



Ouse & Adur Rivers Trust

## **Climate Change Mitigation for Freshwater Species**

### **Trees for Trout**



#### **Knepp Estate Tree Planting Proposal**

**2016 – 2017**

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## Overview

Whilst predicting future climatic patterns is difficult, climate experts have tried to capture some of this uncertainty in the current set of scenarios for the UK. The models predict that average summer air temperatures will warm by between 2°C and 4°C by the 2050s compared to the long term 1961-90 average temperature. River temperatures are sensitive to changes in climate and water temperatures are expected to rise by a similar amount. It may not seem much but even small changes like this can have an impact on the health of wildlife living in freshwaters. Brown trout and salmon are particularly vulnerable to predicted climate change. A rise in water temperature above 22°C for more than seven consecutive days can be lethal for brown trout (Environment Agency, Keeping Rivers Cool Guidance) and some areas of the South East have seen water temperatures of 31° recorded.

The Ouse & Adur Rivers Trust are working in partnership with the Woodland Trust to provide additional tree cover to the River Adur. The Trees for Trout project is in line with the principles of the national Keeping Rivers Cool project. Whilst as organisations we strive to create additional woodland coverage within our riparian zones this project is focused on the provision of shading to the channel using small clumps of trees as opposed to large scale woodland block planting. Having stated this we would, of course, be delighted to increase the amount of woodland cover within the catchment.

In order for tree shading to be effective these should preferably be placed on the southern bank of the watercourse (when running east/west) and as a patchwork of both eastern and western banks (when running north/south).

This document set out a suggested approach to increasing the bankside tree cover and associated shade on the River Adur as it flows through the Knepp Estate. There are multiple benefits to this approach beyond shade, including natural recharge of woody debris to the channel, trapping of sediment and faeces from the floodplain and increased invertebrate habitat and the increased food resource this provides.

## Project Site

We propose to focus on the main River Adur between the A24 (TQ16408 20732) and Kings Windmill (TQ14273 21733) in the first instance although establishing shade cover on the associated tributaries would also be of benefit where appropriate. Of the 3.1km of river within this area, approximately 2km currently lacks tree cover (Fig. 1).

