Tree management

Issues

Shading of the river channel plays a big part in the well-being of chalkstreams. Too much, and the instream and marginal vegetation can be suppressed, reducing valuable cover and sometimes leading to excessive erosion of bare banks. Too little, and summer water temperatures can climb, sometimes to near lethal levels for salmonids. In streams suffering from nutrient enrichment, excessive sunlight can promote the growth of diatoms, recently shown to be implicated in the poor survival of grayling eggs in some rivers. As with so many things, the secret to good management is to maintain a balance between light and shade. Generally, a figure of around 60% open water to 40% shaded represents a reasonable compromise, obtained by the management of trees within the riparian zone.

In addition to being of great importance to shading, floodplain trees also help to control the flow of energy into rivers (via leaf fall). They are also fundamental to the control of surface and ground water flow. Infiltration rates in a well-wooded buffer strip have been shown to be over 60 times greater than those in sheep grazed fields. The implications for the control of excessive run-off and hence attenuation of peak flood flows are obvious. This mechanism also plays a major part in the storage of groundwater, buffering chalkstreams against low flows during drier summer periods.

Potential restoration options

Many rivers have very few trees along their banks, often as a result of overgrazing. More recently, large numbers of alder *Alnus glutinosa* have died as a result of *Phytophora* infection. *Phytophora* is a water borne fungal infection that causes crown die-back and the eventual death of alder trees. There is no known treatment, although there is some anecdotal evidence that coppicing can prolong the life of individual trees.

Where tree numbers alongside rivers are very low, it is prudent to replant. Selection of species should be made with reference to the existing tree flora, generally avoiding alder for the above reason. In the absence of other guidance, the following species are suitable for planting alongside rivers: ash *Fraxinus excelsior*, hazel *Corylus avellana*, field maple *Acer campestre*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, goat willow *Salix caprea* and crack willow *Salix fragilis*. All trees should be protected from grazing stock (fencing)

RECENT PLANTING ALONGSIDE A WATERCOURSE.

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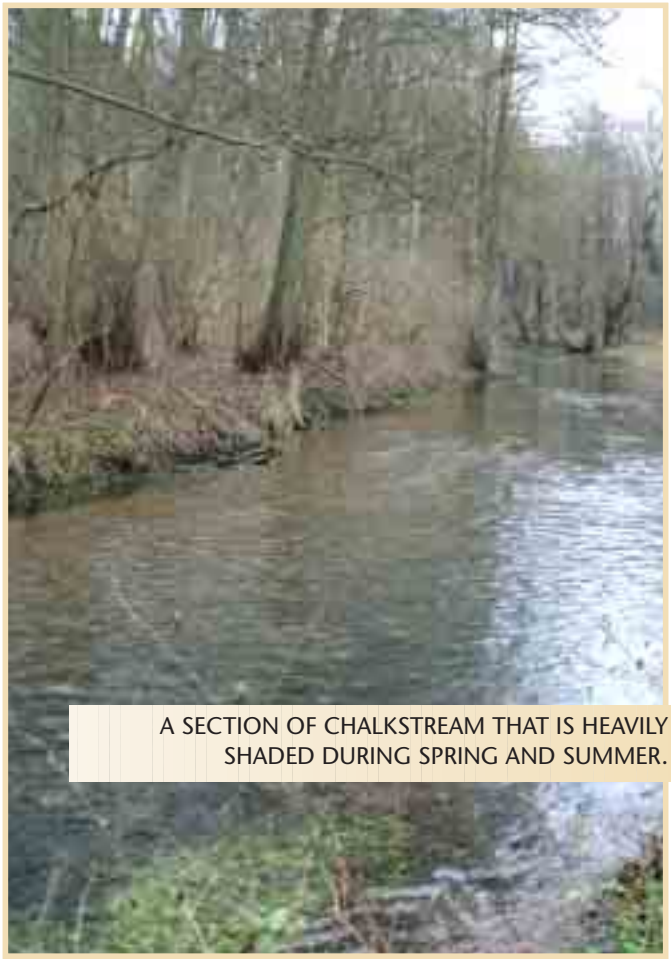
and rabbits (tree guards). Ideally, riparian trees should be planted in small clumps of say 10-20, allowing adequate access between for angling. If a wide belt of land (ideally at least 10m) is available parallel to the river, then a continuous band of trees across the contours will optimise attenuation of surface run-off and associated fine sediment.

Cutting riparian trees

Unless there are specific reasons to do so (for instance, disease, control of alien tree species or Health and Safety concerns) there is generally no reason to cut down or remove trees. The control of overshading by trees is best effected by a combination of coppicing, pollarding or singling.



A SECTION OF CHALKSTREAM THAT IS HEAVILY SHADED DURING SPRING AND SUMMER.

Coppicing and pollarding

These are techniques traditionally used to manage trees on a regular cycle. In coppicing, the young shoot stems are cut off cleanly immediately above ground level, promoting the development of several new stems. These are allowed to grow from the base (or 'stool') until they are re-cut, normally on a 5-30 year rotation. Coppice regrowth is very palatable to livestock, deer, hare and rabbits. It therefore needs careful protection during the early stages of regrowth. Species that are regularly coppiced include ash, hazel *Corylus avellana*, and alder. Coppice products historically included hazel sticks for hurdle making, ash poles for tool handles and alder trunks for clog making.

EXTENSIVE TREE ROOT SYSTEM PROVIDING VALUABLE COVER.

Pollarding is basically a similar process adapted for areas of 'wood pasture' where livestock were present. Trees were cut above the height that grazing cattle could reach. Some riverside trees, particularly crack willow *Salix fragilis* have historically been managed by pollarding, with trees cut on 15-30 year cycles in order to promote longevity of individual trees.

