Improving the River Blackwater

Woody debris

Improving the River Blackwater – Woody debris

Trees regularly fall into the river, it is a natural part of life in a healthy river. Fallen trees can make a huge contribution to varied habitats and hence the diversity of life in the river.

As part of a project to improve the quality of the River Blackwater fallen trees will be assessed and wherever possible, if they pose no risk of flooding or unwanted erosion, they will be retained and monitored rather than removed.

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1 Introduction

In the past when a tree fell in the river the first response was to remove it as quickly as possible. However, it is now recognised that woody debris makes a great contribution to the diversity of water flows, habitats and wildlife in a river.

The River Blackwater runs through an urban, managed and heavily used landscape, as a result a substantial part of the existing channel has been modified or moved over the years. For much of it's length, the river cannot be left to 'nature's course' and any changes, such as leaving fallen trees in the channel, require management and the assessment of any risks that might arise. However, the river in general and the modified sections in particular could benefit greatly from the introduction of woody debris into the channel.

Woody debris is so valuable to the life of the river that the Blackwater Valley Countryside team have been working closely with the Environment Agency and landowners to use fallen trees and woody debris to improve the quality of the River Blackwater.

2 The Benefits of Large Woody Debris (LWD)

Essentially, large woody debris introduces diversity into a river channel.

It affect **River flow,** causing localised changes in water velocity which typically result in:

- Higher water velocity downstream of woody debris causes:
  - A scour pool which itself creates
  - A downstream gravel bank
- Lower water velocity upstream which
  - Leads to silt deposition and creates silt benches,
  - removing fine silt from the river and helps to prevent gravels from becoming silted over.

Over time, the introduction of LWD greatly increases the diversity of the river channel, creating deep pools, shallow gravel beds, silt banks, still backwaters and fast water.

These varying water flows, together with the woody debris itself, introduce new habitats to the river channel which enable the river to support a much greater variety of wildlife.

- Scours / gravel banks improve the water quality for spawning fish.
- Areas of silt build up are colonised by emergent vegetation, increasing the amount of marginal habitat.

- A variety of conditions in a small area including: speed of flow, depth and type of substrate, increasing the variety and number of plant and animals species that can be supported.

The LWD itself

- tends to accumulate leaf litter and smaller debris which provides a habitat and food resource for invertebrates.
- Shades the water and can lower water temperatures, again introducing variety into the channel.
- Provides refuges and habitats

LWD in the channel can be very stable over time and become important structural features in its own right. However, the build up should not be allowed to completely block the channel, both for flood defence and to allow the passage of migrating fish.

3 Dealing with woody debris

EA guidance is that, wherever possible, woody debris should be left in place. It should only be removed if there is sufficient evidence that it might cause :

- A flood risk
- bank erosion
- a hazard to navigation.

If woody debris is covering less than 10% of cross-section area of the river it is unlikely to impact on water levels so the presumption should be to leave it in place.

For other woody debris, the process should be:

- Assess
- Action
    - Leave it
    - Manage it
    - Move it
    - Remove it

Assess

Each tree or piece of woody debris should be assessed and if possible appropriate action taken to ensure that it can be safely left in place.

It should be assessed for :

- Flood risk, does the tree increase the chance of a flood? Could it increase the likelihood of flooding adjacent properties?

- Unwanted erosion, will the tree cause the nearby banks to erode? Could it cause erosion of an adjacent footpath, property or structures?
- Stability, is the tree likely to move? Is it likely to move and become a problem elsewhere?
- Fish passage, can fish migrate upstream past the tree?

Action

- **Leave it.** If none of the above concerns is a problem the tree can be left in situ or modified if this gives greater overall benefits.
- **Manage it.** Sometimes potential problems can be solved: cutting back the tree or putting in measures to support the adjacent bank might help to prevent erosion; a tree that is likely to move can be pinned down to keep it in place and cut back to stop it becoming a flood risk.
- **Move it.** It may be possible to reposition the woody debris elsewhere so that the ecological benefits are not lost.
- **Remove it.** In some cases, especially where the river is narrow or in an urban area it may not be possible to reduce all the risks and the tree will be removed.

4 Context

4.1 Water Framework Directive

The Water Framework Directive (WFD) establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which, amongst other things, prevents further deterioration and protects and enhances the status of aquatic ecosystems.

The Directive establishes environmental objectives for water bodies and seeks to prevent the ecological deterioration of water bodies and as far as possible to restore them. A key contribution will be ensuring flood risk management activities work with and restore the natural processes of fluvial, coastal or estuarine aquatic ecosystems.

Fallen trees help to restore the natural processes in the River Blackwater and in doing so, create improved environments for the ecology of the river. The aim of WFD is to achieve good ecological status. The Environment Agency fisheries surveys show fish species that often fail to reach a good ecological status should benefit from management to retain and secure fallen trees.

4.2 Blackwater Valley Countryside Strategy 2011-16

Vision: "A continuous green space along the Blackwater Valley attractive to wildlife and the community" (Blackwater Valley Countryside Partnership, 2010).

