

Water and the landscape

Flood risk Management

The Landscape and its design and management can have a vital effect on slowing and decreasing water runoff in times of flooding.



There are many elements of the natural landscape which can help facilitate water retention.

These may include tree planting, restoring blanket bog and heather moorland. These have their place in upstream river catchment areas to minimise effects of downstream flooding.

These can become or are already, important wildlife habitats, supporting rare species. They also form an important recreation resource.

Further downstream, the use of wet woodlands and tree canopies mean that up to a third of rainfall is intercepted and returned to the air through evaporation. The remaining two thirds of the rain is slowed down by trees which increase the surface “roughness” dramatically. The woodland floor of broadleaved deciduous woodland is composed of a thick layer of leaf litter which acts like a sponge,

soaking up surface water and intercepting it; slowing down the rate of surface water flow.

Coniferous woodland conversely, does not form a deep leaf litter layer and has hardened soil surface layers as it tends to be acidic. These factors mean that coniferous woodland are less effective at delaying water flows.

Sediment trapping and management

In lowland river valleys, less intensive farming methods which include short term coppicing of wet woodlands, will be used to slow the flow of water.

Designing in the use of marshland features like reed beds, lowland bogs and wet woodland can afford valuable extra warning time and allow additional emergency preparation time by staggering peak water flows and decreasing the intensity and damage by flood water.

Conversely, intensive farming systems and buried land drains can act to speed up water flows and increase the risk of damage from peak flows of water to the landscape.

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The roots from trees and the surface roughness of unimproved pasture and wet meadows and marshland by contrast, act as a sponge to water and increase water holding capacity.

In this way, landscape design and management to increase the incidence of water slowing and water retaining bodies in the landscape, can have a considerable and beneficial effect in increasing safety to landowners and residents of the catchment areas affected by flooding.

The nature of river catchments, their differing characteristics (slopes, soil, hydrology, vegetation cover, management coupled with the changeable weather systems that bring high rainfall events mean that predicting and pinpointing flooding is not always easy.

By using landscape design and management, we can however take positive immediate steps towards intercepting and slowing water flows, whilst improving water storage systems and thus aiding sustainability of water resources in the landscape.

In urban areas, water flows are speeded up by the increased incidence of hard surfacing and drainage systems. Runoff from roofs and car parks increases the rates of water flow into river systems. This increases the likelihood of flooding during high rainfall and when this coincides with Spring tides, damage caused to land and property in coastal areas downstream and in river floodplains can be considerable.



Urban forestry has dramatically declined in the UK. This trend needs to be reversed and more urban trees planted. Also, in upland areas where soil erosion is occurring following past overgrazing of highland pastures and moorlands, the urgent re-vegetation of bare soil areas by replanting of vegetation with root systems to bind the soil together and tree species is vital, to prevent landslides which are a form of ecosystem “crash”. Similarly, in wetland landscapes, trees

will have an important defensive role against floods and should be replanted where they have been removed in the past.

These are all ecologically friendly management techniques which need to be taken on board with immediate effect.

As part of the longer term strategy for dealing with water in urban areas, local planning authorities’ policies and the new flooding guidance note means that developers will need to pay attention to the design and implementation of sustainable drainage systems. Along with tree planting, SUDS will help to reverse the trend of faster water flows and increased propensity towards flooding.

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Habitat Creation

Restoring the natural landscape of rivers by rehabilitating floodplain features, river channels, banks, marshland and reed beds, can improve biodiversity and the visual amenity of riverside landscapes. It will also enhance the natural functions and increase the water carrying capacity of rivers and floodplains systems. Detailed re design of geomorphological features, such as pools and riffles, swales and washlands, the floodplain water carrying capacity can be enhanced. This design will have positive knock-on side effects by increasing biodiversity and restoring the balance of ecosystems as well as improving water storage capacity in floodplain areas.



The risk of flooding can thus be decreased by landscape design and management to alleviate flooding. Sustainable urban drainage systems will help to increase water holding capacity and thus lessen flow runoff and flooding. Amended landscape management practices in upstream catchment areas and re vegetation of denuded areas of the moorland and uplands, or steep slopes in catchment areas will help to slow water flow

and increase biodiversity and restore ecosystem balance.

New legislation will be passed soon to help to prevent flooding and SUDS will be a part of new legislation to speed the sustainability of all landscape design and management practices.

The improved biodiversity of floodplains and catchment areas and the improved landscape amenity in these areas will be a beneficial effect of flood alleviation schemes and sustainable development.

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