

**WILD TROUT TRUST**  
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## **A TREE PLAN FOR RODDEN MEADOW, FROME, SOMERSET**



**Spring 2022**

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## 1. Introduction

Rodden Meadow is an area of former farmland with ancient meadow characteristics, which was previously used for sheep grazing and teasel cultivation, associated with the town's former successful textile trade. Today, it forms a significant area of blue-green space, very close to the centre of Frome, and highly valued by the local community.

Current management with mowers and strimmers helps to promote a diversity of attractive native wildflowers. Frome Town Council (FTC) is planning to improve Rodden Meadow's biodiversity value, and increase visual interest, by planting hedges and specimen trees, and constructing a wildlife pond / wetland area: this work will reflect, and be informed by, the Council's declaration of climate and ecological emergencies.

The southern boundary of Rodden Meadow is delineated by the meandering course of the River Frome, providing a valuable wooded wildlife corridor which extends into the heart of the town. Past management would have included coppicing the dominant alders, but this harvesting activity has now lapsed. As a result, the river corridor has become significantly tunnelled, and largely invisible to local people.

It is widely recognised that access to nature, including high-quality blue/green spaces, is hugely beneficial for people's physical and mental health, and this is especially true for urban dwellers whose private outdoor space may be limited. As such, Rodden Meadow provides a particularly valuable 'oasis' of natural habitats for Frome residents to enjoy, and maximising these publicly-accessible benefits will only become more important in the future.

The Frome River Strategy, published by the Friends of the River Frome (FORF), includes a vision for:

*'a linear, nature-rich, wide, naturally vegetated buffer zone of native trees, scrub, wetlands, restored permanent grasslands and meadows alongside both main river and its tributaries'.*

To facilitate this, the creation of a tree plan, including guidance for managing tree and woody material in Rodden Meadow, has been identified as a helpful contribution to the future administration of the area.

Accordingly, this tree plan has been produced by the Wild Trout Trust, with funding from the Environment Agency (EA). The contribution of many local residents and stakeholders is gratefully acknowledged.

***This tree plan has been circulated in early 2022 to local stakeholders - including FTC, EA, FORF, and The Tree Group Frome - for comment and agreement, and it is hoped that they will adopt its recommendations and continue to support its future implementation.***

Comments in this tree plan are based on observations during various visits, and detailed discussions with local stakeholders. Throughout the text, normal convention is followed with respect to bank identification i.e. banks are designated

Left Bank (LB) or Right Bank (RB) whilst looking downstream. The Ordnance Survey National Grid Reference system is used to identify specific locations.



## 2. Overview of current situation



*Figure 1: The banks of the River Frome in Rodden Meadow are dominated by alder trees of uniform age and structure: many of these could be coppiced to create more structural diversity, allow more light penetration, and improve views of the river for local people.*

The corridor of the River Frome through Rodden Meadow is dominated by alder, of excessively uniform age and structure, with occasional self-seeded sycamore, and limited numbers of oak and ash. Crack willow is present at either end of the Meadow, and has also been used in the form of stakes which support a stretch of bank revetment. A mature hedge of non-native laurel is also associated with private properties on the south bank of the river. Successional juvenile trees appear to be very limited in both abundance and variety of different species.

Bramble-dominated scrub provides a vegetated buffer along much of the river bank, and combines with the mature bankside trees and deeply incised banks to prevent beneficial sunlight from reaching the river, except in very limited areas. As a result of this heavy over-shading, aquatic and trailing riparian vegetation is suppressed, and is absent from most areas.

As seen in Figure 1 above, views of the river are provided from seating areas at either end of the Meadow: however, these views have become progressively obscured by self-seeded species such as sycamore.

FTC intends to improve Rodden Meadow's aesthetic and biodiversity benefits by planting additional native hedgerows as well as specimen blossom trees, and possibly creating a wildlife pond.

### 3. General management principles



*Figure 2: A mosaic of different tree and shrub species, of varying ages and structures, creates a healthy, diverse ecosystem.*

- 3.1. Riverside trees – whether living or dead – provide habitat for a wide variety of insects, birds and animals. In general, the more complex the native habitat, the better.
- 3.2. The broad definition of trees should include not just single or multi-stemmed trees, but also dense scrub – a very valuable habitat - in the river corridor.
- 3.3. To achieve maximum biodiversity, a mosaic of tree ages, structures and species is desirable – offering not just successional and aesthetic variety, but also a range of habitats for the greatest diversity of species of animals, birds, insects and fungi. Native trees generally have the greatest number of other native species associated with them.
- 3.4. When trees die, their standing dead wood is a habitat resource which may have been undervalued in the past. If standing dead trees are not causing health and safety issues, they should be retained wherever possible.
- 3.5. If any tree is removed, the aim should be to plant three more, following the principle of 'the right tree in the right place'.



- 3.6. Planned tree works should be preceded by appropriate wildlife protection surveys, including for bats and nesting birds.
- 3.7. A healthy mosaic of bankside trees provides a patchwork of light and shade for the river – ideally, neither heavily tunnelled and overshadowed, nor completely open to direct sunlight. Lack of sunlight penetration can lead to loss of riparian and aquatic vegetation and their associated habitats, while lack of shade can result in excessive growth which clogs the channel. However, shade can help to protect river ecology from overheating: summer water temperatures in unshaded channels can be 9 degrees C higher than in shaded areas. In general, most of the shade should be over deeper pools, and most of the light should be over shallow riffles, where the food web's primary production takes place.
- 3.8. Trees provide nutritional subsidy for rivers in the form of fallen leaves (which are 'shredded' by specialist aquatic insects like caddis and freshwater shrimp); fish also benefit from a subsidy of terrestrial invertebrates dropping into the water from riparian vegetation.
- 3.9. When larger branches and full trees fall into the river, this 'Large Woody Material' (LWM) continues to provide complex habitat for aquatic insects and fish, and benefits the river by 'forcing' localised natural processes of scour and deposition (thus creating an even wider range of micro-habitats).
- 3.10. In the past, over-zealous flood risk management practices have removed most LWM for the purposes of 'maximising conveyance', resulting in many rivers which are functionally starved of the benefits outlined above. Today, it is recognized that LWM can actually help to 'slow the flow' of flood waters into urban areas and other pinch points; additionally, the more LWM is present in the river channel, the less mobile any individual piece of wood is likely to be, due to friction and the interaction of multiple large pieces of LWM.
- 3.11. Adding LWM to rivers, as part of practical habitat improvement work, seeks to increase the complexity and dynamism of the underwater landscape. This mimics the biological activity of beavers – which are known to be present a short distance upstream in a wetland / tributary of the River Frome. Beaver activities may increase dynamic inputs of LWM to the river channel in future. Specimen trees can be protected from beaver activity by wrapping their lower trunks with wire, or treating them with deterrent sandy-textured paint.
- 3.12. Invasive non-native plants and trees should be controlled, and replaced with native species over time. In particular, Himalayan balsam has seriously invaded the upper Frome catchment: its seeds are water-borne, and it could rapidly invade Rodden Meadow and out-compete native

riparian plants, leaving river banks bare and vulnerable to erosion. Himalayan balsam can be locally controlled by hand-pulling: an ideal community activity which has already been undertaken by FORF.

- 3.13. Non-native laurel is also present, and could be replaced with native evergreens such as holly for local residents' screening and privacy. Cutting laurel branches and leaves can release cyanide into nearby air and water: any tree works involving laurel should prevent arisings from falling into the river or watercourse, and people should avoid being in a confined space with cut leaves and laurel branches: see <https://www.express.co.uk/life-style/garden/1129540/laurel-laurel-hedging-cyanide-poisonous-plants-alnwick-poison-garden-video>
- 3.14. Rodden Meadow is in a Conservation Area (CA); and there are currently six trees with the additional protection of Tree Protection Orders (TPOs). As such, applications for most tree works must be submitted to Mendip District Council as the planning authority for Frome. (See Appendix A).
- 3.15. Tree works may also require felling licences from the Forestry Commission, and in-river works (or creating any structures within 8m of the top of the bank) will require consent from the Environment Agency. Access to the river should always be maintained for emergency EA works.



## 4. River-related recommendations



*Figure 3: Large Woody Material (LWM), such as this naturally-fallen alder, provides complex habitat for many aquatic species, and is a valuable component of a healthy river. The projects proposed in section 7 of this Tree Plan are designed to replicate natural processes of tree fall and LWM accumulation.*

- 4.1. Whenever possible, management should be 'light touch' in character, and seek to promote dynamic natural processes, including assisted regeneration, and allowing the river to look 'shaggy' and 'messy' for greater structural complexity and thus maximum biodiversity benefit. Interventions should be gradual and incremental, with local community involvement and buy-in, rather than sudden, radical and surprising.
- 4.2. Living trees should be carefully assessed for their landscape and habitat value, with the aim of moving towards a more diverse successional mosaic over time.
- 4.3. Mature / veteran trees, especially those thickly covered with ivy, should be retained whenever possible, because they offer such a wide range of habitat niches for animals, birds and insects. The same presumption should apply to standing dead trees, if they are not causing health and safety issues.
- 4.4. The corridor of the River Frome would benefit from a biodiverse bankside buffer of vegetation – up to 10m wide – with a developing

succession of native tree and plant species, including those which may in the future be favoured as forage by beavers: black poplar, goat willow, alder and hazel.