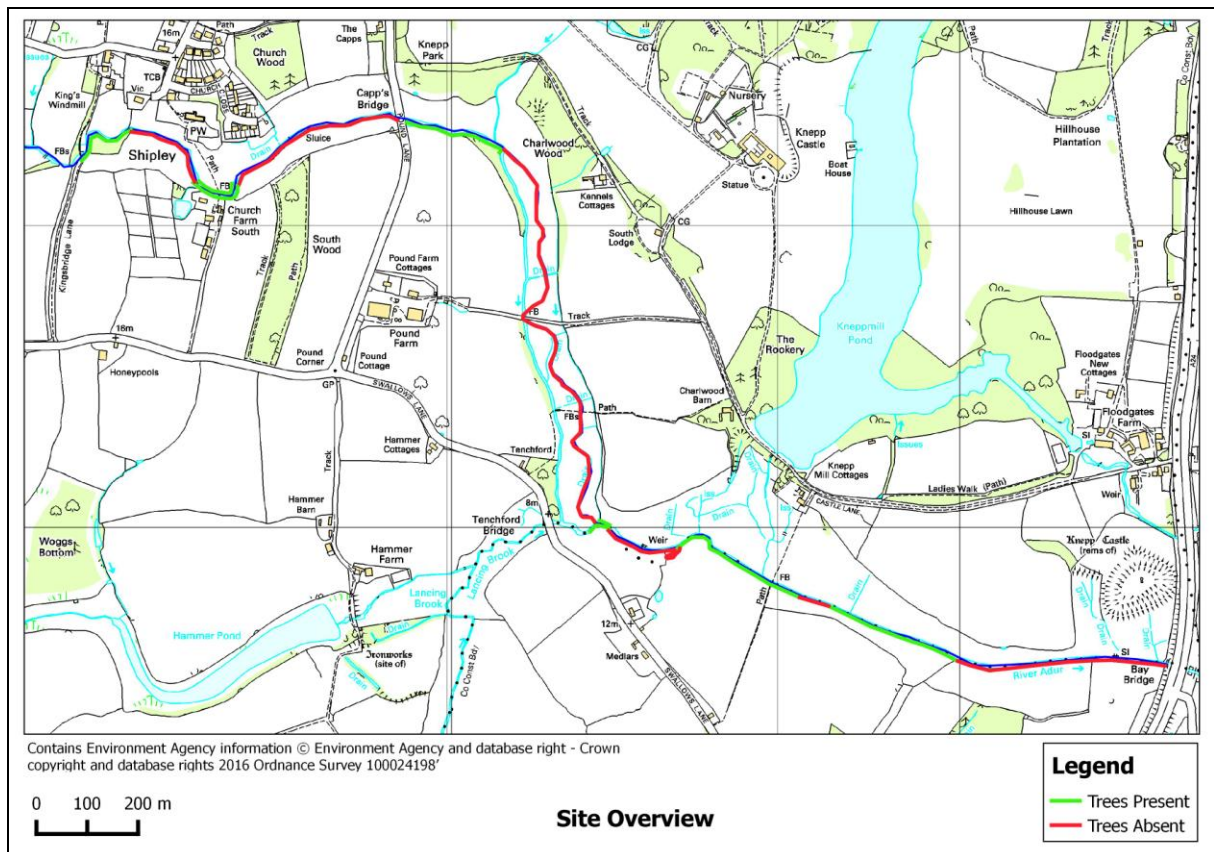


Fig. 1. Overview of proposed tree planting zone showing areas where tree cover is currently present and conversely absent from the channel.

The objective of this project is not to establish continuous shade along the river corridor but to create a mosaic of dense and mottled areas interspersed with open areas. We propose to establish shaded patches across approximately 50% of the area where trees are currently absent (approximately 1.0km of patchy tree cover). All trees will be placed in Tubex vented guards for protection against rabbit and small mammal damage whilst allowing flood waters to pass through, preventing rot through prolonged submersion in water. Species selection will be discussed with the Knepp Estate, however, it is suggested that the majority of those planted be a mix of crack willow, goat willow, hawthorn, alder, hornbeam and hazel. This would provide a mix of slow and fast growing species giving structure to the planted areas and optimise future benefits to the river.

Clumps are suggested to be approximately 50m in length and three to four trees in depth. With an average of 1.5m spacing between trees this would provide approximately 100 trees per section with a maximum total of 16 sections (Fig. 2).

