

Wurrawa soil – gradational soil in granite, under dry forest

Site description

Occurrence: In northeastern lowland Tasmania where mean annual rainfall is <1200 mm

Parent Material: In-situ deeply weathered granite

Landform: Undulating and rolling hills

Drainage Class: Well drained

Vegetation: Dry sclerophyll forest with *Eucalyptus amygdalina*, *E. obliqua* and *Pteridium esculentum*

Distinguishing Soil Properties

Profile Features:

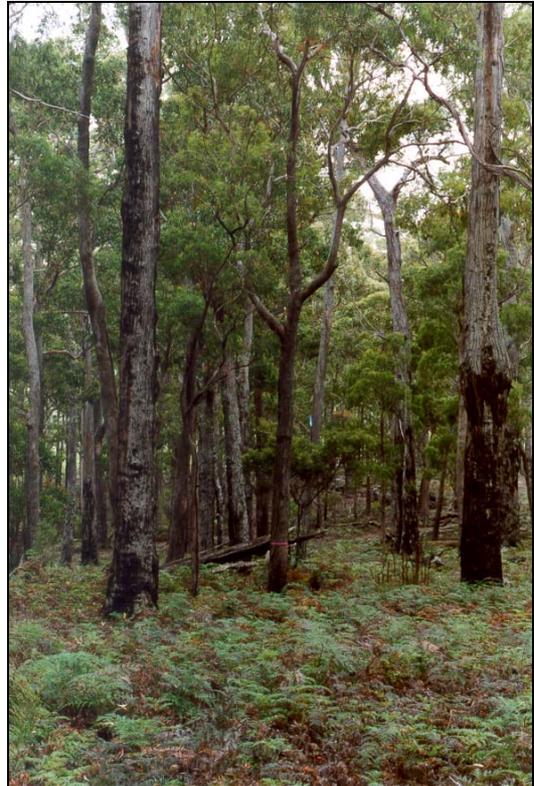
- Thin A1 horizon
- Gradational profile with sandy clay loam texture in upper horizons, clayey in lower horizons
- Firm weakly-structured B2 horizon

Chemical and physical features

- Low total C and N, and low to medium total P in surface layer (0-30 cm)
- Low to medium organic C and total P and N throughout, except in very thin A1 horizon
- Permeability – moderate, limited by firm B2 horizon

Similar soils

- Stronach soil (Forest Soils of Tasmania Soil 11.3) – gradational soils under wet forest; thicker A1 horizon and higher nutrient status
- Hogarth soil (Grant et al. 1995) – red-weathered in subsoils
- Fraser soil (Tasmanian forest soil fact sheet no. 14) – gradational soil with thin A1 horizon in granodiorite under dry forest
- A variant of Wurrawa soil, having lower total P and N, occurs in association with Jensen soil in areas with rainfall <800 mm; a profile has been described near the old Waterhouse Road, Scottsdale



Soil Degradation Potential

FACTOR	RATING OF DEGRADATION POTENTIAL
Erodibility:	Moderate
Compaction and puddling:	Moderate
Mixing:	High
Nutrient depletion:	High
Landslides:	Slight
Flooding:	Negligible

Site Productivity

Low to medium productivity, limited by low to medium reserves of nutrients. The soils superficially resemble high-productivity Stronach soils, but are much less fertile.

Soil Management

Topsoils are very thin, probably as a result of burning. In native forest management, surface horizons should be left intact as far as possible. Excessive disturbance and burning may further reduce productivity and should be avoided.

Native Forest Logging and Regeneration

LOGGING AND CLEARING:

Nutrient levels are low and concentrated in the thin surface horizon. The soils are prone to degradation by erosion especially after burning. Selective logging rather than clearfelling is appropriate.

PREPARATION FOR REGENERATION:

Minimal seedbed preparation is required. Disturbance during logging should be sufficient. Burning should be minimised.

SILVICULTURAL CONSIDERATIONS:

Low nutrient status limits long-term productivity. Long-term management using partial logging techniques is likely to be a viable option.

Suitability for Plantations

Marginally suitable for plantations due to low to medium site productivity.

CLEARING: Dozer clearing must be done using a rake blade.

CULTIVATION: Ripping to >50 cm depth is required so that roots can penetrate into the firm B2 horizon and utilise the full profile for nutrients and water.