- 4.5. Over time, this successional development could be assisted by thinning and / or selectively felling some of the denser stands of trees, particularly alder. This will also improve sightlines into and along the river corridor.
- 4.6. Rodden Meadow represents the 'unimplemented' Stage 4 section of the Frome Flood Alleviation Scheme (FAS), where the river retains a more natural form, and has more room to connect with its natural flood plain without threatening homes and infrastructure. At the same time, it is recognised that the EA's flood risk management teams wish to continue reducing flood risk in this area, and improve and/or formalise access for their operations. The following recommendations should be read with these requirements in mind.
- 4.7. Naturally fallen trees, both on land and in the river channel, should be left in situ and closely observed (in continuation of the current light-touch management regime). On a case-by-case basis, it may be judged desirable to stake in-channel LWM into place, to prevent it from moving downstream to block bridges or threaten infrastructure, and reduce its profile so that high river flows can pass over it unimpeded. If a tree does fall in a place which is judged to cause a blockage or other problem, it should be moved to a more favourable position, and secured with posts and wire or sisal rope, to retain its ecological benefit.
- 4.8. Where the river runs close to the paved public footpath at the western end of Rodden Meadow (c ST 78428 48074), trees falling into the river could accelerate undesirable erosion of the banks. In this area, consideration should be given to repositioning LWM to protect the banks via deflection or diffusion of high flows. If necessary, LWM could also be moved downstream into locations where scour could provide positive effects instead of threatening infrastructure.
- 4.9. In some areas of the river, past enhancement activities have created LWM structures which may now need maintenance (see for example section 7.1. below). Arisings from future tree works could be used to repair and improve these existing structures, and create new ones.
- 4.10. The medium-term aim should be to increase structural diversity within the river channel by introducing a series of complex, flow-deflecting LWM habitat features. Trees (or large limbs) can be introduced directly into the river, or hinged and staked into place, with the canopy end pointing downstream where possible. This mimics the angle of repose of most naturally fallen large woody debris and reduces the risk of the limbs catching debris and/or being torn away in high flows. When necessary,

naturally fallen trees can be repositioned in the channel, parallel to the bank, with the root ball upstream and branches downstream.

- 4.11. Willows are probably the species most appropriate for hinging and staking in place. In this part of the Frome FAS, and minor hinging is likely to be accepted by the EA. Ageing willow pollards should be maintained by re-pollarding at appropriate intervals, in order to save them from splitting or collapsing.
- 4.12. Tree works should be co-ordinated with in-river works if possible, to maximise the ecological benefit of the availability of felled wood.
- 4.13. Local residents should be encouraged to appreciate the river by increasing the number of high-quality viewing points, with sightlines along the river corridor, as well as enhancing paddling and dog swimming areas to encourage safe and responsible access (see Appendix C). If appropriate, some areas of brambles and nettles could be trimmed to improve views of the river (while also recognising the long-term successional biodiversity benefits of such areas of scrub).
- 4.14. At the same time, erosion-vulnerable banks should be fenced off, to reduce trampling and damage to bankside vegetation, as well as erosion and damaging silt inputs to the river, and replanted with visually-appealing native plants.
- 4.15. For the best possible public engagement, interpretation signage should also be installed to explain the objectives of habitat and access improvement works – including the wide-ranging ecological benefits of allowing the river to become 'shaggier' and 'messier' – and boost local enthusiasm for future projects.



## 5. Species-specific recommendations



*Figure 4: Historic tree management practices such as coppicing and pollarding have lapsed in the Rodden Meadow area, but could be revived (as in the case of this ageing willow pollard) to prolong the life of trees which are now mature and at risk of failing.*

**Alder** trees along the river were historically managed by coppicing, but this activity has lapsed, and the coppice stools are now mature and of uniform age and structure, creating a deeply shaded tunnel along the river. Many are now vulnerable to *Phytophthora* disease, which is known to be present. Hard re-coppicing is sometimes used as a means of saving and regenerating diseased alder stools, but has significant landscape effects if widely adopted, and will require detailed discussion with landowners. Some alder stools could also be thinned, with one or two stems from selected coppices laid into the river channel in a downstream direction as beneficial LWM, and cabled back to the stump for security.

**Ash** trees in Rodden Meadow are likely to be impacted by the spread of *Chalara* (ash dieback) disease, which can cause affected trees to fail suddenly and catastrophically. As such, this may be regarded as a health and safety issue, and it is recommended that such trees should be felled safely, with wood re-used as habitat structure in the river channel.

**Sycamore** trees along the banks appear to be largely self-seeded. Some of these have now become landscape features in their own right, while other younger saplings add less value, and are significantly obstructing views of the river. It is recommended that some of these younger trees should be cut and laid along the



banks to improve in-river habitat diversity, with arisings used to repair deteriorated habitat structures. However, local residents feel that not all sycamore should be removed, to ensure that some trees are still present in case of sudden and serious impacts of *Phytophthora* on the area's alders.

**Willow** trees at the eastern end of Rodden Meadow appear to have been managed by pollarding in the past. The pollards are now mature, and would benefit from re-pollarding, in order to prevent them from splitting or collapsing. Arisings could also be used for in-river habitat structures. Successional planting (including replacing alders killed by *Phytophthora*) could include small and medium sized willow species such as goat willow, which are also favoured by beavers: crack willows tend to grow to considerable height, thus creating future management issues. Willows are probably the species most appropriate for hinging and staking to form living, in-river habitat structures.

## 6. Successional planting lists



*Figure 5: Millais's 'Ophelia' was painted from life on the banks of a small river similar to the Frome: it is widely regarded as a portrait of a diverse assemblage of native riparian plant species including pollarded willow, wild rose, yellow flag iris, purple loosestrife, forget-me-not and Ranunculus.*

Soft, natural, well-vegetated river banks offer a mosaic of habitats for many species: they also resist undesirable erosion, and 'slow the flow' of water very valuably in a range of water conditions.

Assemblages of native British waterside trees and flowers are visually appealing and culturally iconic. Many of these species are featured in Millais's pre-Raphaelite painting 'Ophelia', which was painted from life on a small southern British river.

The following tree and shrub species could be considered for successional planting in Rodden Meadow:

- Goat willow (*Salix caprea*)
- Grey willow (*Salix cinerea*)
- Osiers (*Salix viminalis*)
- Other willows including purple willow (*Salix purpurea*) and almond willow (*Salix trianda*)
- Black poplar (*Populus nigra*)
- Elm (disease resistant) (*Ulmus minor*)
- Alder (*Alnus glutinosa*)
- Aspen (*Populus tremula*)

- Guelder rose (*Viburnum opulus*)
- Hawthorn (*Crataegus monogyna*)
- Blackthorn (*Prunus spinosa*)

Depending on light levels within the (currently very shaded) river corridor, other pollinator-friendly and visually-appealing riparian plant species could include:

- Purple loosestrife
- Hemp agrimony
- Gypsyweed
- Flowering rush
- Meadowsweet
- Sedges: *black sedge is beneficial for the boggy ecotone; woodland (pendulous) sedge grows well on a comparatively dry bank-top, and copes well with shading, while also offering erosion protection and habitat value*
- Reed canary grass: *a beneficial plant which will grow out from the toe of the bank in slightly deeper water than iris or sedge, but is less likely to appear in mid-channel locations than burr reed or club rush*
- Marsh marigold
- Yellow flag iris: *useful for planting in shaded areas, off the toe of the bank*
- Water forget-me-not
- Water mint
- Watercress and fool's watercress
- Water parsnip
- Harts tongue fern (*already likely to be present*) and other ferns

From Shoots to Roots: revealing the above and below ground structure of meadow plants