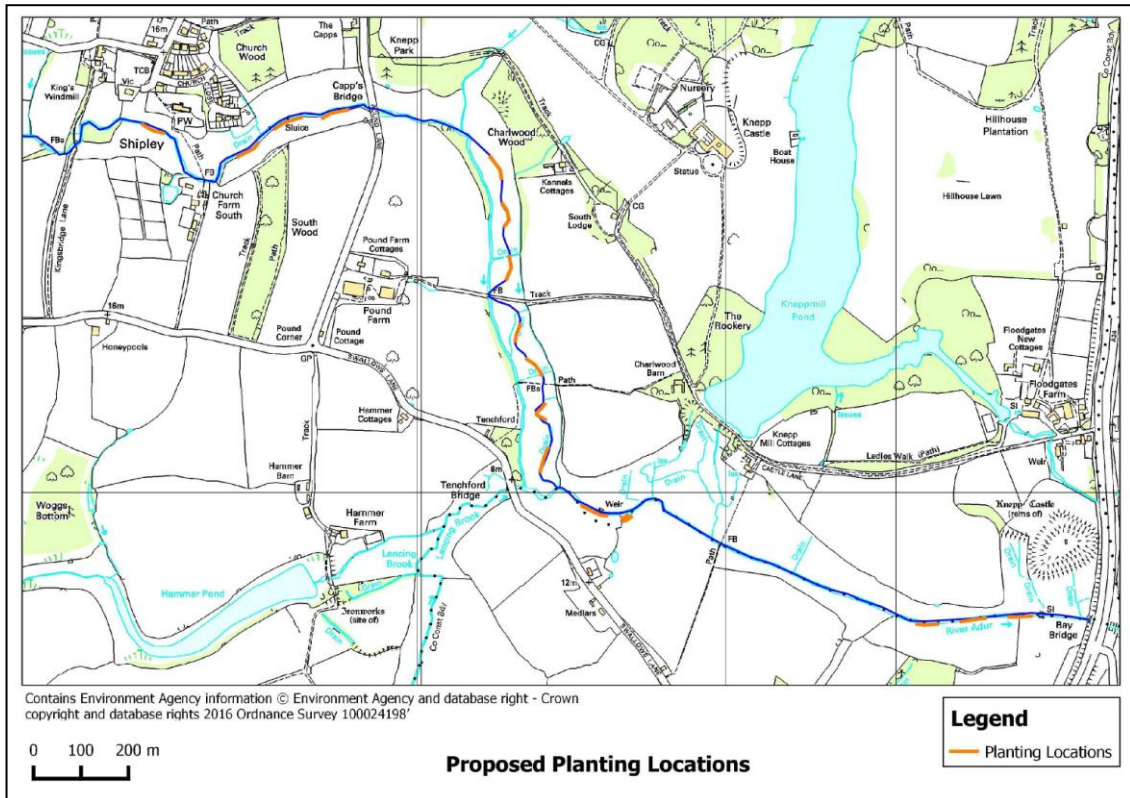


Fig. 2. Proposed planting locations along the River Adur.

Three sections are proposed between Bay Bridge Weir and the existing tree line on the southern bank of the river (Fig. 3).

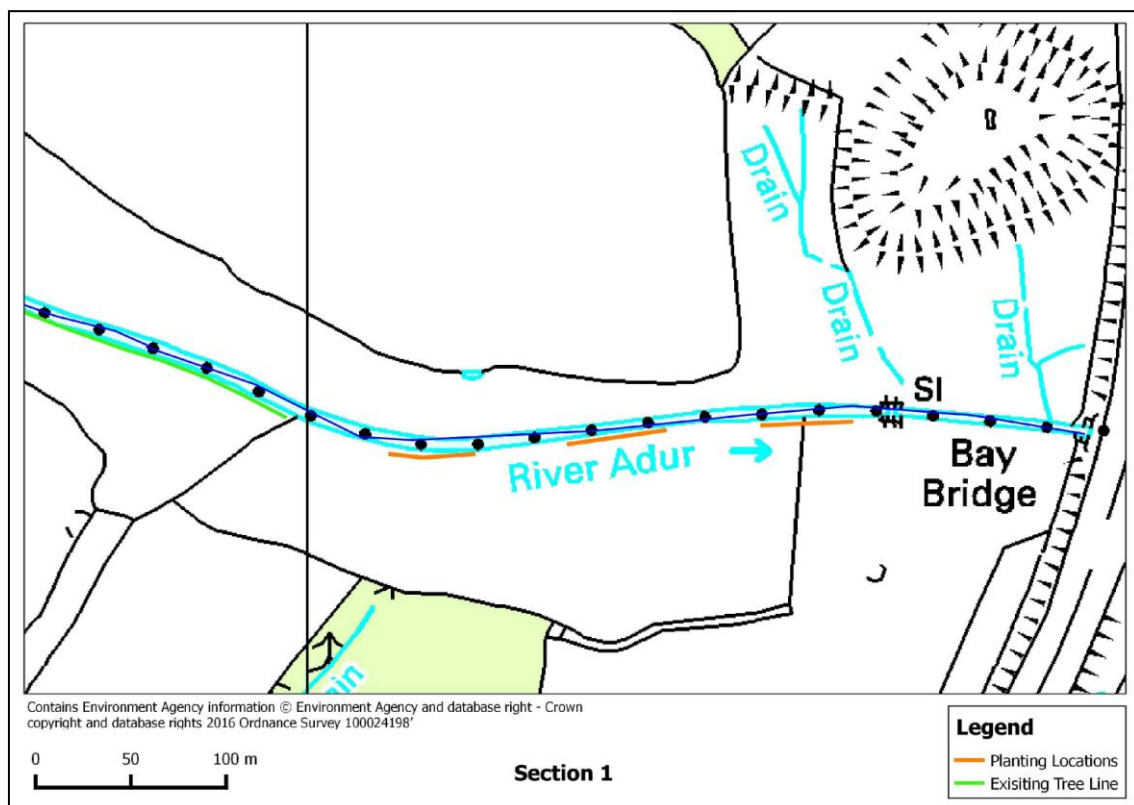


Fig. 3. Three locations suggested between Bay Bridge and the existing tree line to the west.



The second area is at the site of the old weir structure, removed as part of the enhancement programme. An important section here is around the backwater area which would benefit from shade to improve its function as a refuge (Fig. 4).

