Woody debris in rivers (England and Wales)

Quick guide 138_13 **Issued** 11/03/2013

This document is for staff in Asset Performance,[1] Partnerships and Strategic Overview,[2] NEAS, ncpms and Fisheries and Biodiversity (F&B) who undertake or regulate work near rivers.

Document details

Related documents

Feedback

What's this document about?

This document introduces you to the use of woody debris to reduce flood risk and improve the environment.

A decision-support tool is provided to help you decide when to retain, install or remove woody debris. In this document the term **you** means Flood and Coastal Risk Management (FCRM).

Who does this apply to?

All FCRM staff who undertake or regulate work near rivers, NEAS, ncpms and F&B.

Woody debris in rivers

What is woody debris?

Branches, large limbs, root boles, entire trees, smaller branches, twigs and leaf litter which have fallen into rivers.

This guide covers both naturally occurring woody debris and that which is deliberately placed into river channels to restore habitat diversity. It is focussed on trees and does not cover the removal of small branches (this is covered in the maintenance standards).

What this guide will do

This guide helps you to implement our woody debris position statement which says we will:

- retain woody debris when undertaking river management (if flood risk not increased); and
- promote its use in river restoration projects as a fast and cheap means of restoring habitat.

Contacts for queries

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[1] In Wales Asset Performance teams are called Asset Systems Management and Operations Delivery.
[2] In Wales Partnership and Strategic Overview teams are called Development and Flood Risk.

Biodiversity

Woody debris is beneficial to rivers because it helps to vary the flow and shape of the channel, creating habitat for many species of plants, invertebrates and fish. Working with natural processes we can use woody debris to help restore the physical habitat within watercourses (see supplementary case studies).

Climate change

Woody debris also improves the resilience of river ecosystems to the impacts of climate change. Reducing water level fluctuation and temperature through shading, creating backwaters and pools that provide refuge for fish and invertebrates during drought.

Flood risk

Woody debris can increase flood risk in critical locations, causing blockages beneath bridges or culverts. However, it can also be used to restore floodplain connectivity, helping encourage upstream flood storage.

!Important The maintenance standards are FCRM's guide to river maintenance, they now include retaining or removing woody debris as an environmental option.

Water Framework Directive

Woody debris can help achieve the environmental improvements included in your River Basin Management Plan and can be used to restore rivers to good ecological status or potential.

Decision support tool

Take a risk-based approach

When considering whether to install, retain or remove woody debris we must take a risk-based approach, with a greater level of consideration needed in higher flood risk locations. This decision support tool helps you decide where to:

- **Install woody debris**
- **Retain woody debris**
- **Remove woody debris**

Click on the links above to go to relevant sections in document.

Installing woody debris

Catchment planning

ideally installing woody debris should be planned at a catchment scale by identifying:

- which water bodies could benefit most from woody debris to achieve Water Framework Directive objectives;
- the most appropriate locations for woody debris avoiding areas of high flood risk or where woody debris could cause blockage;
- which landowners own the land where woody debris is needed; and
- what partnerships we need to develop to ensure woody debris is retained and managed effectively.

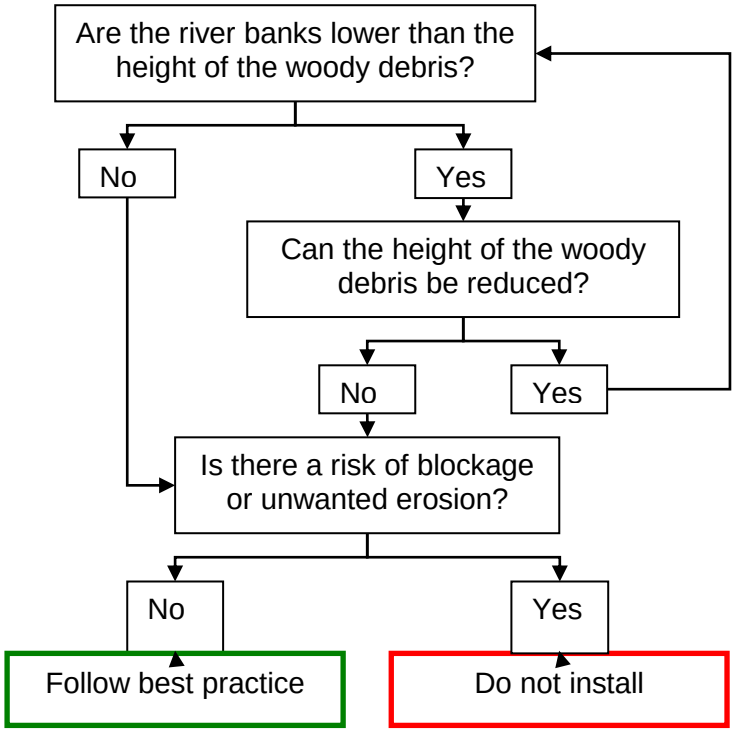
Installing woody debris

When installing woody debris you need to establish if proposed works will increase **flood risk**. Determine which flood risk management system (FRMS) your site falls in and click on the follow link:

- Low or Medium FRMS
- High FRMS

Low or Medium FRMS

Right click on coloured cells to go to relevant section of this document.