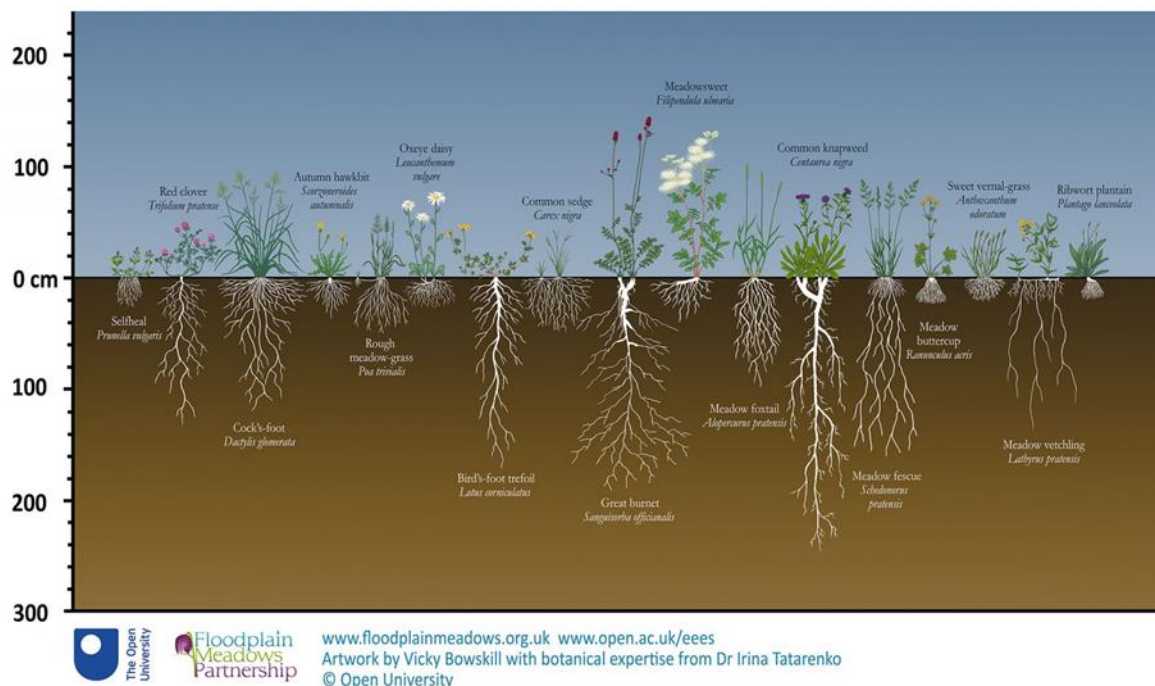


Figure 6: A diagram showing the root depths of a range of native British plants, most of which are also very suitable for stabilising river banks.

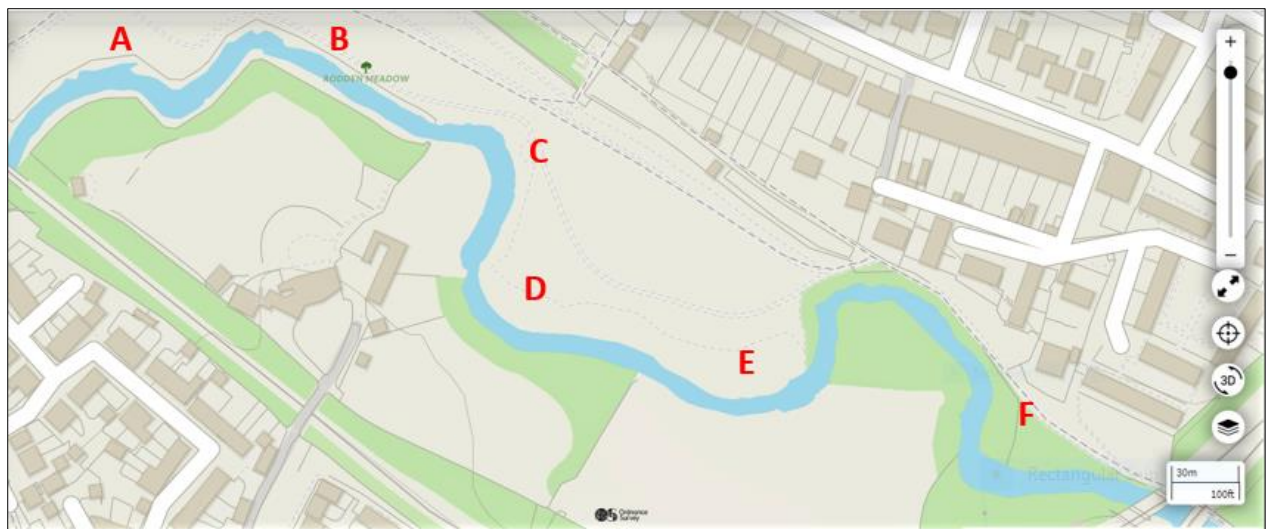
## 7. Proposed projects

Potential activities listed against the projects below are grouped according to the relevant letters on the map, starting at the downstream end of Rodden Meadow and proceeding in an upstream direction.

Some of these proposals have direct or indirect implications for privately-owned river banks opposite Rodden Meadow: as such, they will require discussion and permissions well in advance of implementation.

To secure support from local people in general, good communication will be essential, including interpretative signage and perhaps consultations for more extensive projects.

Not all projects need to be implemented at once: a suggested order of delivery is laid out at the end of this section.



*Figure 7: A map showing potential tree and river project areas in Rodden Meadow.*



## 7.1 Project area A: NGR ST 78124 48171 (approx.)

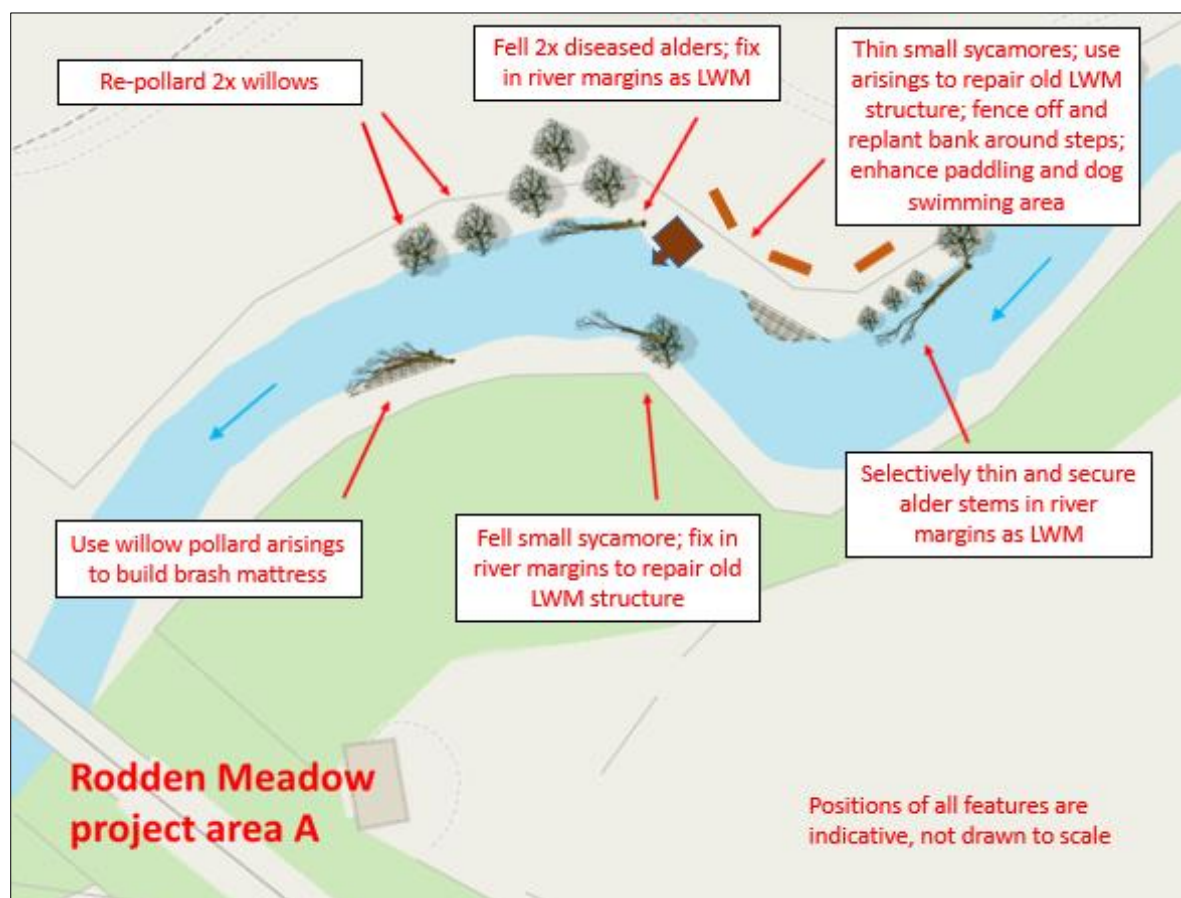


Figure 8: A map of recommended enhancements in Rodden Meadow project area A.

During winter 2021-22, Frome Town Council has started bankside tree thinning in this area, to let more light reach the river and its banks, and open up sight lines.