Singling

Singling offers an alternative to coppicing, in that rather than cutting all stems of the tree, the most upright stem is retained and allowed to grow into a semi-mature tree. It is a less risky option than coppicing in circumstances where there is significant grazing pressure. It also maintains a large, structural element to the landscape that may be important at sensitive sites.

RECENTLY FELLED TREE.

Timing

Whichever technique is chosen, the aim should be to create a mosaic of trees, with individuals at differing stages of succession. This approach avoids abrupt change to overall habitat and helps to maintain refuges and corridors of stable habitat for a range of woodland species.

Tree management is best undertaken during the dormant winter period, when the trees are not being used by nesting birds and are less likely to hold colonies of roosting bats. Timber arisings from tree management can be introduced into the river as LWD groynes or sold as firewood, charcoal burning and other traditional woodland crafts. The finer brushwood ('brashings') can be converted into faggots for use in bank revetments and channel narrowing. Alternatively, both timber and brashings can be utilised in the construction of so-called 'log pile' holts.

Summary

Technique	Advantages	Disadvantages
Tree removal.	May be necessary for H&S reasons.	Removal of cover, loss of CO_2 sequestration, loss of root systems binding banks, loss of shade.
Pollarding, coppicing and singling.	Controls excessive shading without loss of cover and stability from root systems. Can prolong life of trees. Produces sustainable yield of timber and brushwood.	Can cause over-warming of river if excessive cutting undertaken. Temporary reduction in cover.
Tree planting.	Increased cover, more CO_2 sequestration, increase in root systems binding banks, increased shade.	Risk of introduction of non-native species.

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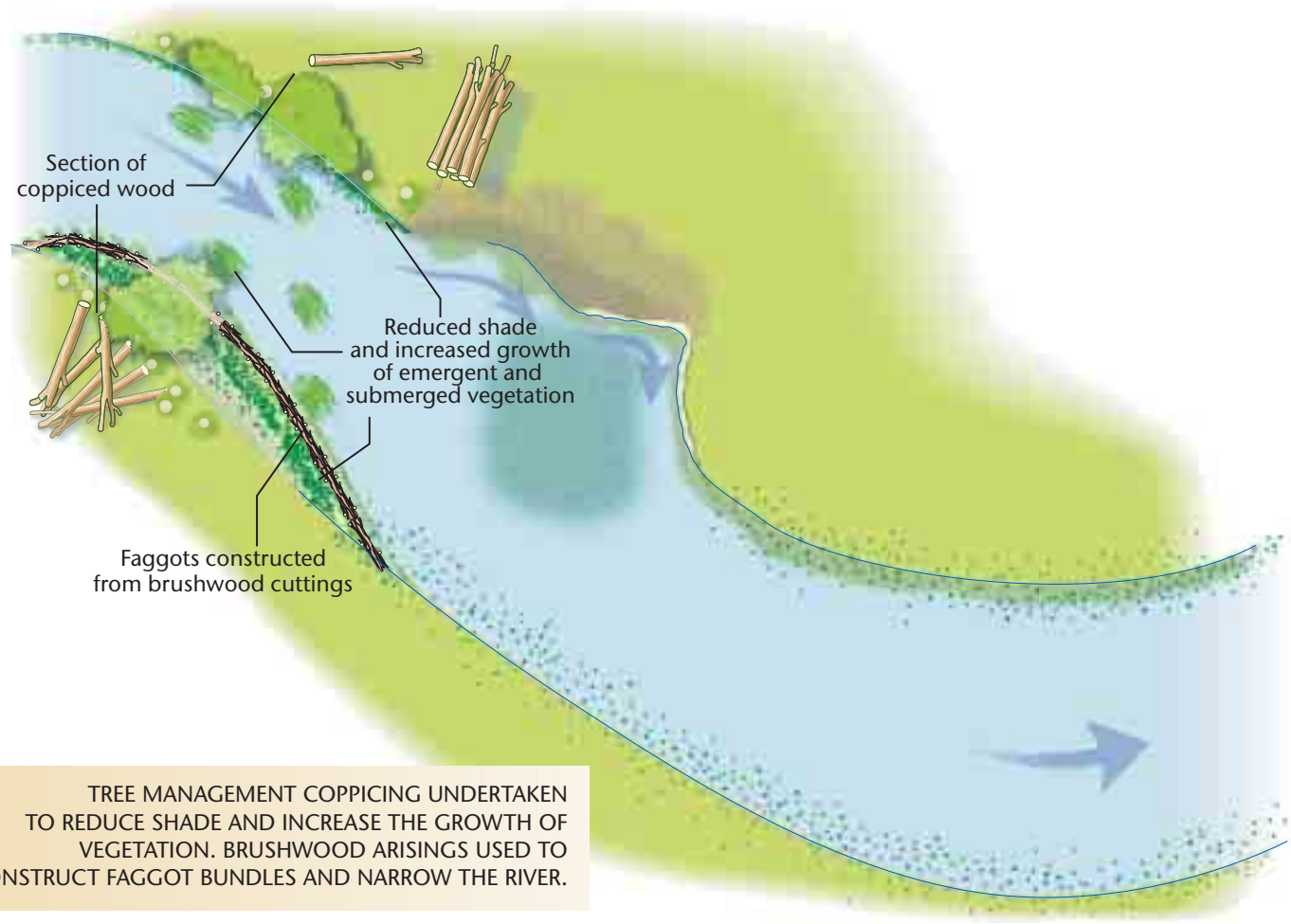

TREE MANAGEMENT COPPICING UNDERTAKEN TO REDUCE SHADE AND INCREASE THE GROWTH OF VEGETATION. BRUSHWOOD ARISINGS USED TO CONSTRUCT FAGGOT BUNDLES AND NARROW THE RIVER.