High FRMS

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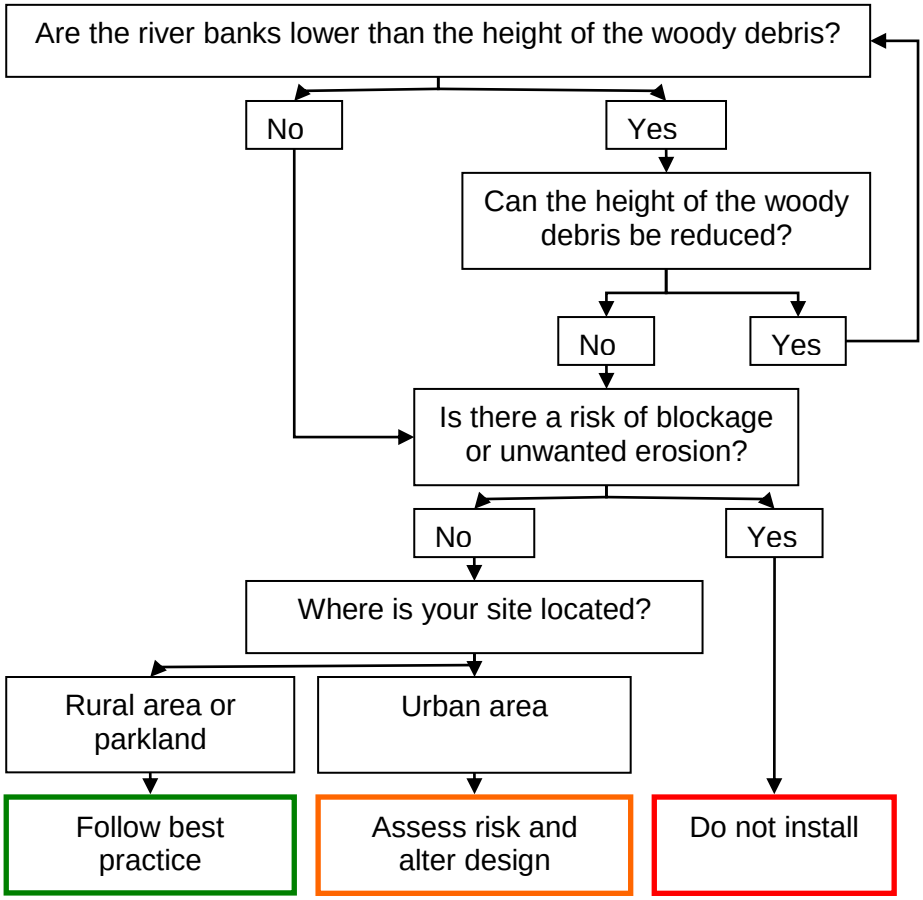


Follow best practice

Woody debris should be placed in a river following one of four methods:

- **No anchors** – wood is supplied to the stream and is allowed to move (not appropriate in urban locations or near structures which could block);
- **Passive anchors** – weight and shape of the structure acts as anchor;
- **Flexible anchors** – tethering the structure, movement is controlled; and
- **Rigid anchors** – permanently holding woody debris in place, no movement allowed.

There are a variety of anchoring methods available:

- **Ballast** – weighing the woody debris down with gravel/rocks;
- **Piling using wooden poles** – drive wooden poles in to the bed/bank, secure woody debris in place using pins/cables;
- **Cabling** – securing woody debris to other objects using;
- **Pinning** – using steel pins to connect woody debris to other anchors;
- **Deadman anchors** – bury the anchor in stream bed or bank;
- **Anchoring to bedrock and boulders** – hold woody debris down by chaining or anchoring to bedrock; and
- **Combination of methods** – variety of methods used to suit local conditions.

!Important See supplementary case studies for examples of projects.

Assess risk and alter design

Assess risk

Speak to your Partnerships and Strategic Overview team to see if a flood risk assessment (FRA[3]) is needed. The FRA should be proportionate to the scale and risks associated with the work.

The Conveyance guide provides further guidance on assessment techniques. The Conveyance Estimation System (CES) is a simple model developed to show upstream / downstream impacts of introducing woody debris.