- Re-pollard 2x mature, top-heavy willow pollards on RB to prevent them from failing: use arisings to create brashy mattress in LB depositional area
- Fell 2x *Phytophthora*-affected alder stems overhanging riverside path, and stake into adjacent RB river margins - augmenting wood already present to formalise a valuable LWM habitat structure
- Fence off river banks on both sides of existing steps in order to focus community access for dogs and people, and enhance formal paddling area and dog dip (perhaps with addition of gravel – see Appendix C) to prevent excessive erosion and silt deposition into river; stabilise bank by planting a range of deep rooted and visually appealing native plant species
- Fell sycamore on LB and cable or stake into margins immediately downstream to repair deteriorated woody mattress structure
- Hinge small willows in part-deteriorated RB habitat structure to encourage re-sprouting from a lower level
- Thin small self-seeded sycamores on RB to open up sightlines from benches into river, and use arisings to repair adjacent habitat structure
- Selectively thin downstream alder coppice on RB, felling 1x or 2x stems into river and cabling back to stump as LWM habitat structure

## 7.2 Project area B: NGR ST 78185 48179 (approx.)

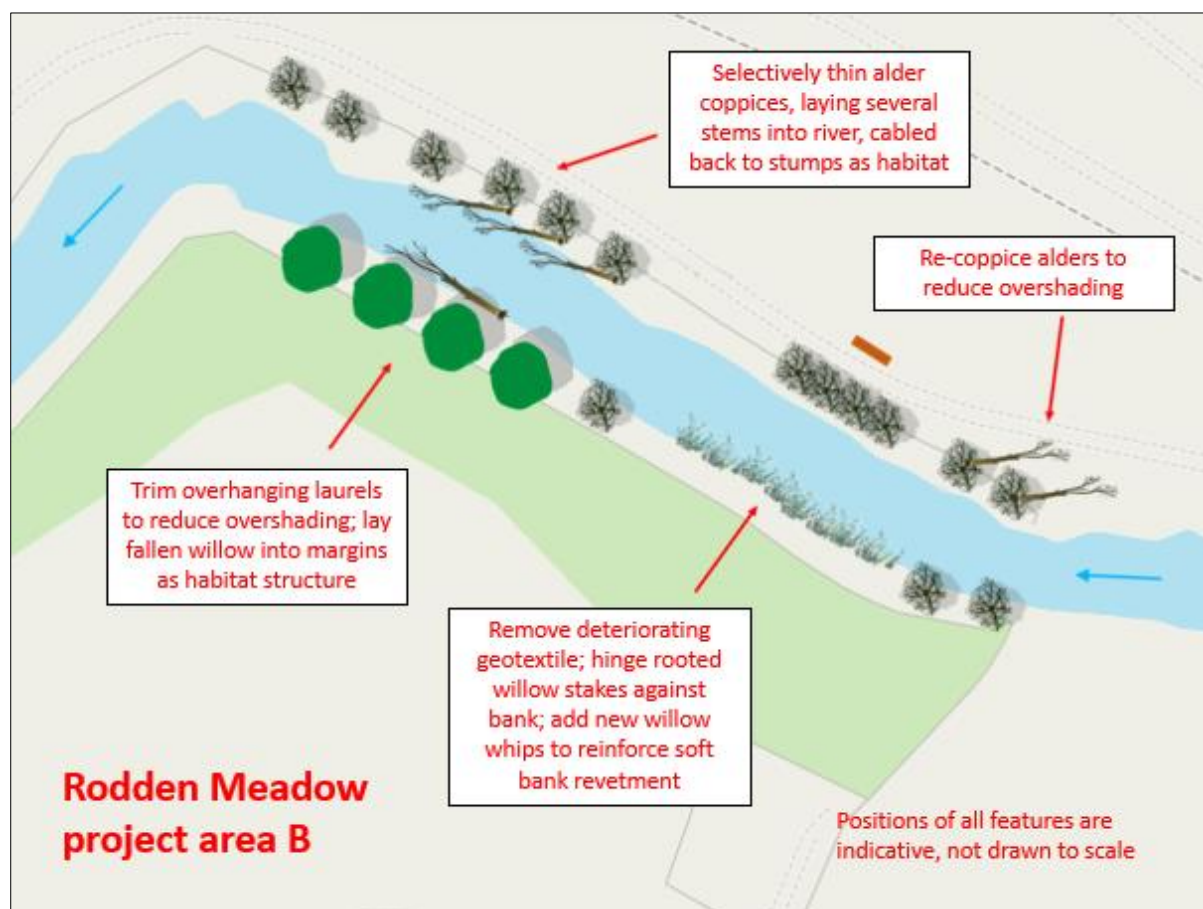


Figure 9: A map of recommended enhancements in Rodden Meadow project area B.

During winter 2021-22, Frome Town Council has started bankside tree thinning in this area, to let more light reach the river and its banks, and open up sight lines.

- Reduce overshading by trimming back overhanging laurels from LB, taking care not to let arisings enter river due to possible release of cyanide from cut branches and leaves; lay fallen willow into LB margins and stake into position for security
- Selectively thin alder coppices on RB, laying several stems into the river and cabling them back to the stumps as habitat structures
- Remove deteriorating geotextile from LB; improve soft bank revetment by hinging live willow stakes into the margins in a downstream direction, part cutting through each stem, a few inches above average water level, then bending them over in a downstream direction, and securing them onto other non-growing stakes for stability. In this publicly-accessible area, biodegradable sisal rope may be better than wire.
- Additional willow whips could be harvested from the pollards and bank top, pushed into the lower face and toe of the bank, and woven among the bank toe stakes in the hope of generating further growth
- Goat willow could also be planted in this area (and may require less future management)

- Reduce overshadowing by retaining specimen sycamores on RB, and coppicing alder stool just upstream; use arisings for additional habitat structures on the bank or in the river

### 7.3 Project area C: NGR ST 78283 48132 (approx.)

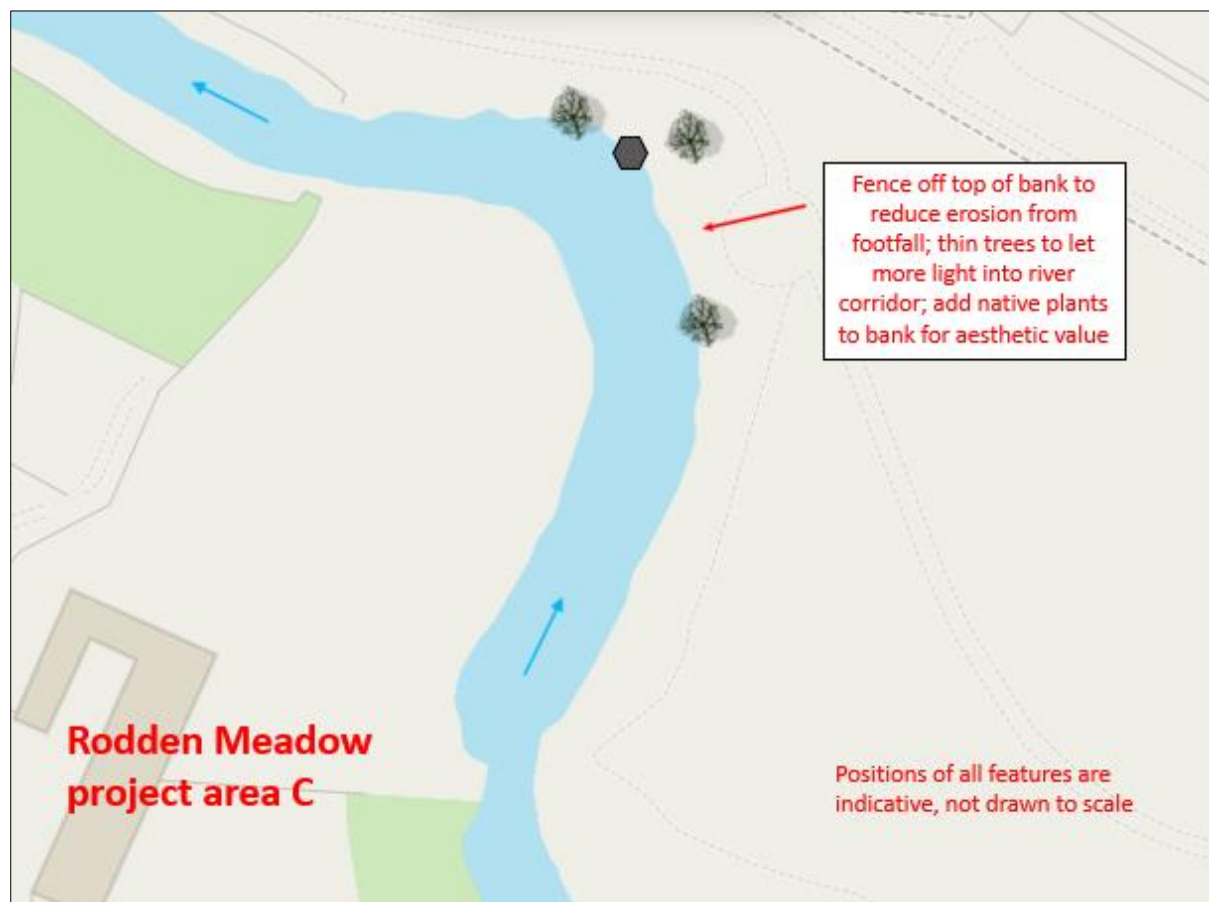


Figure 10: A map of recommended enhancements in Rodden Meadow project area C.