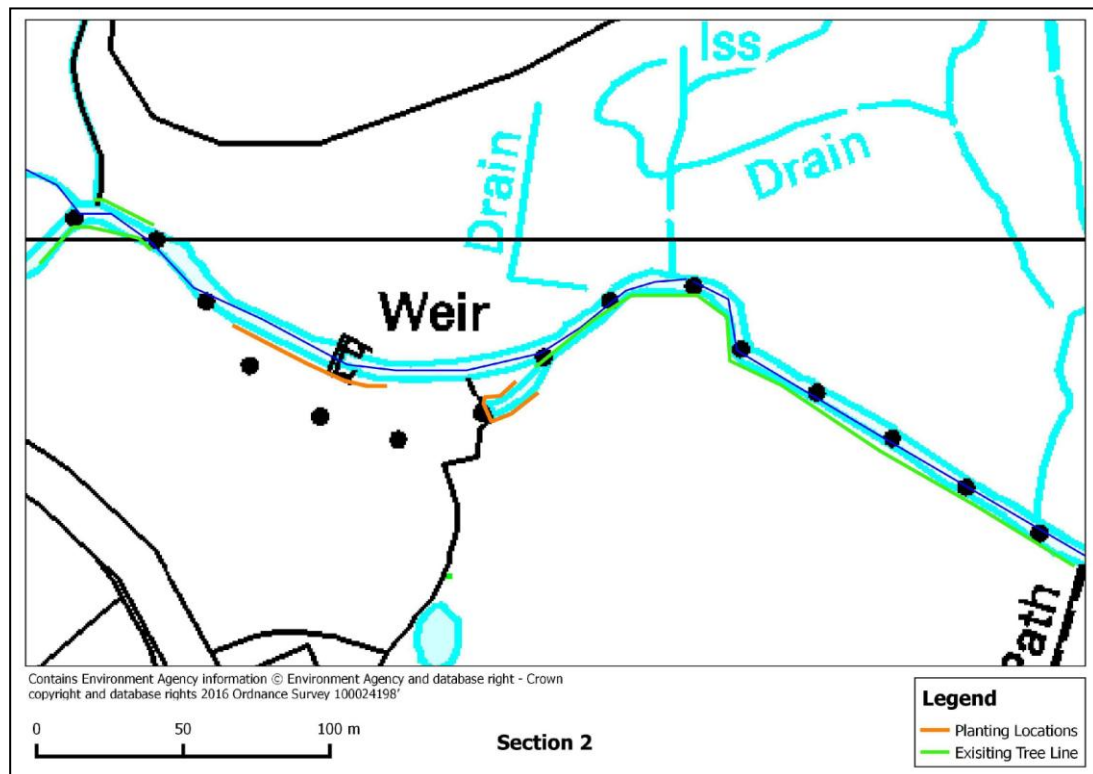


Fig. 4. Proposed location of trees at site of the old weir which has been removed.

The new section of channel would benefit from tree cover on alternate sides (as the channel flows north/south). If this is impractical then all could be planted to one side (Fig. 5).

