Large quantities of *slash* are undesirable in *rivers* and may have significant adverse effects on instream ecology, channel stability and infrastructure in and outside the forest boundary. *Slash* must be managed where it could enter a *river*.

Small amounts of *slash* can provide instream benefits (e.g. food and shelter for insects and fish, and by reducing post-harvest fluctuations in *stream* temperature).
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A Where and when to use

1. Try to avoid or minimise slash entering rivers where there is an identified risk of:
   a. Blocking or damming a water body, contributing to bank erosion or a debris flow.
   b. Damaging downstream infrastructure or water bodies.
   c. It being difficult or impossible to manually extract (e.g. from steep sided rivers).

g. Social effects of slash moving off site. How close is it to neighbouring properties – houses, fences, water supply intakes, beaches, recreational areas etc?

h. In-forest and off-site infrastructure (e.g. roads, culverts, bridges, state highways).

i. Riparian areas and remaining forest. These can be operational risks or benefits (e.g. standing/live tree slash traps) depending on the situation.

B Where not to use

Not applicable for this FPG

C Design

1. Assess the terrain, river type, values, and risk associated with inputs of slash.

2. Undertake a water body risk assessment to identify the likelihood and severity of effects if slash did move off site. In the assessment consider:
   a. Likelihood of high intensity rainfall events, and their frequency.
   b. Catchment size – bigger catchments often mean higher energy stormwater flows.
   c. Topography – steep land sheds water more quickly. High energy water flows will mobilise slash.
   d. Receiving environment. For example, does a high energy river deliver into a high-volume river, or one with stop-banks? This increases the risk that slash could be transported long distances.
   e. Water body ecological values. Identify species present and their rarity. Refer to the NES-PF Fish Spawning Indicator1.
   f. Cumulative effects of harvest in the same catchment. Sub-catchments then could all contribute to the main stem of the river in large storm and flood events. This may require greater slash management and additional slash removal requirements.

3. Decide how to manage slash after the risk assessment has been completed. Harvest methods should minimise the amount of slash and length of stream damage where practicable (e.g. bridle to a fixed skyline and pull through strategically located narrow corridors).

4. Risk mitigation strategies. If it is not possible to remove slash from rivers, put debris traps at strategic locations downstream. This could be on an adjoining property. Larger traps may need resource consent – seek engineering or specialist advice. Be prepared to clean these out on a regular basis.

5. Be aware that areas of significant windthrow will increase the quantity of slash that could be in and around streams.

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**Operational controls**

1. Minimise the amount of *slash* that is deposited in the *river* by using directional felling or other measures where possible.

2. Minimise the availability of *slash* by using measures that limit stem breakage during falling and extraction.

3. Minimise damage to *indigenous riparian vegetation areas*. These protect *water bodies*, help reduce erosion and *sedimentation*, and may have important ecological values.

4. Follow a *slash* management plan. Remove as much *slash* as needed to meet the plan’s performance standards.

5. It is often the better to remove *slash* from or adjacent to *water bodies* before a line shift.

6. Ensure that *slash* left adjacent to a *water body* is not in a position where it could be picked up by large flood flows (e.g. a one in 20-year event), where possible.

7. Consider extracting non-merchantable smaller dimension stems and heads above *water bodies* with steep convex slopes (steeper closer to the *water body*).

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National Environmental Standards for Plantation Forestry
Particular relevant provisions for managing *slash* are Regulations 20, 69, 83 – 92.
Examples

Unacceptable slash loading in a small river.

Minimal slash removed from a river therefore posing a risk of blocking or damming the river or damaging downstream infrastructure.
Trees have been left standing, where extraction would have been difficult and added non-retrievable slash into the river. Harvesting trees from either side of the river also minimises damage to the riparian margins.

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