- Open up sightlines up- and downstream by reducing mature sycamore and alder
- Fence off slippery top of RB for health and safety reasons, and stabilise bank by planting a range of deep rooted and visually appealing native plant species



#### 7.4 Project area D: NGR ST 78275 48068 (approx.)

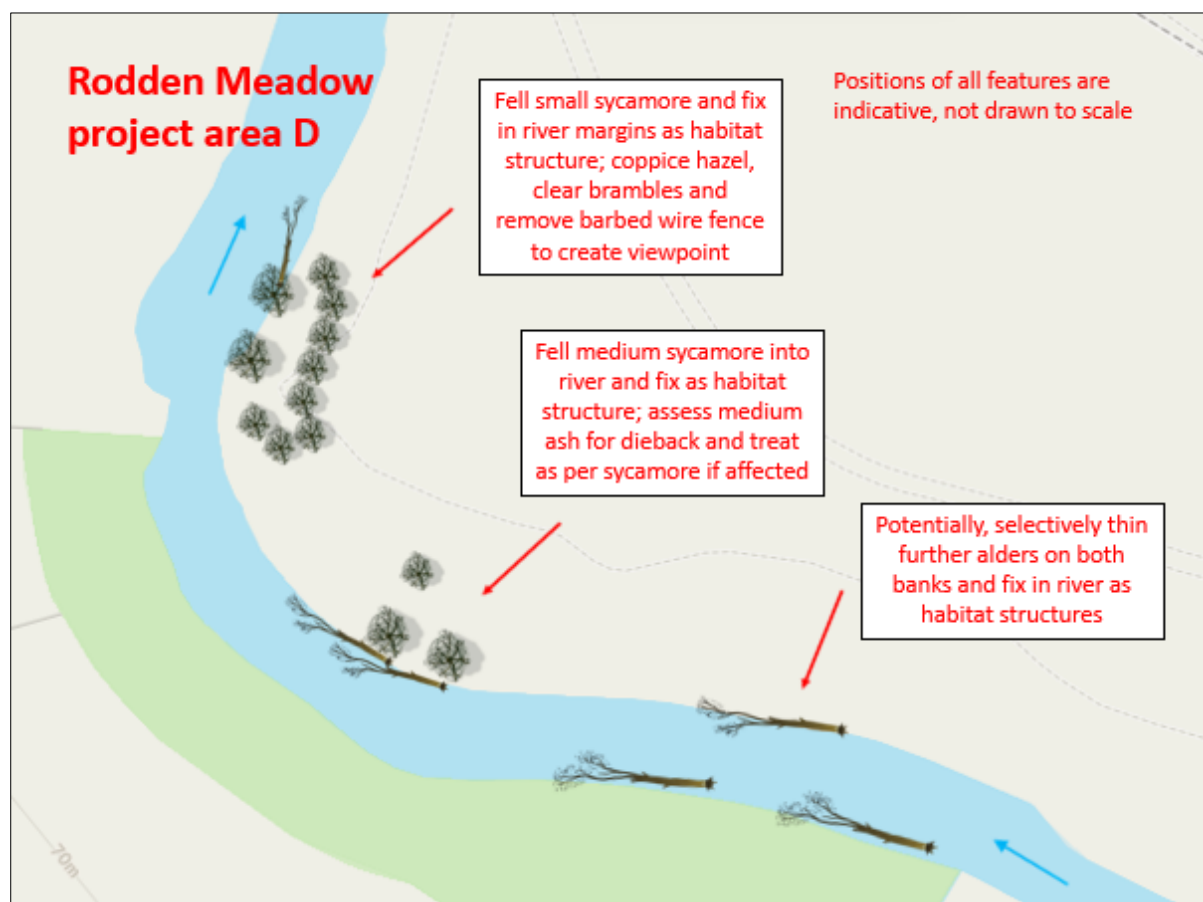


Figure 11: A map of recommended enhancements in Rodden Meadow project area D.

- Fell 1x medium and 1x small sycamore and cable / stake them into the river margins as LWM habitat structures
- Coppice 1x hazel to allow more light to reach the river and its banks
- Assess 1x medium ash for disease: if affected, fell into river if possible, and cable back to stump for security
- Remove dangerous barbed wire fence and clear brambles to create viewpoint and reduce antisocial behaviour

## 7.5 Project area E: NGR ST 78403 48032 (approx.)



Figure 12: A map of recommended enhancements in Rodden Meadow project area E.

- Create informal riverside path on RB (similar to path near project area A)
- Fence off bank top to prevent excessive erosion and silt deposition into river as a result of dog access (see 13 C); stabilise bank by planting a range of deep rooted and visually appealing native plant species
- Fell 1x small sycamore on RB and cable or stake into margins immediately downstream to repair deteriorated woody
- 1x crack willow may fail naturally within the next few years: when this happens, aim to secure as a natural flow deflector
- Selectively thin 1x or more alder coppices, felling 1x or 2x stems into river and cabling back to stump as LWM habitat structure

## 7.6 Project area F: NGR ST 78531 47990 (approx.)

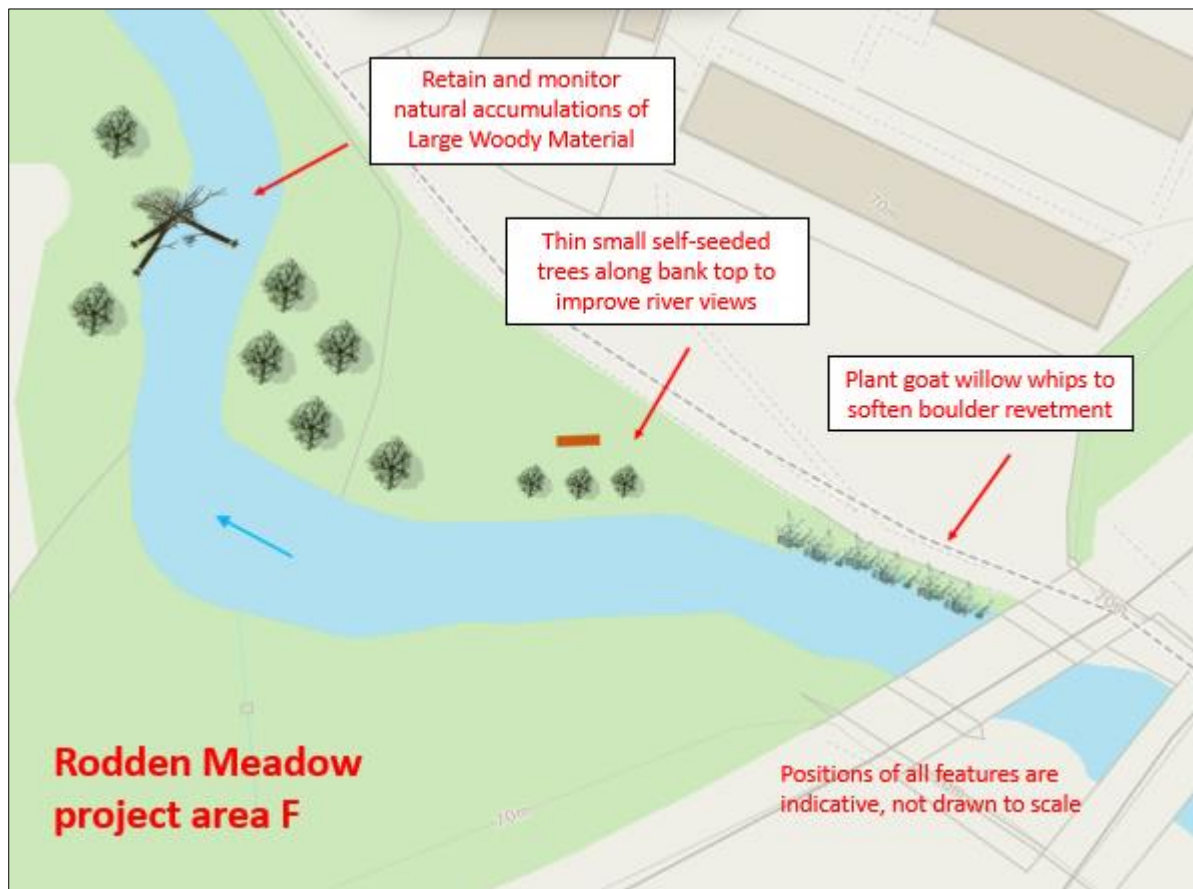


Figure 13: A map of recommended enhancements in Rodden Meadow project area F.