Aims

- To maintain the valley as an important open gap between urban areas, and enhance its landscape to create a continuous areas of naturalistic countryside
- To realise the full potential of the Blackwater Valley as an outdoor recreation resource, with an emphasis on providing freely accessible green space as an alternative recreational venue to the Thames Basin Heaths SPA's.
- To improve the Valley as a green corridor for wildlife by enhancing existing habitats, expanding the areas of ecological value by the creation of new habitats, and developing links between habitats.
- To improve the water quality and riparian habitat of the River Blackwater and maximise the floodplain capacity of the valley floor.
- To coordinate environmental and recreational improvements so that they are mutually beneficial, and to prevent conflicts of interest between different uses or organisations.
- To increase usage of the Valley, and involve local communities in its management.
- To promote sustainable transport links along and across the Valley.

5 Woody debris in the River Blackwater

There are already some examples of 'large woody debris' in the River Blackwater.

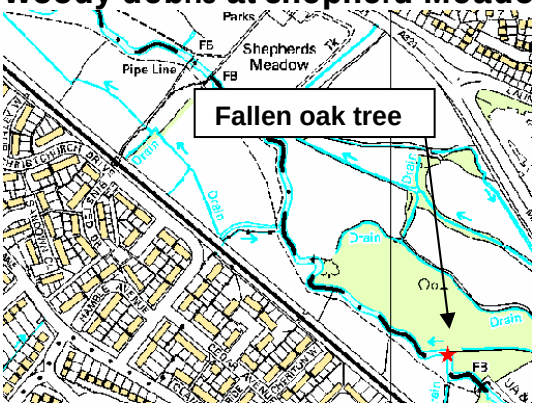
5.1 Shepherd Meadows

A small oak tree has recently fallen into the River Blackwater towards the south of Shepherd Meadows (see map below). Because of the position and size of the tree it doesn't present any flood risk but could be a great chance to improve the river for wildlife.

The tree is inspected 6 monthly to ensure that it is still stable and that no other problems have developed and to monitor the development of the river channel.

At least annually it is litter picked to remove debris that is collecting around it.

Woody debris at Shepherd Meadows



Position

Early days

Blackwater Valley Countryside

Showing the effect on river flow

5.2 Hawley Meadows

The meadows lie to the west of the Blackwater Valley Road and between the M3 and A30. They are an ideal site for a trial of the benefits of woody debris in the river, firstly the meadows are a flood storage area and regularly flood in winter so there is no problem with possible flooding and secondly fish populations in this section of the River Blackwater have been monitored annually for a number of years so that any effects can be seen.

In 2008 one live willow and one poplar were felled into the river and staked into place across the channel, at about the same time a willow upstream also fell into the river and was left in place. In 2010 the fallen tree together with some other woody debris was removed from the river, although the deliberately felled trees remained in place.

The fish population survey shows the dramatic effect that the woody debris has had. From 2007 to 2008 the total Biomass of fish caught more than doubled, with the number of Roach in particular increasing. However, in 2010, after the removal of some of the woody debris, the Biomass fell sharply to a little more than it's 2007 level.

Woody Debris at Hawley Meadows

Attachment to the bank

Showing the accumulation of material and the effect on river flow.

6 References

Environment Agency (2010) Management and use of large wood. http://evidence.environment-agency.gov.uk/FCERM/en/SC060065/MeasuresList/M5/M5T3.aspx?pagenum=1

The Wildlife Trusts (Undated). Managing Woody Debris in Rivers, Streams & Floodplains.

Wild Trout Trust (2008) The Chalkstream Habitat Manual. www.wildtrout.org

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Appendix 1
Draft text of leaflet for public information

Why are Fallen Trees Important?

Fallen trees are a natural component of healthy rivers. Fallen wood introduces new areas of habitat, creates changes to the flow and improves the character of the river. These changes help to support wildlife, including otters, and fish species, such as brown trout, roach, chub and barbel. Fallen trees support wildlife both above and below water.

If you find a fallen tree stop to look at the range of wildlife living in and around it. See if you can spot moorhens, ducks and swans seeking shelter and nesting. If you are lucky, you might spot a kingfisher using a branch for a perch, or see insects flying off the water, ready to be eaten by a rising fish.

Or 'stand and stare' for a moment to enjoy the *sound* of the river which is so often silent.

Is there a down side?

Litter! A fallen tree in the river will inevitably collect litter, plastic bottles are especially visible. This doesn't generally detract from the value of the tree for wildlife but it can be an eyesore. Wherever possible we will try to 'litter pick' fallen trees once or twice a year. They do have the advantage of accumulating all the rubbish in the river at one place!

Do we need to manage fallen trees?

Apart from removing debris, trees are also managed to avoid them damaging properties or structures. Fallen trees are monitored to make sure that they don't develop into a flood risk or become unstable and at risk of drifting off. If problems occur the fallen tree can be adjusted or removed.

Managing Flood Risk

Fallen trees will also be monitored to ensure that there is no threat to properties and important structures. Monitoring will reveal if the fallen wood is increasing water levels and rendering the structure at risk of drifting off. We will secure or remove it if problems occur.

What will happen?

Fallen trees improve habitat by increasing flows that scour the bed and transport clean gravel back into the river. This clean gravel may create a new island or provide spawning opportunities for fish. They provide feeding and nesting sites for water birds.

Over time they will encourage the River to change and to develop a more natural and diverse habitat. In the Blackwater Valley there are few sites where the River can be entirely left to 'do it's own thing' but there is a great deal that can be done to improve and develop the quality of the River within the existing constraints.