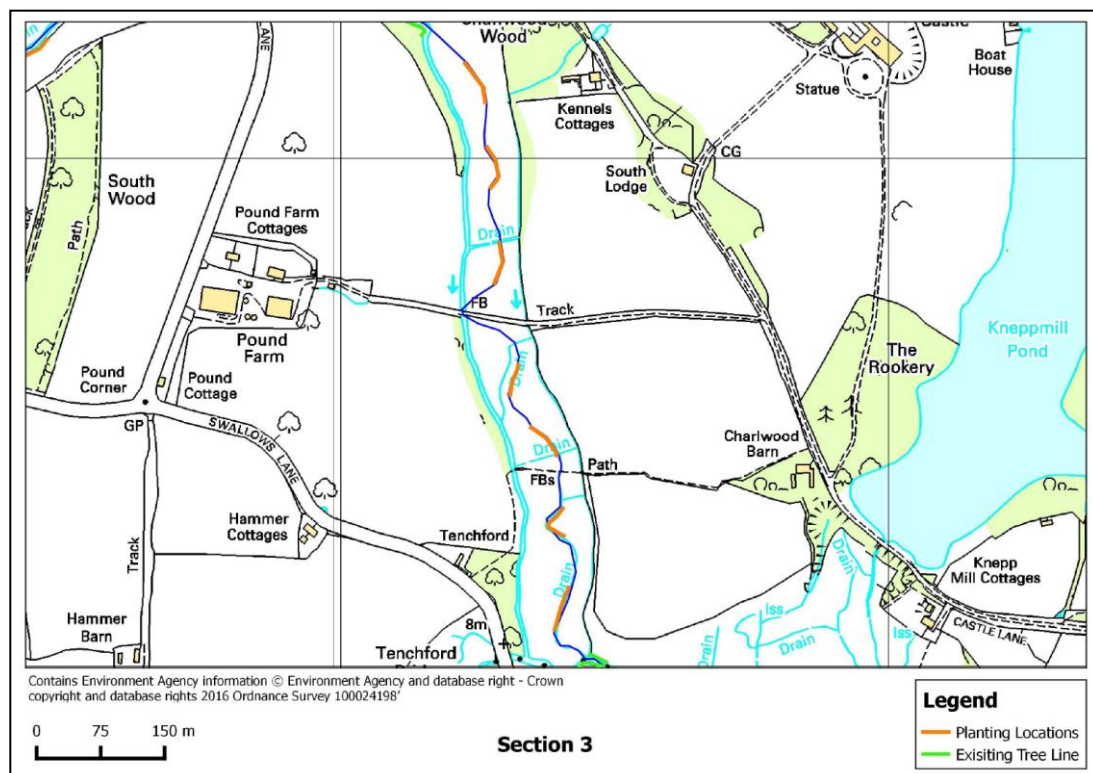


Fig. 5. Locations of trees on alternate banks through the new section of river.

The final section of the proposed planting is between Pound Lane (Capps Bridge) and Shipley Windmill (Fig. 6).

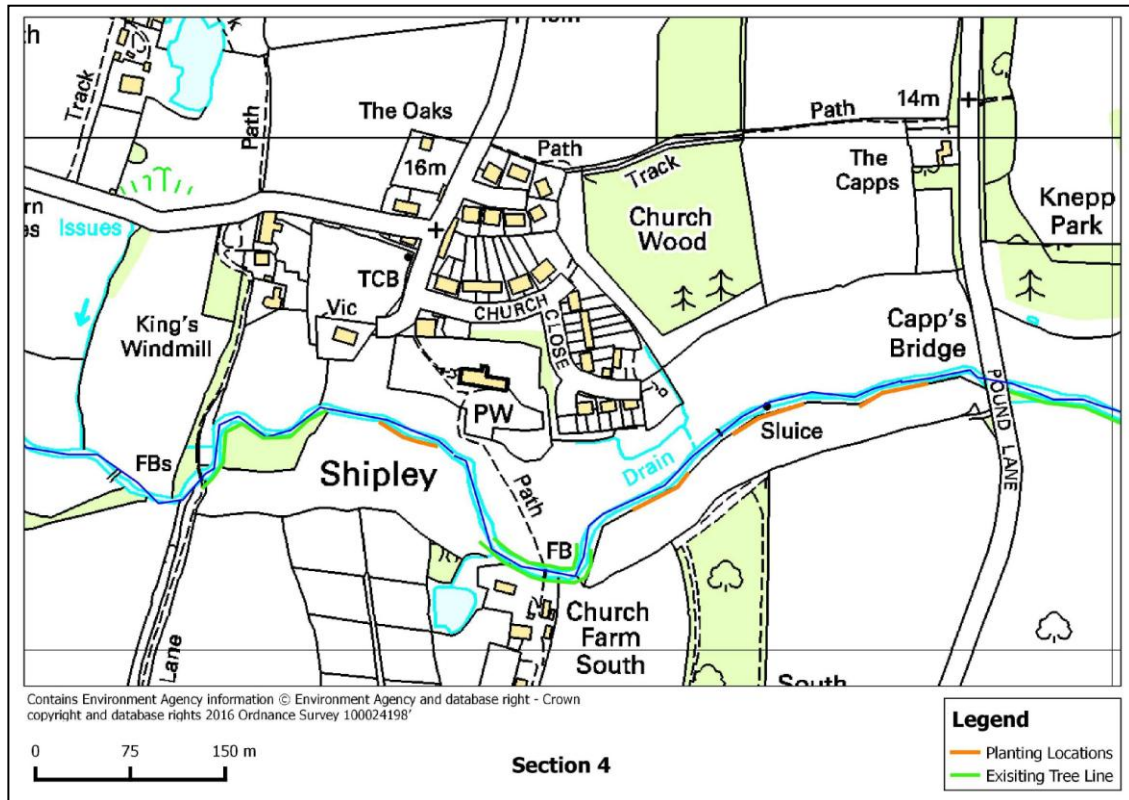


Fig. 6. Proposed planting between Pound Lane and Shipley Windmill.