- Trim RB small sycamore and other trees to open up sightlines from bench to river
- Plant goat willow and / or other small willow species among deteriorated rock / wood RB revetment to provide soft bank protection and improved habitat

## 8 Proposed project timings

*2021 – 2022*

**Project areas A, E, F:** Frome Town Council to implement light touch trimming to open up sightlines / vistas along the river corridor from seating areas; plus fencing and replanting vulnerable banks (eg at steps at project area A); plus felling selected small trees to repair habitat structures (perhaps with FORF and other volunteers)

**Project area B:** FORF and other volunteers to address geotextile and willow bank

*2022 – 2023*

Progress other projects as desired, plus pond, tree propagation and planting by FORF and other volunteers

*2023 – 2024*

Progress other projects as desired

## 9 Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency for funding the production of this tree plan. The recommendations in this report are based on the expert and impartial view of WTT's conservation team, with valuable advice and input from local partners including the Environment Agency, Frome Town Council, Friends of the River Frome, and The Tree Group Frome.

## 10 Disclaimer

This report is produced for guidance; no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting upon guidance made in this report.



## 11 Appendix A: Rodden Meadow Conservation Area and Tree Preservation Orders

Rodden Meadow is in a Conservation Area (CA); and there are currently six trees with the additional protection of Tree Preservation Orders (TPOs). The following maps have been supplied by Frome Town Council to show the details of these designations (correct as at 2 February 2022). Applications for most tree works must be submitted to Mendip District Council as the planning authority for Frome.

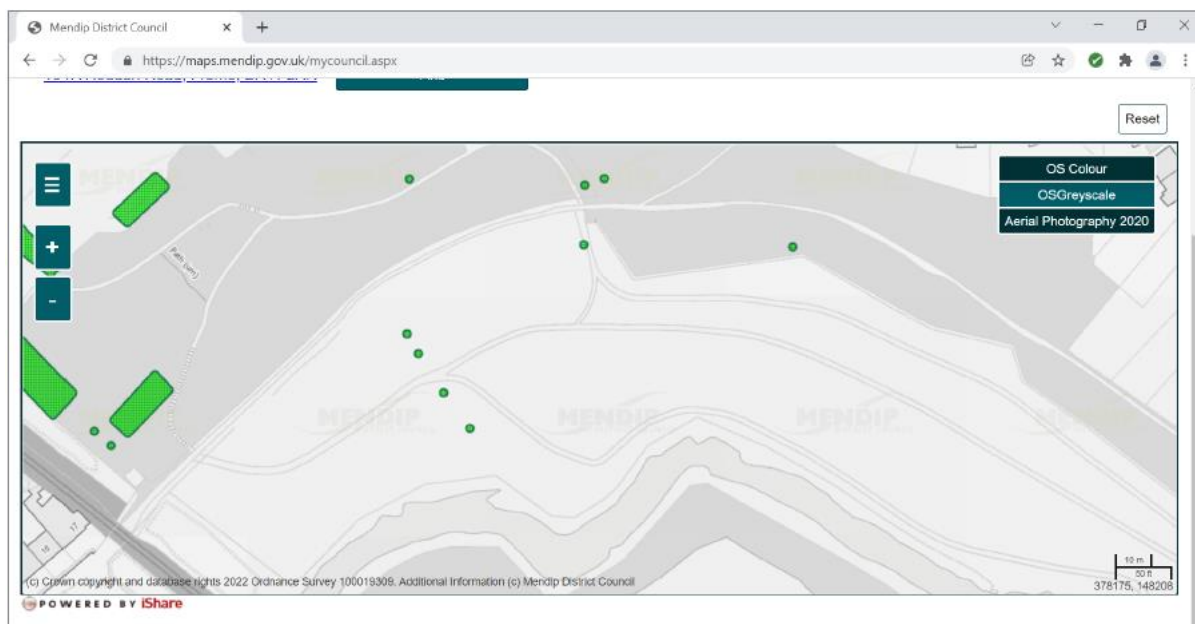


Figure 14: A map of trees with Tree Preservation Orders in Rodden Meadow.

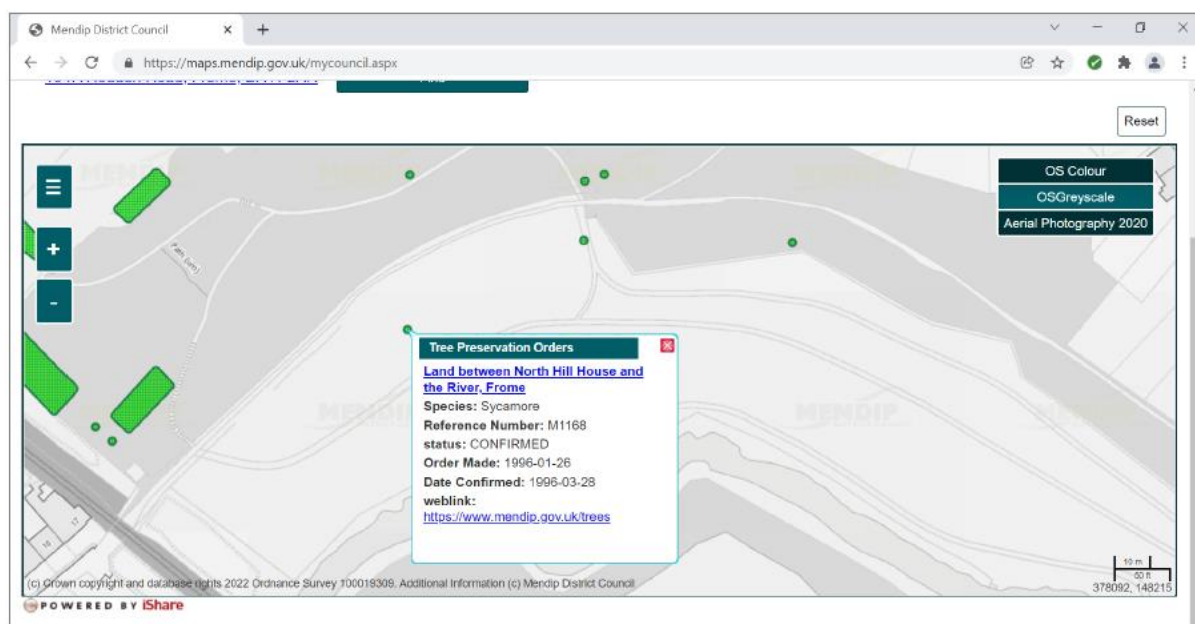


Figure 15: A map with details of protected sycamore trees in Rodden Meadow.

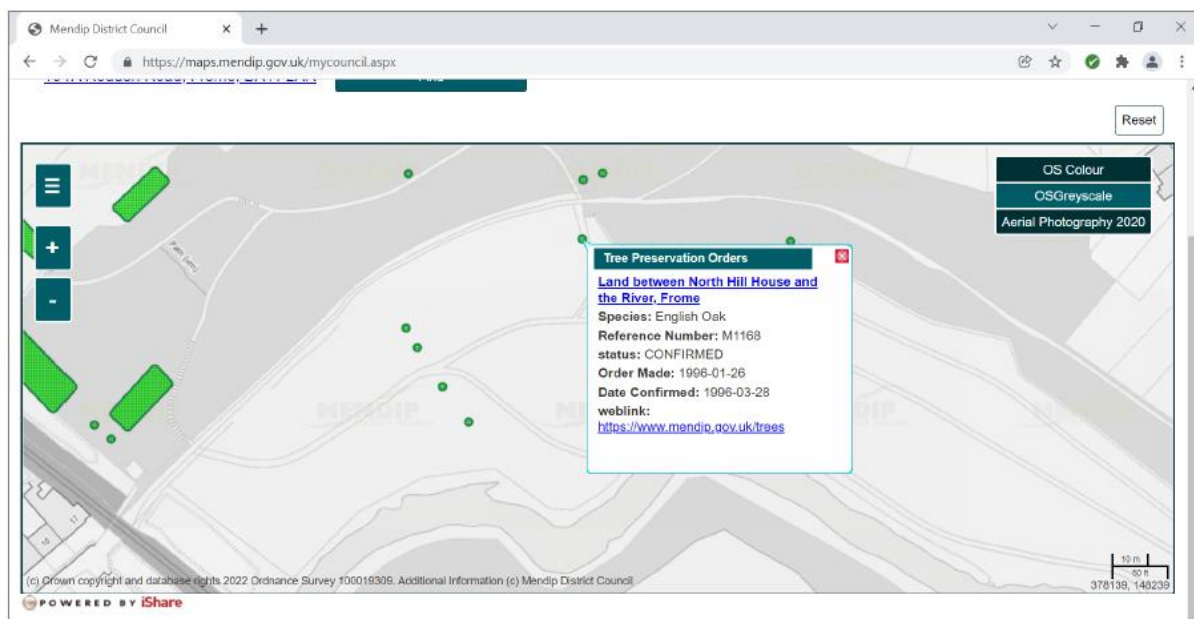


Figure 16: A map with details of a protected English oak tree in Rodden Meadow.