Alter design

The impacts of woody debris on water levels can be reduced by making simple changes to its proposed layout such as:

- **realigning it** so that it is pointing in a downstream direction;
- **realigning it** so that it is closer to river banks;
- **repositioning it** away from culverts and bridges;
- **repositioning it** away from main flow routes in the channel; and
- **reducing its volume** so it takes up less of the channel cross-section.

Retaining woody debris

Retaining woody debris

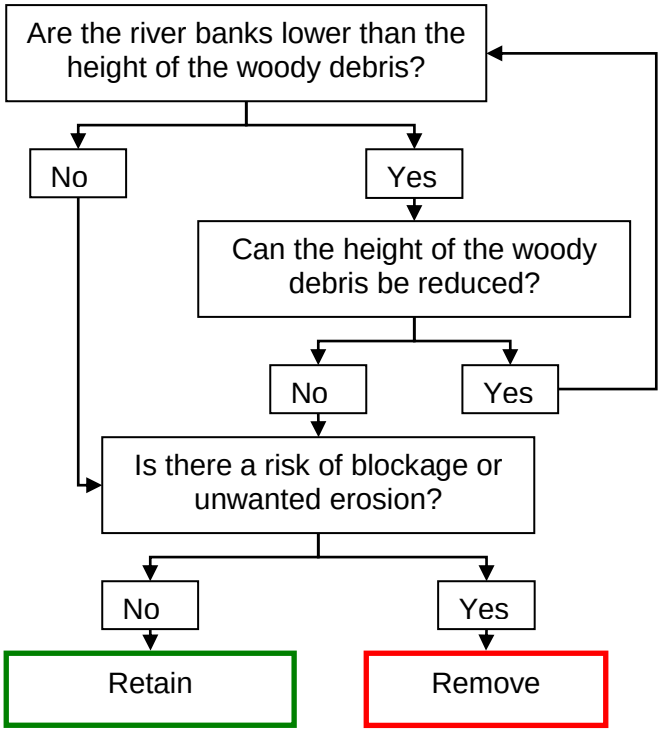
When deciding to retain woody debris you need to establish if it will increase **flood risk** to people and property. Determine which flood risk management system (FRMS) your site falls in and click on the follow link:

- Low or Medium FRMS
- High FRMS

[3] In Wales FRAs are called Flood Consequence Assessments.

Low or Medium FRMS

Right click on coloured cells to go to relevant section of this document.



High FRMS

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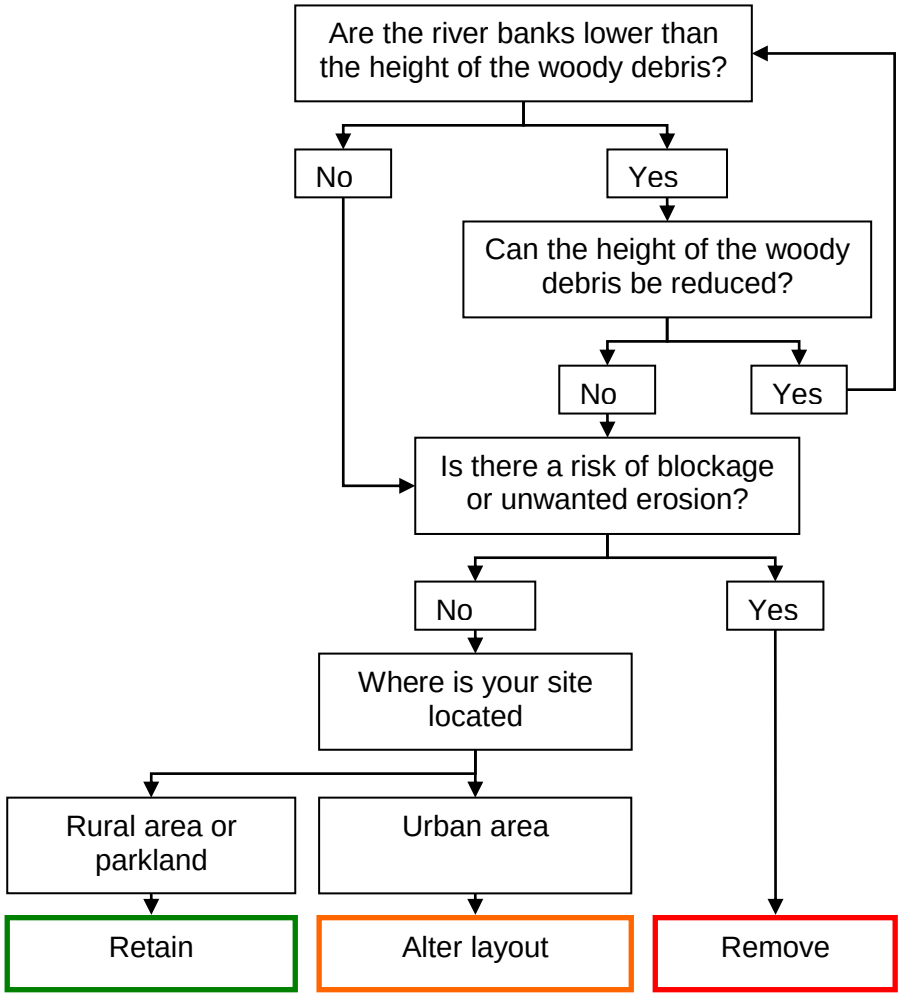

