



### Lodged Large Woody Material

Some of the best in-channel habitat results from fallen trees and branches becoming lodged in place (referred to as Large Woody Material or LWM). This occurs naturally and creates features that are often stable for many years, but eventually disintegrate. Naturally occurring LWM therefore relies on a dynamic supply of trees and branches from land adjacent to the river.

Where LWM is lacking, simple in-channel habitat improvements can be initiated by installing lodged large woody material (LLWM). In its most effective form, LLWM mimics the natural fall of wood into a river channel. Wherever possible, it is best to allow introduced material to find its own secure position (using complex pieces  $>1.5$  times the channel width) but where there are flood risk considerations, it can be preferable for material to stay where it is installed. LLWM offers a way of achieving that without any man-made fixings.

Choosing the material (trunk or branch) and optimal location to install LLWM requires understanding of river processes and habitat, but the installation process is very simple. LLWM replicates the natural occurrence of trees and limbs lodged between or against other standing trees or stumps. The structure is secured by its own weight and the force that high flow exerts against it, pinning it even more securely to the anchor point - usually one or more vertical trees (ideally at least two). The picture below shows a simplified form of the technique, used as a flow deflector, that has been lodged between two vertical trunks.





The other simple method for installing LWM is as a hanger, where a forked branch is hooked over a vertical trunk, with the butt end facing upstream, canopy downstream. Again, this completely secures the material, with no requirement for wire, rope or posts.



A hybrid of the two techniques can also be used, being demonstrated below in a habitat workshop on the River Leven in north Yorkshire. Note how the canopy of a sycamore tree is dragged butt end first between two bankside alders, lodging and hanging it in place and leaving the bushy canopy in the channel. Depending upon the porosity of the material used, this technique can be used to create flow diversity, encourage deposition and provide cover for fish and invertebrates.