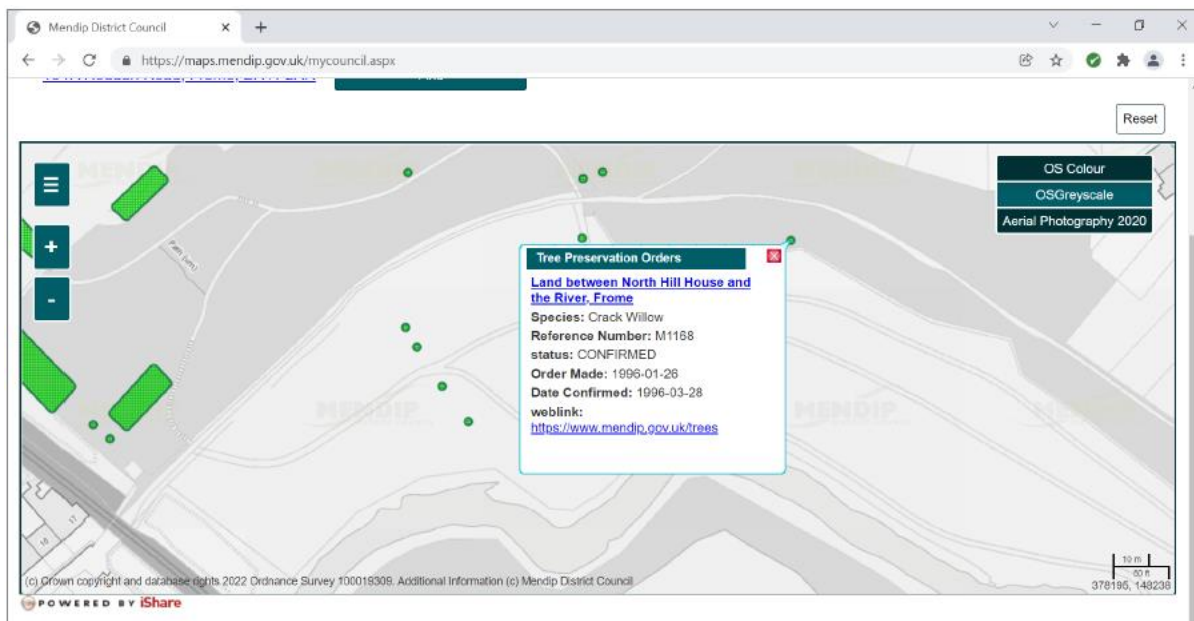


Figure 17: A map with details of a protected crack willow in Rodden Meadow.

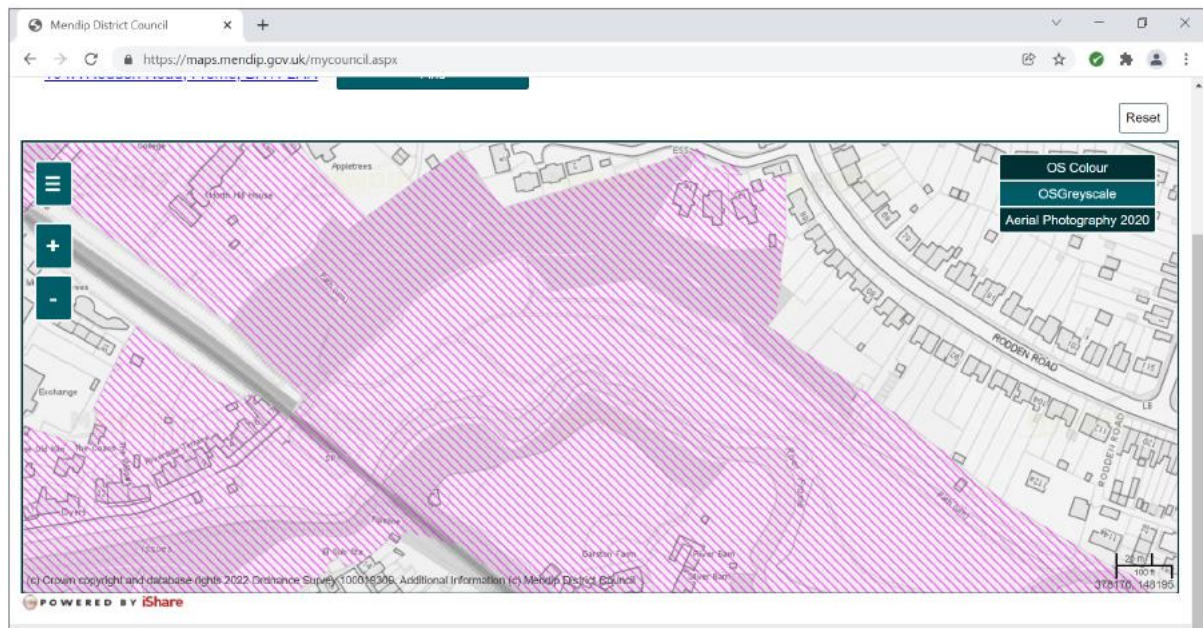


Figure 18: A map showing the Conservation Area as it relates Rodden Meadow.

## 12 Appendix B: Tree hinging and similar works: A Wild Trout Trust summary

### 12.1 Introduction

Hinging (also called laying, folding or pleaching) trees, shrubs or saplings into the edge of a watercourse is an excellent way of adding flow diversity and roughness to a channel which may have been simplified or straightened in the past, and now lacks complex habitat for many different species. It can also be used to increase the availability of overhanging cover in areas that have been over-pruned or only have trees set back from the riverbank. Tree branches in and above the water provide great cover for fish and invertebrates, while gravel and silt will settle and be 'sorted' around the branches. In turn, some of this silt may be colonised by aquatic plants.

Hinged and felled trees can also be an excellent way of protecting eroded sections of bank, or for creating bed scour - the end result depending on the location and way the technique is implemented. Willows are the best type of trees for hinging directly into the channel and can still thrive with up to 50% of their canopy submerged. Many other species also hinge well but should be laid into shallower areas or along the river margin, to ensure that the majority of their canopy remains in the dry.

Hinging replicates the natural process of trees falling into the channel, with the added benefit that the hinged section of tree should continue to grow, developing even more habitat complexity over time. It can also be very beneficial on long shaded reaches of river or stream – allowing enhanced light penetration by 'skylighting' as well as providing added habitat value and diversity.

### 12.2 Small trees

Small, pliable species of trees and shrubs like willow, hazel, elm, hawthorn and even alder (with a bit of practice) can easily be hinged into the margin, using hand tools such as pruning or bow saws to cut trunks or limbs up to 100 – 150mm diameter, in a process much like hedge laying. The more brittle species such as sycamore, ash or elder should be avoided as they tend to break off rather than bend.

In its simplest form, hinging involves a single quick cut through the 'top' half to two-thirds of the trunk/branch, then continuing to cut a little at a time until the trunk/branch collapses down over the river or along the bank (depending upon species). The cut should be made from the exact opposite side of the tree to the direction you want it to fall in, as if the tree were being felled, but without the face (gob) cut, as that is the area that will be retained as the hinge.

Think about the intended hinge and the way it has to bend: e.g. the bark must be retained on the hinge to keep the limb alive, so the cut must be from the opposite side. The depth of the cut should be the minimum required to bend the



limb over, as this will maintain maximum size and strength of the hinge and the health of the tree/shrub.



*Figure 19: Trees can be hinged and then staked to reduce movement in high flow and provide greater protection of the hinge. Once completed, these valuable living structures will benefit a range of aquatic and terrestrial wildlife.*

### 12.3 Larger trees

The technique for laying large trees is similar to that of smaller ones but is likely to be slightly higher risk, requiring a chainsaw.

With larger trees, it becomes more important to understand which way the canopy is weighted, the way the tree is leaning and therefore, the direction it will naturally fall, as this will influence exactly where the cut needs to be. It will still be approximately opposite the intended hinge, but may require a little finessing to steer the tree in the right direction.

