Gordon soil – uniform very gravelly sandy soil in colluvium of Cambrian chert under wet forest

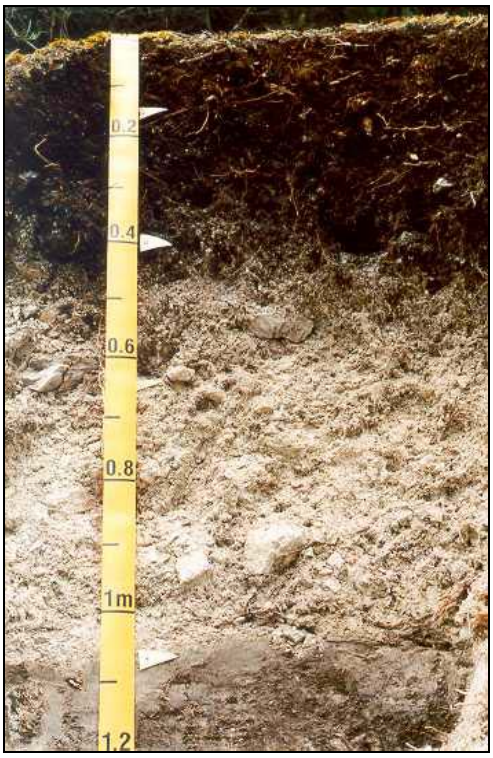
Site description

Occurrence: At medium altitude (300-550 m) in the southwest forests near Lake Gordon
Parent Material: Cambrian chert
Landform: Hilly and steep slopes
Drainage Class: Well drained
Vegetation: Wet eucalypt forest with *Eucalyptus obliqua*, *E. nitida*, *Monotoca glauca* and *Cenarrhenes nitida*

Distinguishing Soil Properties

Profile Features:

- Uniform profile
- A/C profiles - no brown B horizon
- Peaty surface horizon



Chemical and physical features

- Very high total C, high total N and low to medium total P in topsoil (0-30 cm)
- Very low nutrients in subsoil
- Low SO_4-S throughout profile
- Very low ability to retain added P (very low P retention)
- Very gravelly structureless subsoils
- Permeability – high

Similar soils

- No similar soils have been described

Soil Degradation Potential

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

Site Productivity

Moderate productivity, becoming limited at higher altitude and on exposed sites. Soil nutrient reserves are very low. Productivity probably depends in part on nutrients in rainfall.

Soil Management

These soils are generally stable and normal Forest Practices Code provisions will generally ensure good soil and water conservation outcomes. As most of the nutrients are held in the O and A1 horizons special care must be taken to keep these horizons intact.

Native Forest Logging and Regeneration

LOGGING AND CLEARING:
Soils are very stony and suitable for wet-weather conventional logging; many slopes are more suitable for cable logging
PREPARATION FOR REGENERATION:
Burning is required for good germination, but very hot burns could lead to loss of nutrients since these are mostly held in the organic-rich surface layers.
SILVICULTURAL CONSIDERATIONS:
After disturbance and fire nutrients may become more limiting than 0-30 cm soil analysis indicate. Relatively long rotations may be required.

Suitability for Plantations

Unsuitable for plantations because of very low nutrients in subsoils and inability of peaty topsoils to supply nutrients over a long period.

Profile

Authors: P.D. McIntosh, M. D. Laffan and B. Plumpton
Date: 9 January 2001
Location: Coupe WE34E, east side of Strathgordon Island Road
Map reference: Sheet 4226 (Strathgordon) 439600 5261130
Landform: Midslope of hillside 200 m long
Vegetation: *Eucalyptus obliqua*, *E. nitida*, *Monotoca glauca* and *Cenarrhenes nitida*
Parent material: Colluvium of Cambrian chert over silty clay
Drainage: Well drained
Slope: 25°
Aspect: West
Altitude: 360 m
Photographs: PDM 1(2)-01-22 (site); 1(2)-01-18 (profile)
Australian Soil Classification: **Regolithic Leptic Tenosol**

Oh	0-15 cm	Black (7.5YR2.5/1) (moist) peat; very weak strength; abundant medium roots; many charcoal fragments; NaF 0/5.
A1	15-39 cm	Black (10YR2/1) peaty loamy sand; very weak strength; 40% angular chert gravels 2-5 cm diameter; strong 2-5 mm crumb structure; abundant fine roots; NaF 0/5.
C11	39-62 cm	Light grey (2.5Y7/1) (moist) very gravelly sand; 80% angular chert gravels 2-10 cm diameter; loose; single grain; many fine roots; NaF 0/5.
C12	62-107 cm	White (2.5Y8/1) (moist) very gravelly sand; 80% angular chert gravels 2-10 cm diameter; weak strength; single grain; few fine and medium roots; NaF 0/5.
Ab	107-122+cm	Very dark greyish brown (10YR3/2) (moist) silty clay loam; 30% inclusions of light grey (10YR7/2), 1-2 cm diameter; firm strength; massive; many fine roots; NaF 0/5.

Laboratory Analyses

Horizon	Depth (cm)	pH (H_2O)	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	*3.8*	*17.7*	*0.59*	*30*	*10*	*101*	*0*	*2.3*	*n.d.*
Oh	0-15	3.7	n.d.	n.d.	n.d.	n.d.	n.d.	n.d	n.d.	n.d.
A1	15-39	3.7	21.9	0.71	31	11	113	0	2.5	12
C11	39-62	4.4	1.02	0.03	35	n.d.	49	0	0.3	21
C12	62-107	4.5	0.33	0.01	44	n.d.	43	0	0.2	19
Ab	107-122	3.7	2.23	0.11	21	6	132	15	2.4	71

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	*0.87*	*6.38*	*0.64*	*1.56*	*64.6*	*15*
Oh	0-15	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
A1	15-39	1.23	7.62	0.36	1.36	73.4	14
C11	39-62	0.09	0.41	0.05	0.10	2.5	26
C12	62-107	0.05	0.13	0.01	0.06	0.7	35
Ab	107-122	0.34	1.40	0.40	0.33	15.9	16

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 SO_4-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. Gordon soil. *Tasmanian forest soil fact sheet no. 10.* Forest Practices Board, Hobart and Forestry Tasmania, Hobart. 4 p.

3 January 2002