FERTILISER TREATMENT: Fertilising planted seedlings is required. Secondary fertilisation will be necessary.

Profile

Authors: M. D. Laffan and P.D. McIntosh

Date: 2 June 1999

Location: On northern slopes of a low hill between Peters Road and Counsels Road, accessed by track running east-west along ridgeline.

Map reference: Sheet 5844 (Spurrs Rivulet) 592800 5444700

Landform: Upper midslope of rise in rolling country

Vegetation: *Eucalyptus obliqua* and *E. amygdalina* forest. Sparse *Pteridium esculentum* and *Gahnia grandis* ground cover

Parent material: Deeply weathered granite

Drainage: Well drained

Slope: 11°

Aspect: Northwest

Altitude: 210 m

Photographs: PDM 1-02-16 (site); 6-99-24 (profile)

Australian Soil Classification: **Haplic Mesotrophic Brown Dermosol**

O	3-0 cm	Black leaf litter.
A1	0-1 cm	Black (10YR2/1) (moist) moderately gravelly humic loam; 30% fine quartz gravels; very weak strength; weak 1 mm granular structure; abundant roots; NaF 0/5.
AB	1-20 cm	Dark yellowish brown (10YR4/4) (moist) moderately gravelly coarse sandy clay loam; 20% fine quartz gravels; 30% very dark greyish brown (10YR3/2) worm casts 3-10 mm diameter; firm strength; weak 5-10 mm subangular blocky structure; many roots; NaF 0/5.
B21	20-45 cm	Dark yellowish brown (10YR4/6) (moist) moderately gravelly light medium clay; 20% fine quartz gravels; 20% brown (10YR4/3) worm casts 3-10 mm diameter; firm strength; weak to moderate 20-50 mm subangular blocky structure breaking to 5-10 mm subangular blocky structure; common roots; NaF 0/5.
B22	45-80+cm	Strong brown (7.5YR5/6) (moist) moderately gravelly light medium clay; 20% fine quartz gravels; 10% dark yellowish brown (10YR4/4) worm casts 3-10 mm diameter; firm strength; weak to moderate 20-50 mm subangular blocky structure breaking to 5-10 mm subangular blocky structure; NaF 2/5.
C	on	Moderately weathered granite.

Laboratory Analyses

Horizon	Depth (cm)	pH (H ₂ O)	Total C (%)	Total N (%)	Total P (mg/kg)	Citrate-dithionite Fe (%)	Colwell P (mg/kg)	P retention (%)	Water stable aggregates (%)
	0-30	5.2	1.3	0.05	93	<i>n.d.</i>	0.0	<i>n.d.</i>	<i>n.d.</i>
A1	0-1	4.5	20.0	0.60	298	1.1	<i>n.d.</i>	36	<i>n.d.</i>
AB	1-20	5.1	3.0	0.11	138	2.6	<i>n.d.</i>	43	74
B21	20-45	5.3	1.4	0.06	122	3.0	<i>n.d.</i>	48	73
B22	45-80	5.5	1.0	0.03	116	3.5	<i>n.d.</i>	48	63

Analytical methods were those of Blakemore et al. (1987), Laffan et al. (1996) and Rayment and Higginson (1992), except that total C was analysed by the Walkley/Black digestion method.

References

- Blakemore, L. C.; Searle, P. L. and Daly, B. K. 1987. Methods of chemical analysis of soils. *New Zealand Soil Bureau Scientific Report 80*.
- Grant, J., Laffan, M. and Hill, R. 1995. Soils of Tasmanian State Forests. 2. Forester Sheet. *Soils Bulletin 2*. Forestry Tasmania, Hobart. 246 p.
- Laffan, M. D. and Hill, R. 1996. A method for assessing the erodibility of Tasmanian forest soils. *Australian Journal of Soil and Water Conservation* 9: 16 – 22.
- Rayment, G. E. and Higginson, F. R. 1992. Australian Laboratory Handbook of Soil and Water Chemical Methods. Incarta Press, Melbourne. 330p.

Acknowledgements

To Forestry Tasmania and the Forest Practices Board, for funding soil analyses.

Citation

Laffan, M.D. and McIntosh, P.D. 2002. Wurrawa soil. *Tasmanian forest soil fact sheet no. 19*. Forest Practices Board, Hobart and Forestry Tasmania, Hobart. 4 p.

1 May 2002