Retain woody debris

When retaining woody debris establish if it is mobile and could become dislodged, where needed follow best practice guidance to anchor the structure.

Alter layout

The impacts of woody debris on water levels can be reduced by making simple changes to its existing layout such as:

- **realigning it** so that it is pointing in a downstream direction;
- **realigning it** so that it is closer to river banks;
- **repositioning it** away from culverts and bridges;
- **repositioning it** away from main flow routes in a channel; and
- **reducing its volume** - so it takes up less of the channel cross-section.

Where needed follow best practice guidance to anchor the structure. See supplementary case studies for examples of recent projects.

Removing woody debris

Removing woody debris

Woody debris may need to be removed as part of your planned annual maintenance regime or in response to an emergency.

Planned maintenance

You should only remove woody debris as part of your planned maintenance works if it is causing a blockage, increasing flood risk or causing unwanted erosion. Wholesale removal of woody debris may not be needed, its impacts may be reduced by:

- **realigning it** so that it is pointing in a downstream direction;
- **realigning it** so that it is closer to river banks;
- **repositioning it** away from culverts and bridges;
- **repositioning it** away from main flow routes in a channel; and
- **reducing its volume** so it takes up less of the channel cross-section.

Where needed follow best practice guidance to anchor the structure.

If woody debris is removed it should be:

- **re-used** in a different part of the catchment;
- **retained** for use elsewhere; or
- **disposed of** .

!Important Your annual maintenance regime needs to be screened to make sure it is acceptable from a Water Framework Directive perspective see: 301_09_SD05 Delivering consistent maintenance standards for sustainable asset management

Emergency works

Emergency works are defined as '*works that need an immediate operational response.'* If you are responding to an incident (though NIRS or you FIDO) only remove the woody debris if it is causing an immediate flood risk.

Take a picture of the woody debris being removed. Once an emergency has subsided, you will need to liaise with F&B to agree if the loss of habitat needs to be mitigated for.

!Important Reactive blockage removal does not count as emergency works.

Mitigation	When woody debris is removed it leads to a loss of fish and invertebrate habitat. Ideally the removed woody debris should be reinstalled as close as possible to the site from which it was removed.

Getting permission

Future maintenance	An FCRM asset is defined as '*an asset that has a direct impact on the likelihood of flooding*.' When we undertake maintenance works we do not solely maintain the types of assets defined above, but our corporate targets only measure our performance against the maintenance of these assets. Using this definition of an asset, woody debris can only be classed as an asset if it is being used to reduce the risk of flooding (for example, diverting water into a storage area). If we are not using woody debris to reduce flood risk, then it should not be classed as an asset. We decide on a case by case basis if maintenance of woody debris needs including in our routine maintenance programme. This decision should be based on the level of flood risk at and downstream of the site. Asset Performance and F&B could agree with a land owner and/or an environmental NGO to undertake any maintenance works on our behalf by agreeing a long-term management plan.
Do I need flood defence consent	Installing woody debris structures in the bed or on the banks of a river requires flood defence consent. Proposals should be discussed with area Partnerships and Strategic Overview teams. Provide details of the proposed method of securing the woody debris, and clarify responsibilities for inspection and maintenance. An FRA may be required.
Waste management	Under the waste regulations woody debris is classed as 'virgin timber' and is not subject to waste regulatory controls.

Related documents

Links

- 43_12 Woody debris in rivers
- 169_12 Flood and Coastal Risk Management – maintenance programming to improve the water environment
- 301_09_SD05 Delivering consistent maintenance standards for sustainable asset management
- 140_13 Trees near rivers (England and Wales)
- 139_13 Woody debris in rivers (England and Wales) – supplementary case studies
- Conveyance guide
- Conveyance Estimation System
- Forestry Commission and Environment Agency. 2011. Woodland for water: woodland measures for meeting Water Framework Directive objectives
- Managing woody debris in rivers, streams and floodplains
- River channel maintenance: a guide to how we manage conveyance