The angle of the hinge in relation to the flow of the watercourse must also be considered, as it will only usually hinge in the one plane (unless it twists, which is trickier to achieve intentionally and requires experience). A downstream hinge is much more likely to fold than snap in a spate, and will also accumulate less debris than a cross-channel or upstream hinge. By the same token, a hinged tree straight out across the channel has a much higher chance of breaking off in high flows as it cannot bend across its hinge.

For these reasons, trees tend to be hinged in a downstream direction along the bank, to reduce the force from direct flow and so that the canopy is braced

against the river margin or other trees. As highlighted previously, where necessary, additional posts can be driven into the bed around the canopy to help brace the limbs and protect the hinge.



*Figure 20: The arrow indicates the intended direction for these two limbs to be felled in and the area for the cut. As the trees are crack willow, they are perfectly suited to hinging into the water (other species would be laid onto the bank, so as to create overhanging cover, without being directly in the water).*





*Figure 21: The end result with the trunks hinged into the river margin, providing beneficial cover and structure.*



*Figure 22: Another example of a larger willow tree successfully hinged into the river margin to improve habitat diversity. Note how, because the tree was leaning in the right direction, only a single cut into the opposite side of the tree was required to allow it to*



*fold over into the channel – a few side-branches have also been pruned to allow it to sit down into the water.*

## 12.4 Important notes for professionals and experienced chainsaw operatives

Depending on size, and the angle of lean, larger trees may require a different approach. In most cases, tree hinging is quite safe, but a large or heavily-leaning limb can sometimes 'barber-chair' unexpectedly if it is not cut correctly by an appropriately trained or experienced person. A 'barber chair' is where a tree splits upward from the felling cut before falling and slides backwards under its own weight in an unpredictable direction, which can be very dangerous.

To counter this, where a tree is unbalanced, a horizontal 'plunge cut' (using the tip of the chainsaw to bore through the tree in a plunging motion) can be used as the first cut to remove the resistance in the centre of the trunk while the tree is still being held upright by the remaining trunk on either side. This allows the tree to fall more easily on its hinge when the controlled 'final cut' is made (see Fig. 5). A variation on this technique is to also include an initial vertical plunge-cut, to dictate exactly where the edge of the hinge will be, but this can increase the likelihood of the saw becoming trapped and is usually unnecessary.



*Figure 23: A diagram showing the sequence of chainsaw cuts for a dog tooth style of hinge for a larger tree.*



N.B. The plunge-cut can cause the saw to kick back if not correctly executed – so this is a more advanced technique that should only be attempted by more experienced chainsaw operators.

When hinging larger trees, please also take the following into account:

- Large crack willows can hinge well, but may be susceptible to barber-chairing
- Alders tend not to produce a strong hinge, so may not be appropriate in high energy or high flood risk areas. They can also crack suddenly, especially if affected by *Phytophthora* disease. However, they can be laid effectively with practice and in appropriate places
- Poplars can be even trickier than alders: the bark tends to crumple and ruck up, and should only be used if nothing else is available
- Ash and sycamore are very brittle, and tend to lay very poorly as a result
- In cold weather, trees can react particularly explosively to being cut – failing more suddenly, and splitting further and in a less controlled way

## 12.5 Other important points to note

- Use chainsaws with the greatest care – if you're in any doubt at all, employ a specialist contractor
- WTT recommends that all volunteer groups wanting to implement tree hinging should seek demonstration and training from a qualified chainsaw operator
- For added security (where necessary), hinged trees can be secured in the channel with stakes and wire, and/or sisal rope (and possibly even secured back to the stump with 12 mm steel cable and cable clamps) - but these additional measures should not usually be required

## 12.6 Tree kickers

If the hinge fails in the course of felling (or if hinging requires advanced chainsaw skills that aren't available), it is still possible to construct a useful habitat feature with felled timber by securing it back to the stump, or to another tree. These non-hinged but secured structures are called tree kickers.

Use a chain saw or augur to bore a hole through the felled trunk and its stump, then thread a suitable length of 10 mm (6.5 tonne breaking strain) or 12 mm (9.4 tonne b.s.) steel cable through both holes, and secure the ends with steel cable clamps. The tethering cable length should be relatively short, to stop the kicker floating up and lodging in an awkward spot, or even ending up high and dry on the bank. The length of cable should also be kept to a minimum so that the kicker does not move excessively in high flows. To achieve this, a winch can often come in handy to pull the trunk back towards its stump.



*Figure 24: Making a tree kicker: details of steel cabling used to secure the sawn-off trunk back to its stump. The hinge on this structure is minimal, so the decision was made to provide additional security with a steel cable – effectively turning it into a tree kicker.*

## 12.7 Lodged woody material

In most circumstances, it is possible to create very durable structures simply by lodging a large piece of woody material in or around an existing bankside tree. If the pieces of wood are suitable, no wire or stakes will be required to create highly naturalistic habitat features. In many cases, this technique is at least as secure as cabled structures, as the lodged material cannot move downstream before it begins to disintegrate.



*Figure 25: Lodged woody material.*

## 12.8 Consent

In England, EA permissions may be required for some of these techniques in certain locations.

## 12.9 Disclaimer

This document is produced for guidance; no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon guidance made in this report.



## 13 Appendix C: Fencing and dog swimming areas

In urban parks, nature reserves and other areas with high footfall, trampling by people and dogs can quickly lead to river banks becoming denuded of vegetation. As a result, these areas are extremely susceptible to excessive erosion – depositing large quantities of silt into the river (which suffocates aquatic life including insects and fish) and providing very little ecological or aesthetic benefit. Simply fencing dogs out of vulnerable bankside areas is usually the best and easiest solution, perhaps with supplementary planting of native wetland plants to encourage the re-establishment of a healthy and visually appealing riparian fringe.

It is recognised that some local people may still wish to let their dogs access the river. Formalising dedicated steps down to a gravel 'dog dip' area, fenced off from the rest of the bank, is a tried and tested way of focusing this activity and reducing its impacts, including siltation and trampling, on more sensitive stretches. Adjacent to this swimming area, a notice board could helpfully highlight the reasons for this action, and the dangers to aquatic life from pet flea treatments:

<https://www.wildtrout.org/news/pet-flea-treatments-in-our-rivers>



*Figure 26: Simple fencing can protect river banks from trampling and erosion by dogs and people, and focus responsible 'dog dipping' activities at tailor-made, erosion-resistant steps and swimming areas. (Photos: Moragh Stirling, Wessex Rivers Trust, and Nick Lawrence, WTT)*



Specifications for the fencing pictured above are as follows (per Moragh Stirling, Wessex Rivers Trust, March 2022):

- Polyethylene netting
  - 'Heavy cricket netting: 2.4 x 50mm black knotted PE, 1m height'
  - £2.19 per metre plus VAT (March 2022)
  - Supplier: Coastal Nets Ltd, North Mills Trading Estate, Bridport, Dorset, DT6 3BE. Phone: 01308 427885. Website: <https://www.coastalnets.co.uk/>
- Netting is fixed to 2.5mm high tensile wire at top and bottom, using cable ties
- Wire is supported by round posts at 2.5m spacing: in-line posts 75mm, with sturdier 125mm posts at corners and ends.

## 14 Appendix D: Useful links and further resources

### 14.1 UK based Large Woody Material publications

- Trees and Large Woody Material as key components of healthy river systems: <https://www.wildtrout.org/content/trees-and-rivers>
- Managing Woody Debris in Rivers, Streams and Floodplains (EA and Wildlife Trusts, 2006):  
[https://www.therrc.co.uk/MOT/References/WT\\_Managing\\_woody\\_debris.pdf](https://www.therrc.co.uk/MOT/References/WT_Managing_woody_debris.pdf)
- River Blockage Management Guide (EA, 2005):  
[https://assets.publishing.service.gov.uk/media/60378f4fd3bf7f03985e1286/Blockage\\_management\\_guide\\_-\\_report.pdf](https://assets.publishing.service.gov.uk/media/60378f4fd3bf7f03985e1286/Blockage_management_guide_-_report.pdf)
- Large Woody Debris in British Headwater Rivers (EA, 1999):  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/290558/str-w181-e-e.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290558/str-w181-e-e.pdf)

### 14.2 US based Large Woody Material publications

- Low-Tech Process-Based Restoration of Riverscapes:  
<https://lowtechpbr.restoration.usu.edu/>
- Large Wood National Manual (US Army Corps of Engineers):  
[https://www.engr.colostate.edu/~pierre/ce\\_old/classes/ce717/Manuals/Large%20Wood%20National%20Manual/Large\\_Wood\\_National\\_Manual\\_final.pdf](https://www.engr.colostate.edu/~pierre/ce_old/classes/ce717/Manuals/Large%20Wood%20National%20Manual/Large_Wood_National_Manual_final.pdf)
- Field Manual on Maintenance of Large Woody Debris:  
<https://www.hrwc.org/wp-content/uploads/2013/03/LWD%20Manual%20Final.pdf>