

GUIDELINES FOR FORESTRY OPERATIONS ON SOILS FORMED IN DOLERITE SLOPE DEPOSITS (DOLERITE TALUS)

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Dolerite talus deposits such as these in the Mersey Valley are weathered bouldery scree deposits formed under periglacial conditions (cold dry climates associated with glaciations) but in places may include deposits directly emplaced by ice such as moraines.

Soils developed on dolerite talus have management requirements that are (1) related to the *inherent* properties of the soils; and (2) related to features *associated* with them.

(1) Guidelines related to soil properties.

In the Forest Soils of Tasmania¹ book five soils developed in dolerite are described. These are the numbered soils in the table below. Two other soils, Wielangta and Bream, have been described in Forest soil fact sheets nos. 5 and 6, available in the “Soil and Water” section of the Forest Practices Board web site². These soils differ in their erodibility ratings because of the presence or absence of texture-contrast features, different drainage, and different clay mineralogy. This difference in soil erodibility means that the soils require different management techniques.

¹ Grant, J.; Laffan, M.; Hill, R.; Neilsen, W. 1995. Forest Soils of Tasmania. Forestry Tasmania, Hobart.

² www.fpb.tas.gov.au

Soil number/ name	Description	Erodibility	Other limitations	Management Guidelines
15.1 Eastfield	Loamy over mottled clayey soils under dry forest	Moderate – Moderate to high	Low load-bearing strength when wet	- Dry weather logging only
15.2 Holloway	Red clayey soils under dry forest	Moderate	Thin topsoils	- Minimise topsoil disturbance
15.3 Murdunna	Yellowish brown mottled clayey soils under wet forest	Moderate	-	- Wet weather logging OK except when soil is saturated
15.4 Excalibur	Red to brown clayey soils under wet forest	Low	-	- Wet weather logging OK except when soil is saturated
15.5 Interlaken	Red to brown clayey soils under mid- to high-altitude forest	Low - moderate	Thin topsoils	- Minimise topsoil disturbance - Wet weather logging OK except when soil is saturated
Wielangta	Red clayey soil under wet forest	Low	-	- Wet weather logging only on stony soils
Bream	Clayey soil in red-weathered dolerite under dry forest	Moderate	Thin topsoils, low nutrients	- Wet weather logging only on stony soils

Note: If the soil in question does not fit one of the above soils, consult with a soil scientist or the FPB.

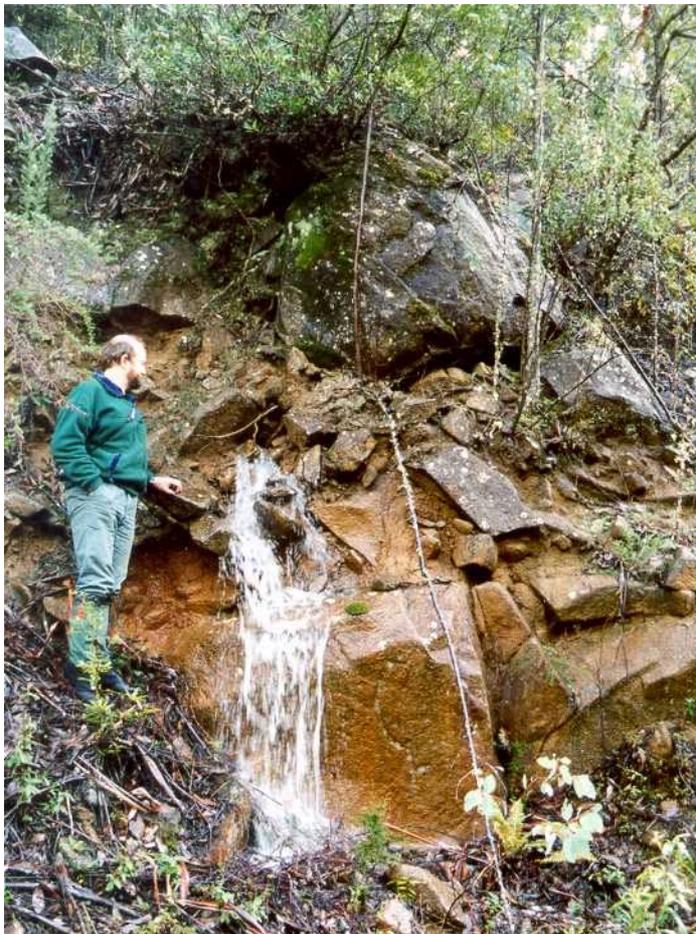


Brown weathered dolerite talus (probably deposited 15-60 thousand years ago) overlying older red-weathered dolerite talus (probably deposited over 120 thousand years ago) in the Plenty Valley. The top of the spade handle marks the boundary of the two deposits.

