

Clearhill soil – gradational brown clayey soil in Cambrian siltstone under wet forest

Site description

Occurrence: At medium altitude (300-550 m) in the southwest forests near Lake Gordon

Parent Material: Cambrian greywacke and siltstone

Landform: Hilly and steep slopes

Drainage Class: Well drained

Vegetation: Wet eucalypt forest with *Eucalyptus obliqua* and *E. regnans*, and some rainforest species e.g. *Nothofagus cunninghamii* and *Atherosperma moschatum*



Distinguishing Soil Properties

Profile Features:

- Gradational profile with silty loam to silty clay loam textures throughout
- Strong structure in A1 and upper B horizon
- Lower B horizon is massive or has weak structure (in-situ weathered rock)

Chemical and physical features

- Low total C, medium total N and high total P in topsoil (0-30 cm)
- Low to medium SO₄-S throughout profile
- Medium to high ability to retain added P (medium P retention)
- High aggregate stability
- Permeability – high



Similar soils

- Soil 6.2, Forest Soils of Tasmania (Farnham soil) – similar profile (Dermosol) but on lower altitude undulating to rolling land in the northwest
- Soil 7.1, Forest Soils of Tasmania (Minnow soil) – red-weathered (Ferrosol) in keratophyres (volcanic rocks) of the northwest

Soil Degradation Potential

FACTOR	RATING OF DEGRADATION POTENTIAL
Erodibility:	Low
Compaction and puddling:	Moderate
Mixing:	Moderate
Nutrient depletion:	Low (N and P)
Landslides:	Slight
Flooding:	Negligible

Site Productivity

High productivity, becoming moderate at higher altitude and on exposed sites. Limited in the longer term by moderate nutrient reserves.

Soil Management

These soils are generally stable and normal Forest Practices Code provisions will generally ensure good soil and water conservation outcomes. As general fertility is moderate, care must be taken to avoid loss of topsoils

Native Forest Logging and Regeneration

LOGGING AND CLEARING:

Soils with few stones are unsuitable for wet-weather conventional logging

PREPARATION FOR REGENERATION:

Burning is required for good germination. Repeated very hot burns should be avoided because of low N status. Success of regeneration depends on moisture conditions.

SILVICULTURAL CONSIDERATIONS:

Moderate nutrient status (low for N) may limit long-term productivity and require relatively long rotations.

Suitability for Plantations

Moderately suitable for plantations on slopes $<19^\circ$ at lower altitudes; limitations are moderate nutrient levels, particularly N, temperature and exposure.

CLEARING: Care must be taken to retain the surface soils.

CULTIVATION: Ripping is unlikely to be beneficial as soils have strong structure to 50 cm depth.

FERTILISER: N and P fertiliser is required at planting. Supplementary N may be required at a later date.

Profile

Authors: P.D. McIntosh and B. Plumpton

Date: 2 February 2001

Location: Coupe WE3D, east side of road, south of old landing

Map reference: Sheet 4426 (Adamsfield) 445530 5262810

Landform: Midslope of hillside 200 m long

Vegetation: *Eucalyptus regnans*, *E. obliqua*, *Nothofagus cunninghamii*, *Atherosperma moschatum* and *Phebalium squameum*

Parent material: Cambrian greywacke and siltstone

Drainage: Well drained

Slope: 10°

Aspect: South

Altitude: 450 m

Photographs: PDM 2-01-5 (site); 2-01-6 (profile)

Australian Soil Classification: **Acidic Eutrophic Brown Dermosol**

A1	0-9 cm	Very dark greyish brown (10YR3/2) (moist) silty loam; boulders on surface; loose strength; strong 1 mm crumb and 3 mm granular structure; abundant fine roots; NaF 0/5.
B1	9-26 cm	Dark greyish brown (10YR4/2) (moist) silty clay loam; weak strength; 10% rounded quartzite stones 10-20 cm diameter; strong 8 mm blocky structure; many fine and medium roots; NaF 1/5.
B21	26-47 cm	Brown (10YR4/3) (moist) silty clay loam; 10% rounded quartzite stones 10-20 cm diameter; firm strength; strong 8-20 mm blocky structure; many fine and medium roots; NaF 1/5.
B22	47-85 cm	Yellowish brown (10YR5/6) (moist) silty clay loam; 20% rounded quartzite stones 5-30 cm diameter; firm strength; weak 20-100 mm blocky structure; many fine and medium roots; NaF 1/5.
B3	85-130 cm	Brownish yellow (10YR6/6) (moist) silty clay loam; 5% angular quartzite stones; 30% strongly weathered siltstone; firm strength; weak blocky structure 20-100 mm diameter; common medium roots; NaF 1/5.

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. (%)
A1	0-9	4.5	1.90	0.10	19	28	512	48	14	82
B1	9-26	5.2	1.91	0.10	20	3	406	55	16	77
B21	26-47	5.1	2.41	0.11	23	n.d.	299	70	12	73
B22	47-85	5.0	1.80	0.07	27	n.d.	264	73	41	74
B3	85-130	5.1	1.44	0.05	29	n.d.	293	66	50	n.d.

Horizon	Depth (cm)	Exch. Ca (cmol(+)/kg)	Exch. Mg (cmol(+)/kg)	Exch. K (cmol(+)/kg)	Exch. Na (cmol(+)/kg)	CEC (cmol(+)/kg)	BS (%)
A1	0-9	1.46	1.60	0.85	0.40	26.5	16
B1	9-26	0.20	0.49	0.16	0.27	13.8	8
B21	26-47	0.09	0.88	0.13	0.26	19.1	7
B22	47-85	0.04	0.46	0.09	0.19	18.6	4
B3	85-130	0.07	0.41	0.09	0.21	14.2	6

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).

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. 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.

Acknowledgement

To Forestry Tasmania for funding soil analyses.

Citation

McIntosh, P.D.; Laffan, M.D. and Plumpton, B. 2002. Clearhill soil. *Tasmanian forest soil fact sheet no. 9*. Forest Practices Board, Hobart and Forestry Tasmania, Hobart. 4 p.

3 January 2002