### Tree Planting Methodology

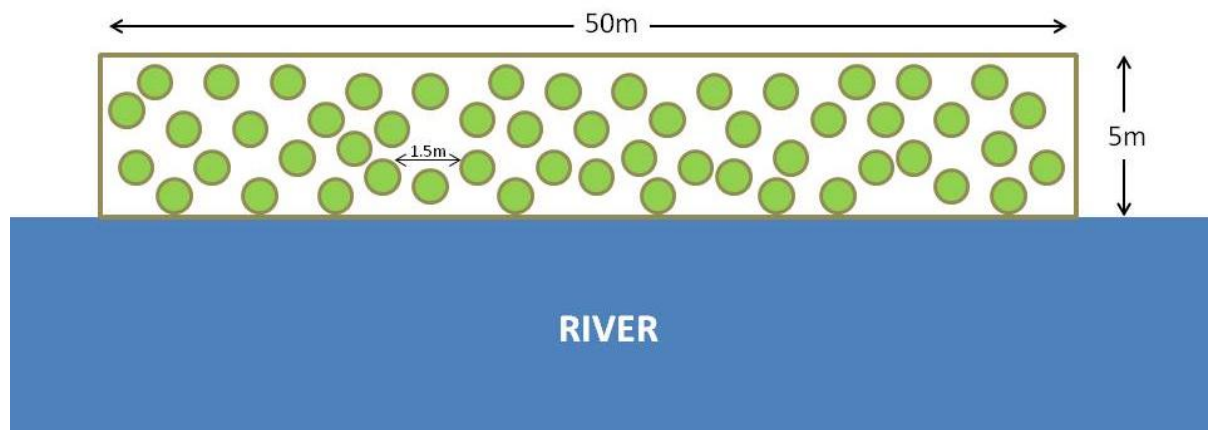
It is appreciated that the Knepp Estate has and continues to go through a process of re-wilding and as such practical management interventions are less than ideal. However, the medium to long term benefit to the river system through this intervention is believed to be worth taking this small scale measure forward at this time. Due to the presence of free-roaming livestock which would damage the young trees it is proposed to not only house each within a vented tree guard but also to



construct "corrals" around each planting area for a period of 3-5 years, at the end of which it will be possible to remove the guards and the fencing, returning the river to being naturally integrated into the landscape. Each corral will be constructed using wooden fencing materials (opposite) to enclose the young trees (not individually but as a "stand") and allow a chance for them to establish before the corral is removed.

The Woodland Trust would provide the financial contribution in as much as providing all trees, guards, stakes delivered to the site. In addition OART would be provided with the necessary funds to purchase the necessary fencing materials. OART would also co-ordinate the planting and fencing along the river corridor between November 2016 and March 2017 at a time convenient to the

Estate. This would involve local volunteers being invited to help plant the trees and erect the fencing. Subsequent to this the trees would be inspected and monitored by OART.



### **Water Temperature Monitoring**

This project has multiple benefits to it in terms of river ecology, morphology and hydrology. However, one of the primary focuses is to mitigate the effects of climate change on freshwater temperatures, a factor which is hugely influential on the success of spawning by a wide range of fish species. We would like to set up long term monitoring at the sites where the planting is undertaken. This would involve the placement of a temperature data logger in sections where trees have been planted and, for control purposes, where they are left absent. These data loggers would record river temperatures at 30 minute intervals, 24 hours a day and we would like to leave them in situ for as long as possible (30 years would be ideal). OART would, in conjunction with the Estate if desired, retrieve the data from these monitoring points and collate into a long term data set.

### **Promotion and Publicity**

The River Adur is almost devoid of trees for most of its length (0.4% of the floodplain corridor is woodland when taking into account the whole catchment area). This project is aimed at the entire Adur corridor to increase this tree cover and deliver the numerous benefits mentioned throughout this document. As such we will, during 2017, be promoting this project and encouraging landowners to get involved, part of which we would like to host a visit to the Estate to show how this might look in reality. In addition we will be advertising this through local press coverage, social media, the Wild Trout Trust, Woodland Trust and OART websites, newsletters and leaflets. We would like to highlight the work at Knepp in order to enthuse others to become involved.

### **Conclusion**

We would like to plant within the areas suggested, however, this is an indicative proposal and exact locations, numbers and species are all open to discussion. In addition if there are other watercourses within the Estate which may benefit from some tree planting we would be more than happy to discuss these as well.