

Harvest Slash

6.2 Managing Cut-over Slash on High Risk Slopes



A high risk slope is where slope failure may have major adverse consequences as a result of cut-over *slash* being mobilised in the slope failure.

High risk slopes are usually identified on steep terrain that is susceptible to slope failure, soil slip, *stream* bank and gully erosion, or more damaging debris flows. High risk slopes also include slopes that may not be highly risky in themselves but are located above a sensitive site (e.g. a valued *water body* or downstream infrastructure) that, if the slope fails, could be adversely affected.

Risk factors include:

- Extended periods of rainfall.
- High intensity rainfall.
- The type and number of *water bodies*.
- The size of forest clear cut areas.
- Highly erodible/unstable soils.

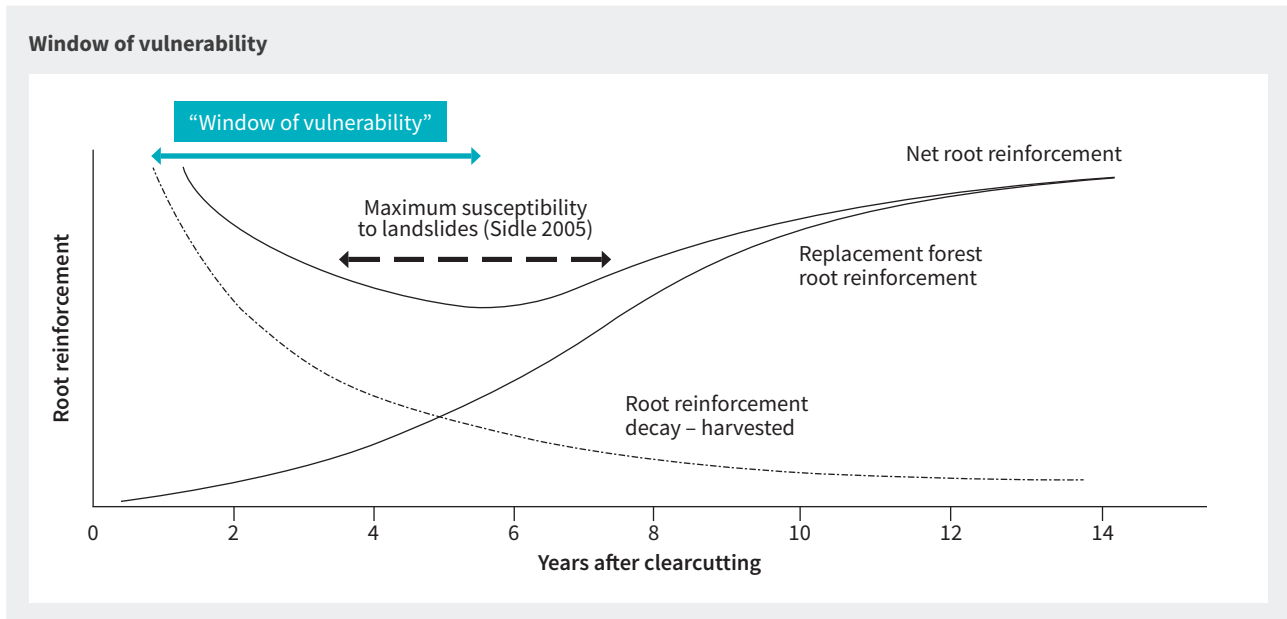


This guide is provided as a reference document and does not constitute a statutory obligation under the Resource Management Act 1991 or the National Environmental Standards for Plantation Forestry.

Please refer to the 'how to use' section of the introduction at <http://docs.nzfoa.org.nz/forest-practice-guides/> for advice on how to use this guide.

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Cut-over *slash* will move in conjunction with slope failure. If a slope failure takes cut-over *slash* with it to a *stream* which then transports the *slash* off site, it may have significant adverse environmental, social and economic effects.

Cut-over *slash* on a steep slope is at risk for a number of years. The ‘window of vulnerability’ is the time between when the logged trees’ roots rot and the new crop’s roots replace them. **The window of vulnerability can be up to five years.**

A key way to reduce risk is to reduce the amount of cut-over *slash* left on the slope, particularly at places where it is evident that the slope is susceptible to slope failure.

