

Bluestone soil – uniform soil in red-weathered dolerite colluvium at mid-altitude

Site description

Occurrence: In eastern and northern Tasmania at mid-altitude (300-600 m) sites

Parent Material: Colluvium derived from Jurassic dolerite

Landform: Rolling and hilly slopes

Drainage Class: Well drained

Vegetation: *Eucalyptus delegatensis*, *Bedfordia salicina* and bracken

Distinguishing Soil Properties

Profile Features:

- Uniform profile
- Loamy and silty clay loam textures
- Red-weathered dolerite in subsoil
- Strong peds throughout profile

Chemical and physical features

- High total C, high total N and high total P in topsoil (0-30 cm)
- Moderate to high nutrients in subsoil
- High to very high SO₄-S in subsoil
- High ability to retain added P (high P retention in all horizons)
- Permeability – high

Similar soils

- Soil 15.4, Forest Soils of Tasmania and Excalibur soil (Laffan et al. 1995) have clayey textures
- Wielangta soil (Forest soil fact sheet no. 5) - in red-weathered dolerite under wet forest at lower altitude
- Bream soil (Forest soil fact sheet no. 6) - in red-weathered dolerite under dry forest at lower altitude



Soil Degradation Potential

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

Site Productivity

Moderate productivity, limited by altitude and exposure rather than soil factors.

Soil Management

These soils are stable and resilient to disturbance. Normal Forest Practices Code provisions will generally ensure good soil and water conservation outcomes.

Native Forest Logging and Regeneration

LOGGING AND CLEARING:

Soils with surface stones are suitable for wet-weather logging provided soils are not saturated.

PREPARATION FOR REGENERATION:

Normal burning procedures should have little long-term effect on these nutrient-rich soils.

SILVICULTURAL CONSIDERATIONS:

Good regeneration and growth should be achieved on these soils.

Suitability for Plantations

Moderately to highly suitable for plantations where soils are not excessively stony. Exposure and temperature are limiting at higher altitudes.

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

CULTIVATION: The soils are friable and have strong structure in topsoils and subsoils, so deep ripping is unnecessary.

FERTILISER TREATMENT: Fertilising planted seedlings is required. Secondary fertilisation is probably unnecessary.

Profile

Authors: M. D. Laffan, P.D. McIntosh and A. Iliopoulos

Date: 10 January 2001

Location: Bluestone Tier in Buckland military zone

Map reference: Sheet 5629 (Triabunna) 56590 529790

Landform: Shoulder of major ridge

Vegetation: *Eucalyptus delegatensis*, *Bedfordia salicina* and bracken; minor *Gahnia*.

Parent material: Strongly weathered colluvium derived from Jurassic dolerite

Drainage: Well drained

Slope: 12°

Aspect: Southeast

Altitude: 570 m

Photographs: PDM 1(1)-01-12 (site); 1(1)-01-11 (profile)

Australian Soil Classification: **Haplic Mesotrophic Red Ferrosol**

A1	0-11 cm	Reddish black (2.5YR2.5/1) (moist) gravelly silty clay loam; 55% subangular dolerite gravels 2-200 mm diameter; loose strength; strong 1-4 mm crumb structure; many fine and medium roots; NaF 1/5.
AB	11-27 cm	Dark reddish brown (5YR2.5/2) (moist) gravelly silty clay loam; 20% yellowish red (5YR4/6) inclusions 50 mm diameter; 45% subangular gravels 2-100 mm diameter; weak strength; strong 3-8 mm granular structure; many fine and medium roots; NaF 2/5.
B21	27-42 cm	Yellowish red (5YR4/6) (moist) gravelly silty clay loam; weak strength; 55% subrounded gravels 2-100 mm diameter; strong 1-2 mm crumb structure; many fine and medium roots; NaF 3/5.
B22	42-63 cm	Yellowish red (5YR5/8) (moist) gravelly loam; 60% subrounded gravels 2-100 mm diameter; weak strength; strong 1 mm crumb structure; common fine and medium roots; NaF 3/5.
B23	63-100 cm	Yellowish red (5YR4/6) (moist) gravelly loam; 30% angular gravels 20-500 mm diameter; firm strength; strong 1 mm crumb structure; common fine and medium roots; NaF 3/5.

Laboratory Analyses

Horizon	Depth (cm)	pH (H ₂ O)	Total C (%)	Total N (%)	C/N	Colwell P (mg/kg)	Total P (mg/kg)	P retn. (%)	SO ₄ -S (mg/kg)	Water-stable aggreg. (%)
	0-30	6.0	7.46	0.32	23	7	362	88	11	<i>n.d.</i>
A1	0-11	5.7	14.2	0.59	24	9	494	83	11	21
AB	11-27	6.1	5.25	0.22	24	3	300	89	19	68
B21	27-42	5.9	2.04	0.10	21	<i>n.d.</i>	290	90	106	61
B22	42-63	5.8	1.11	0.05	22	<i>n.d.</i>	331	86	143	49
B23	63-100	5.8	1.01	0.05	22	<i>n.d.</i>	318	88	209	44

Horizon	Depth (cm)	Exch. Ca (cmol(+)/kg)	Exch. Mg (cmol(+)/kg)	Exch. K (cmol(+)/kg)	Exch. Na (cmol(+)/kg)	CEC (cmol(+)/kg)	BS (%)
	0-30	12.00	3.13	0.39	0.29	29.3	54
A1	0-11	19.06	4.82	0.82	0.42	45.1	56
AB	11-27	7.43	2.32	0.32	0.33	23.9	44
B21	27-42	2.29	1.33	0.20	0.27	14.2	29
B22	42-63	1.74	1.35	0.18	0.47	14.8	25
B23	63-100	1.32	1.00	0.17	0.32	12.5	22

Analytical methods were those of Blakemore et al. (1987), Laffan et al. (1996) and Rayment and Higginson (1992), with variation of methods for C, N and SO₄-S (details available from P. D. McIntosh, Forest Practices Board).

* Citrate-dithionite Fe = 6.3-6.9% in B2 horizon.

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*.
- Laffan, M.D.; Grant, J. and Hill, R. 1995. Soils of Tasmanian State Forests 1. Pipers Sheet. *Soil Bulletin 1*. Forestry Tasmania, Hobart. 271 p.
- Laffan, M. D.; Grant, J 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 Gunns Ltd, for funding soil analyses.

Citation

Laffan, M.D.; McIntosh, P.D.; Iliopoulos, A. and Wong. L. 2002. Bluestone soil. *Tasmanian forest soil fact sheet no. 13*. Forest Practices Board, Hobart, Gunns Ltd, Launceston and Forestry Tasmania, Hobart. 4 p.

3 January 2002
