GUIDELINES FOR CUT ROAD BATTERS IN AREAS OF HIGH ERODIBILITY SOILS

Earth Sciences guidelines provide information for Forest Practices Officers on soil, water and geoscience issues in production forests. These guidelines are advisory and should be read in conjunction with the requirements of the Forest Practices Code.

P.D. McIntosh, Forest Practices Authority, Hobart

Where the deposits are found and how they formed

High erodibility soils normally have a weakly coherent sandy or silty layer 50 cm thick (or greater) below the organic-rich topsoil. Technically the topsoil is called an A1 horizon and the erodible layer below it is called an A2 horizon. The A2 horizon often has a pale grey or white colour. Other highly erodible soils have loose sandy material or erodible weathered rock at depth. These layers are not always light coloured.

In the south deep highly erodible sands and silts are commonly associated with Permian and Triassic sedimentary rocks. Some of the soil material derived from these rocks has since been redistributed by wind in cold dry conditions during the last glaciation and has accumulated as silty wind-blown deposits and dunes (technically called 'aeolian deposits') in the last 60 000 years These aeolian deposits occur inland as well as at coastal sites (e.g. Tyenna, Southwood Road, Wayatinah and the Tasman peninsula). Other highly erodible soils accumulated as sandy hill slope deposits in the same period – examples occur in the Styx, Derwent, Huon, Arve and Florentine valleys.

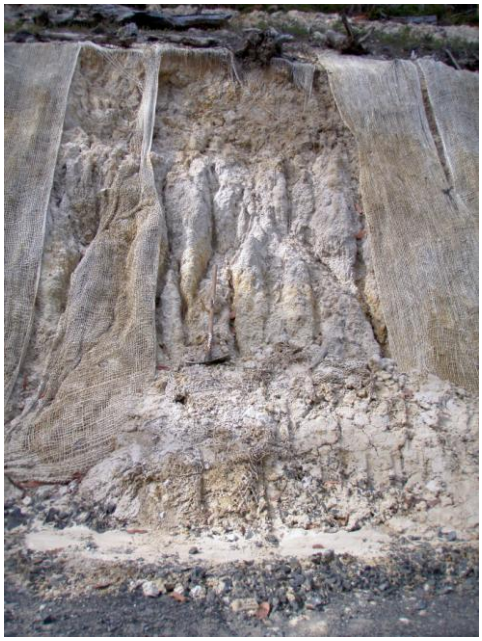
In the northeast deep highly erodible soils can occur in weathered granite, either in dry forest developed on Tertiary outwash (deep white gravels and silty deposits) or under wet forest where otherwise low erodibility soils have "sugary" highly erodible subsoils which can be exposed during road building. The subsoils developed in weathered granite usually have a pale colour and can be easily cut with a spade. Storm flows can erode deep slots in table drains in this material if measures are not taken to protect the erodible subsoil layers.

In the northwest deep silty and fine sandy deposits occur as layers in Tertiary and Quaternary outwash gravels derived from Precambrian sedimentary rocks.

On the west coast extensive areas of high erodibility soils occur in vegetated inactive older coastal sands near Strahan, inland from the active very highly erodible Henty dunes, which are only partly vegetated.

Risks

Where roads cut into these deposits, slumping can cause blocking of table drains and culverts (*see photographs below*). Excessive erosion can result in siltation of streams and contamination of domestic and town water supplies.



Recommended prescriptions

Road clearing width

Keep the road clearing width to the minimum required for safety. Don't remove topsoil from cleared areas either side of the road – the organic A1 horizon provides a protective 'blanket' over the erodible A2 horizon below. Leave light slash and debris on cleared areas to stabilise soils and to encourage vegetation cover (*see photographs below*).

Where road cuts are no higher than 2 m

Keep road cuts approximately vertical. When removing large trees from above the cut batter don't remove the ground cover from the top of the cutting – the organic-rich A1 horizon and the roots it contains acts as a protective blanket for the highly erodible A2 horizon below. Some slumping will occur below the A1 horizon when the highly erodible layers get saturated in winter, but eventually a "steady state" will be reached and no further retreat of the batter should occur. In very wet soils use a log retaining fence (*below, left*). To stop wind erosion of dunes, cut batters can be armoured with low-erodibility soil (*below, right*) or rocks.

Where road cuts are higher than 2 m

A. *If the highly erodible soils in the cutting are less than 2 m thick, and overlie solid rock or stable layers:*

- Follow normal road building procedures for building batters
- If necessary cut a bench at the base of the highly erodible soils or sediments

B. *If the highly erodible soils/sediments are more than 2 m thick*
There is a risk of rotational slumping and/or rilling of the erodible material; this cannot be totally avoided, but effects can be mitigated by benching, so:

- Bench the soils/sediments at 2 m intervals, to the road level or until a stable solid rock or weathered rock layer is reached
- Ensure the benches are at least 1.5 m wide, so that they trap slumping sediment
- On long sloping benches apply a surface layer of rocks to slow water flow and trap sediment (*see below*)

C. *Where runoff carrying a high sediment load cannot_be readily diverted into vegetation, and silty flow into streams is likely, and biological values, karst values and/or domestic or town water quality are likely to be adversely affected*

- Construct benches following the two dot points above, *and* apply one or more of the following additional measures:

– stabilise batters using textiles, by revegetating, or spraying with emulsions.
– line culverts entrances and exits with rocks; rocks at culvert exits should be boulder size to withstand the churning effects of storm flows
– line table drains with rocks
– construct sumps or silt traps at culvert entrances and/or exits

Photo by Dave Tucker.

D. In complex situations not covered by the above guidelines:

- Notify the FPA Soil and Water Specialist

Acknowledgement

Dennis Lewis (FPO and consultant) and Allan Lee (Forestry Tasmania), suggested improvements to these guidelines.

Document Control Log Table

Document summary information

Document name	**GUIDELINES FOR CUT ROAD BATTERS IN AREAS OF HIGH ERODIBILITY SOILS**
Version	1.0
Trim record	2010/100670
Owner	FPA
Author(s)	Peter McIntosh
Release date	1 November 2011
Release Approved by	FPA Board
Release status	Public document; primarily for FPOs

Version control

Version	Date	Author(s)	Summary of changes
1.0	1 November 2011	P.D. McIntosh	Incorporates suggestions by D. Laws (consultant) and A. Lee (FT) and other FT staff.

Stages required for release outside FPA

Category of advice (A1, A2, B1, B2, B3 or C): ***(Refer Appendix 2 overleaf, and to document release protocol in 2009/41809[V2]***		**B2**
Stages	**Required/not required**	**Date Completed**
Specialist	**Required**	**18 July 2011**
Line Manager	**Required**	**18 July 2011**
Peer/stakeholder review	**Required**	**Various dates; completed 18 July 2011**
CFPO	**Required**	**18 July 2011**
FPAC	**Required**	**18 July 2011**
Board	**Required**	**11 August 2011**

TRIM: FPA/09/719; 2010/100670