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A Where and when to use

1. On slopes with soils susceptible to mid-slope failure in the post-harvest period.
2. On slopes with significant risks that material could be transported off site

B Where not to use

Not applicable to this FPG.

C Design

1. Do a *slash* mobilisation risk assessment and consider the possibilities:
 - If cut-over *slash* did move, where would it end up?
 - a. Are there parts of the slope that present a higher risk?
 - b. What would be the potential damage to downstream land, *rivers* and infrastructure if the slope failed? In the assessment consider:
 - Rainfall intensity and duration.
 - Harvest area size.
 - Topography, geology and soils.
 - Social and community implications of visible *slash* outside the forest.
 - Water supply intakes.
 - Proximity to neighbouring properties, beaches, harbours, *rivers*, recreational areas.
 - Infrastructure such as *culverts*, roads, bridges, and state highways.
 - *Riparian areas* and remaining forested areas.

Note: LidAR maps can help predict where slope failure might occur, based on the pattern of previous erosion events. The Erosion Susceptibility Classification¹ mapping provides a high-level overview of greatest risk and the underlying Land Use Capability maps² and the Extended Legend explain the land use limitations for that terrain.

2. Where possible, plan *landing* and blackline positions to get the most direct pull possible across high risk slopes. This will maximise suspension and minimise cut-over *slash* sweeping into gullies.
3. Select an appropriate harvesting system for the terrain and slope. Consider:
 - a. Partially or fully suspended logs will generate less *slash* during in-hauling.
 - b. Trees dragged across a slope can sweep cut-over *slash* into *rivers* (where it will be difficult or impossible to extract).
4. Consider risk mitigation strategies, such as:
 - a. If it is not possible to remove *slash* from identified high-risk slopes, install *slash* traps at strategic locations downstream. This could be on an adjoining property. Larger traps may need resource consent – seek specialist advice.
 - b. Leave areas of standing forest, if the harvesting of the trees would present an unacceptable risk of cut-over *slash* mobilising and causing significant downstream adverse effects. Retained areas of forest could remain standing or be poisoned if necessary.
 - c. Reducing merchantable products in the cut-over (e.g. smaller dimension logs or shorter stems for bin wood or boiler fuel).
 - d. Staging the harvest over a series of years in large *catchments* with identified high risk landforms.
 - e. Be aware that areas of significant *windthrow* will increase the quantity of cut-over *slash*.
 - f. Techniques that minimise felling breakage.

¹ <https://www.mpi.govt.nz/growing-and-harvesting/forestry/national-environmental-standards-for-plantation-forestry/erosion-susceptibility-classification/>
² <https://soils.landcareresearch.co.nz/soil-data/nzlr-soils/>

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D Operational controls

1. Aim to reduce the amount of cut-over *slash* at the time of harvest in high risk areas. At critical sites, this may include extracting non-merchantable stems (e.g. *windthrow* and smaller dimension stems and heads).

E Maintenance

Post-operation

1. Maintain or rehabilitate roads, tracks, and *landings*. No or poor maintenance may exacerbate the size and frequency of slope failure and resulting debris flows on high risk slopes.
2. Where necessary and appropriate, construct *slash* or *slash* traps in *catchments* where there is risk of debris damaging downstream infrastructure.
3. Consider poisoning trees that cannot be harvested so they break down slowly. Leaving unharvested trees to grow may create an additional risk of slope failure.
4. To reduce *slash* from high risk, steeply incised gullies, consider burning. While burning is not recommended as a wide-spread solution, at some specific sites it may produce the safest and most environmentally effective solution.

National Environmental Standards for Plantation Forestry

Particular relevant provisions for managing *slash* are Regulations 68, 69, 83 – 92.

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Examples

Mid-slope failures.



Windthrow significantly increases the volume of cut-over slash.



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The blue arrow identifies an area with a high likelihood of slope failure. In this case, the amount of cut-over slash was reduced in the high-risk area.

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Other Practice Guides in this series



6.1 Managing Processing Slash
on Landings



**6.2 Managing Cut-over Slash on
High Risk Slopes**



6.3 Managing Slash in and around Rivers



6.4 Slash Traps

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