(2) Guidelines related to features associated with dolerite talus

SITE FEATURE	ENVIRONMENTAL RISK	MANAGEMENT GUIDELINE
Subsurface drainage	Excessive flow of water in table drains, where road batters cut through subsurface conduits	<ul style="list-style-type: none"> - Check water flow in streams, road batters and drains during winter rainfall - Treat larger subsurface conduits as Class 4 streams, i.e. one culvert per stream - Avoid collecting more than 3 small subsurface streams into one culvert - Avoid creating “new” streams - Where Class 4 streams flow partly underground and partly on the surface, and the flowing sections appear to be connected, connect the flow on the FPP map and treat as a Class 4 stream
Shallow soils on impermeable “slab” dolerite	Sheet erosion	<ul style="list-style-type: none"> - Cultivate along the contour - Consider no cultivation if extensive areas have soils <50 cm thick - Upgrade drainage lines crossing shallow soils to Class 4 stream status - No machinery or cultivation within 10 m of Class 4 stream (including upgraded drainage lines) - Attempt to prevent burning next to Class 4 streams
Underlying impermeable Permian and Triassic rocks	Landslides	<ul style="list-style-type: none"> - Consult FPB where deposits are on slopes >19° - Keep machinery out of wet areas - Take care with culvert placement to avoid concentrating water in or above potential landslide area
Underlying unconsolidated glacial tills and Quaternary sediments	Landslides, batter collapse	<ul style="list-style-type: none"> - Consult FPB where slope deposits are on slopes >15° - Take care with culvert placement to avoid saturating unconsolidated sediments - Minimise disturbance – avoid deep ripping and cultivation
Seepages and springs flowing directly into streams	Contamination of water in streams and domestic water supplies	<ul style="list-style-type: none"> - Mark seepages or springs on coupe maps - No machinery within 10 m of any seepage - Where the combination of <i>dolerite talus</i> + <i>moderate (or greater) erodibility soils</i> + <i>seepages or springs</i> + <i>domestic water intake</i> (within 2 km, in the same catchment) occurs, assume there will be subsurface conduits liable to be damaged by machinery and ensure that no roads or snig tracks or machinery pass within a 90° arc with radius 30 m upstream from any seepage (see Code page 48)
Old landslides	Reactivation of landslides	<ul style="list-style-type: none"> - Consult FPB - Avoid cutting into toes or headwalls of landslides when roading - Take care with culvert placement to avoid directing water into landslide zone and landslide slip plane - Apply a no-machinery, no-cultivation zone to existing landslides, plus a 10 m no-machinery buffer at landslide margin - Where possible, maintain vegetation cover by removing no more than 50% of standing trees from the landslide area, including the buffer zone at the margin

Aeolian deposits	Erosion - soils are generally highly or very highly erodible	<ul style="list-style-type: none"> - Mark aeolian deposits on coupe maps (they are generally identifiable by their pale colour and sandy or silty soils) - Upgrade drainage lines to Class 4 stream status - Consult with FPB - Inform contractors of location of aeolian deposits - Align windrows and cultivation along the contour - Minimise topsoil disturbance when building windrows - On flat to undulating land (<math><5^{\circ}</math>), align windrows at right angles to prevailing wind - No contour cultivation on slopes $12^{\circ}+$ - If possible, limit burning 10 m either side of Class 4 streams (including upgraded drainage lines), and maintain ground cover - Avoid cultivation in wet weather or when soils are saturated - Avoid building roads or tracks through aeolian deposits
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Subsurface drainage is characteristic of dolerite talus. The streams probably follow flow pathways that have existed since the dolerite talus was a porous scree: the soils have formed around the subsurface streams by weathering of the dolerite deposits over thousands of years. Where subsurface streams are encountered in road cuttings it is important to treat each large stream as a Class 4 stream, and provide it with a culvert. Where small subsurface flows are encountered no more than three small streams should be combined into one culvert.