	NA	<50 days	>800mm	NA
	2.0 Suitable	50 - 60cm	>140cm	5 - 5.5, 7 – 7.5	1.2 – 1.4	30 – 35%, 55 – 65%	Imperfect	4 – 5ppm		50 – 60 days	700 – 800mm	
	3.0 Moderately suitable	40 - 50cm	80- 140cm	4 – 5, 7.5 - 8	1.4 - 2	20 – 30%, 65 – 70%	Imperfect	4 – 5ppm		50 – 60 days	600 – 700mm	
	4.0 Unsuitable	<40cm	<80cm	<4, >8	>2	<20%, >70%	Poor, very poorly drained	<4ppm		>60 days	<600mm	
<i>E. globulus</i>	1.0 Well suited	>60cm	>140cm	5.5 - 7	<1.2	35 - 55%	Moderately to excessively well drained	>5ppm	NA	<10 days	>800mm	NA
	2.0 Suitable	50 - 60cm	>140cm	5 - 5.5, 7 – 7.5	1.2 – 1.4	30 – 35%, 55 – 65%	Imperfect	4 – 5ppm		10 – 20 days	700 – 800mm	
	3.0 Moderately suitable	40 - 50cm	80- 140cm	4 – 5, 7.5 - 8	1.4 - 2	20 – 30%, 65 – 70%	Imperfect	4 – 5ppm		20 – 25 days	600 – 700mm	
	4.0 Unsuitable	<40cm	<80cm	<4, >8	>2	<20%, >70%	Poor, very poorly drained	<4ppm		>25 days	<600mm	
<i>P. radiata</i>	1.0 Well suited	>50cm	NA				Moderately to excessively well drained	NA	<20%	NA	>800mm	<600m
	2.0 Suitable	40 - 50cm					Imperfect		20-50%		550 – 800mm	<600m
	3.0 Moderately suitable	40 - 50cm					Poorly drained		50-90%		450 – 550mm	600-700m
	4.0 Unsuitable	<40cm					Very poorly drained		>90%		<450mm	>700m

LISTmap instructions

The forest species suitability map is a digital layer that can be manually interrogated within [LISTmap](#). Any location can be enquired within Tasmania to provide location specific parameters pertaining to commercial farm tree species suitability. To interrogate a location, simply click on any location whilst the suitability layer is active in the table of contents panel and a window will appear listing important attributes. An example is given below:



The screenshot shows the LISTmap web application interface. A map of Tasmania is displayed with a suitability layer for *Pinus radiata*. A pop-up window titled "Identify Results" is open, showing the following information:

One feature found in one layer
Enterprise Suitability - *Pinus radiata* (one feature)

Feature	
User Notes	You should read the User Notes via the hyperlink to the right prior to using this information. User Notes (.pdf Document)
Overall Suitability Rating	2.0 Suitable
Constraints	Drainage
Elevation	<600m (Well suited)
Annual mean rainfall	>800mm (Well suited)
Soil Depth (cm)	>50cm (Well suited)
Stone abundance (>200mm diameter, top 15cm)	<20% (Well suited)
Drainage Class	Imperfect (Suitable)

POI: GDA94 MGA55 : 472093E, 5429566N

The interface also shows a table of contents on the right with the following layers:

- Drawing Tools
- Hillshade Grey Basemap
- Enterprise Suitability - *Pinus radiata* (40% transparency)
- ESM - *Pinus Radiata* [CFT 2030 RCPs 8.5]
- ESM - *Pinus Radiata* [CFT 2050 RCPs 8.5]
- Enterprise Suitability - *Eucalyptus globulus*

The window provides information such as the “Overall Suitability Rating” as well as other useful information including the list of attributes that limits a classification to a particular suitability rating;

In addition, information pertaining to each soil and climate attribute (according to the classifications provided in the suitability matrix on page 2) are also provided and appear below the overall suitability rating and constraint fields (as shown in the example above). This allows users to ‘drill down’ and view site-specific information regarding soil and climate requirements that relate to farm tree production for any point of interest in Tasmania.

Vulnerable soils

Listed within the suitability layer (below the individual soil/climate fields) are ratings pertaining to soil vulnerability hazards including:

- Sodicity (ratings of high, moderate, low, nil);
- Salinity (ratings of high, moderate, low, nil);
- Water Erosion (ratings of extreme, very high, high, moderate, low, very low, nil);
- Water Logging (ratings of extreme, very high, high, moderate, low, very low, nil); and
- Wind Erosion (ratings of high, moderate, low, nil).

Information in regards to managing vulnerable soils can be obtained here:

https://nrmdatalibrary.dpiwve.tas.gov.au/FactSheets/WfW/ListMapUserNotes/Vulnerable_soils.pdf

Note that vulnerable soils categories are complementary material to the mapping and does not contribute to the “Overall Suitability Rating”.

Flood risk

Also listed within the suitability layer are categories relating to risk of flood inundation, as provided by flood plain layer within the LIST Hydrography dataset

(http://listdata.thelist.tas.gov.au/public/LIST_Hydrographic_Information.pdf).

Ratings of 'High', 'Moderate' or 'Nil' are listed that correspond to 'Severe', 'Moderate' or 'Nil' flooding potential.

Note that flood risk categories are complementary material to the mapping and does not contribute to the "Overall Suitability Rating".

Additional Information

For information about using LISTmap, please consult the help document:

<http://listdata.thelist.tas.gov.au/public/outgoing/sif/listmaphelp.pdf>

For technical information relating to the dataset, please contact Daniel.Mendham@csiro.au, or

Martin.Moroni@pft.tas.gov.au and the [metadata](#).

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Caution and Disclaimer

The information and material in LISTmap (including the enterprise suitability map layer for *Eucalyptus globulus*, *Eucalyptus nitens* and *Pinus radiata* and accompanying soil and climate input datasets, i.e. "material") is based on computer modelling of the potential suitability to a given area and, as such, there are inherent uncertainties in the results. While every effort has been made to ensure the material is accurate, the Crown in Right of Tasmania ("Crown") provide no warranty, guarantee or representation that the material is accurate, complete, up to date, non-infringing or fit for a particular purpose. All suitability assessments are based upon the assumption that water for crop irrigation is available and therefore is not a limiting factor. Furthermore, the Crown expressly disclaim all and any legal liability and responsibility whatsoever arising from or connected with: (a) the accuracy, reliability, validity, currency or completeness of the material; (b) the consequences of anything done or omitted to be done by any person, either in whole or in part, in reliance of the material. The material does not take into account personal circumstances. The material is made available on the understanding that the Crown are not providing professional advice and that users of this material should undertake site-specific investigations and research and obtain appropriate professional advice relevant to their particular circumstances. The relevant maps that form part of the material have been prepared at 1:50,000 scale (landscape level). These maps consider only soil and climate constraints and do not take into account other parameters or any legislative, regulatory and/or policy requirements of Federal, State or Local Governments that apply to the land in question and/or which could affect the proposed land use or agricultural enterprise.