

Trees and water in the East of England



The Regional Woodland Strategy for the East of England [www.woodlandforlife.net] provides a number of priorities for the enhancement, over the next 20 years, of the benefits that trees and woodlands bring to the people who live and work in the region. Water is obviously necessary for tree growth, but trees and woodland also have an important role in improving our vital regional water resource. This paper summarises the benefit that trees and woodlands bring in relation to water quality, water quantity, flood alleviation and biodiversity.

Water quality and supply

- The East of England is one of the fastest growing regions of the country in terms of population, with a resultant increasing demand on natural resources such as water. The impact of trees and woodlands on the future management of water in the region is likely to become ever more significant; particularly when viewed against climate change predictions.
- The East of England is the driest area of the country and climate change predictions indicate that this is likely to get worse with resultant demand on water that will impact on all uses including domestic and agricultural production.

Trees and water

- Trees and woodlands can impact on both water quality and water quantity.
- Water draining from well-managed woodland tends to be of high quality with low concentrations of nitrate, phosphate, sediment and pesticides. This reflects the minimal use of fertiliser and pesticides and the generally low level of soil disturbance under woodland compared to agriculture. Woodland creation can therefore make a significant contribution to reducing diffuse pollution from agriculture. Benefits can be maximised by targeting high risk soils and careful placement of new woodland on appropriate sites to intercept sediment laden and nutrient-rich runoff, e.g. along downslope field boundaries, runoff source areas, infiltration basins and riparian zones.
- Water quantity can be modified in two ways. The amount of water is potentially less from woodland compared to agriculture, depending on climate, soils, geology and woodland type, design and management factors. Water yield is likely to be significantly reduced under conifer forest and crops of short-rotation coppice but similar to or slightly higher for native broadleaved woodland on soils well supplied with water (e.g. overlying chalk). Woodland can also affect the timing of run-off by enhancing the infiltration of rainwater into the soil. This may help to reduce local flooding, especially where woodland replaces agricultural practices that tend to result in soil compaction and surface capping.

- The planting or restoration of floodplain and riparian woodland in association with the development of more natural river flows has been shown to retain more water on the floodplain. The presence of tree and shrub stems, buttresses, stumps and fallen deadwood form a significant physical barrier to flood flows, which can reduce downstream flooding and hence benefit flood defence.
- Trees and woodlands contribute greatly to the biodiversity of the East of England. Wet woodland (woodland which is established on land subject to seasonal flooding and/or with a high water table) is particularly important to the region. It is a key Biodiversity Action Plan target and the most diverse and species rich of all our terrestrial habitats. Wet woodland along watercourses can also benefit aquatic habitats by the input of woody debris and leaf litter, as well as by regulating water temperature via canopy shade. The latter benefit is expected to become increasingly important as climate warming threatens salmonid fish and other temperature-sensitive freshwater life.

Flood management

- With flood events apparently on the increase the issues of flood prevention and mitigation measures are becoming increasingly important. An increasing risk of flooding is one of the most firmly predicted impacts of climate change. At the same time, it is becoming clear that there are other approaches to solving the problem than by building ever-higher flood defences. The emphasis is turning to pursuing more sustainable means of flood control. One option that requires more research is the potential for woodland to help alleviate damaging floods, particularly though the planting or restoration of floodplain and riparian woodland in association with the development of more natural river flows. It has been shown that these types of woodland can retain more water on the floodplain, principally due to the trees, ground vegetation and fallen dead wood forming a significant physical barrier to flood flows. Woodland higher up the catchment could also have a role in reducing peaks and troughs in flow rates (by reducing infiltration and acting as 'buffering' water storage). There is also the attraction of the many other benefits provided by floodplain woodland, including enhanced;
 - recreation
 - landscape
 - biodiversity
 - water quality
- Opportunities to restore floodplain woodland and to assess its ability to aid flood control, however, are hampered by a number of related concerns. These include the threat of such woodland actually increasing flooding due to backing-up of floodwaters upstream and the blockage of downstream bridges and culverts by woody debris. The risk of such problems arising depends on local factors such as the presence of housing and transportation links, and the capacity and location of flow controlling structures. Other constraints on planting within floodplains include:
 - protection of other important wetland habitats
 - maintenance of appropriate access to the main river channel
 - protection of buried archaeology
 - maintenance of a navigable channel for boat traffic
 - making sure that summer water flows will not be significantly reduced

- The East of England is characterised by the high proportion of the area that is flood plain, but the built-up nature of much of this, and the large number of potential constraints mean that there are likely to be relatively few locations where extensive areas of floodplain woodland could be created. There could be, however, considerable scope for planting a network of smaller riparian and floodplain woods, which collectively could aid downstream flood control.
- Recent developments in information technology and river modelling mean it should now be possible to determine the most suitable location of floodplain woodland. Geographical Information Systems provide a means by which suitability maps could be produced. Such maps would indicate the scope for future planting in river catchments and thus help to determine the extent to which woodland could contribute to flood control in the future.

Biodiversity

- Trees and woodlands contribute greatly to the biodiversity of the East of England. Of greatest importance are those woodlands that are Special Areas for Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), all of which have statutory protection.
- Wet woodland (woodland which is established on land subject to seasonal flooding and/or with a high water table) is particularly important to the region. It is the most diverse and species rich of all our terrestrial habitats. Currently, however, more wet woodland is being removed for Fen or wetland restoration than is being created, so the region is going backwards on its wet woodland HAP targets. Partners should encourage the establishment of new wet woodland wherever this is technically feasible and leads to a net increase in biodiversity.
- Targets for the maintenance, restoration and creation of (ancient) semi-natural woodland have been agreed by the East of England Biodiversity Forum ¹:

Habitat	Maintain	Restore	Create
Wet woodland	100% of existing	200ha by 2010	150ha by 2010

¹ www.eastspace.net/biodiversity

