
WATER

WHERE ARE WE NOW?

The Forest of Dean's complex geology underpins a distinctive and diverse landscape. Water moving through that landscape has naturally responded to the different topographies and permeability of the underlying rock over thousands of years.

On the limestone geologies, surface water would have readily percolated underground, leaving a fairly dry surface much more conducive to people moving through, and settling in the landscape. On the coal measures in the core of the forest, a much wetter natural habitat would have existed, with dense wet woodlands, braided stream channels, sphagnum bogs and mires, which would have made it an unwelcoming place for people.

Over time, as people settled in the landscape and started to exploit it the Forest has become significantly drier. Underground mine workings have provided many more points for surface water to drain underground and be channelled effectively out from the Forest. Centuries of woodland management have led to the creation of effective drainage patterns across much of the land surface. The channelling of water to power industries in the 19th century also had a dramatic impact in some locations. The result of those human activities is a well-drained landscape in which water moves more rapidly through the Forest than would naturally be the case.

There are two contrasting impacts of water moving through the Forest rapidly. Firstly, during periods of drought, low and no-flow conditions in the waterways have significant negative impacts on the ecology of streams and associated ponds. Secondly, in periods of high rainfall, the speed of water in the main channels can cause increased erosion leading to excessive sedimentation and damage to infrastructure, such as bridge supports and culvert pipes, as well as down-stream flood risk to properties. This is of particular concern for the Soudley and Ruspidge areas, that are recognised by the Environment Agency as being in a 'rapid response' catchment, where a catastrophic flood event is possible with risk to life.

It is, however, important to note that the intrinsic 'roughness' of woodlands and associated habitats results in water moving more slowly across the surface before finding its way into a drainage channel than either urban or agricultural land uses. It is also worth noting that the largest water bodies of Cannop Ponds, Soudley Ponds, Woorgreens and Mallards Pike Lakes are all man-made.

Despite the impact man has had on the way water moves through the Forest landscape, there remains a remarkable level of connectivity between the sea, the large tidal rivers (the Severn and Wye), and the Forest's streams and headwaters. This degree of connectivity, and the relatively benign conditions of woodland management, provide huge potential for a wetland network of national importance for aquatic flora and fauna. The Forest is already home to the endangered white claw crayfish, and the critically endangered European eel, for example.

Urban development and modern living can mask the linkages between water flowing in the natural environment and water coming out of your taps, or sewage down your toilets. But those linkages are very real. For example, much of Cinderford's drinking water comes from the underlying limestone aquifer, which is fed and maintained by rainwater percolating through from the woods above. The broken nature of the geology in places allows springs to emerge in the woods, either as lines across a hill side or as a single point, often identified as a well.

Poorly maintained septic tanks, or poor linkage of surface drains to the public sewer system, can lead to contaminated water getting into natural streams and Forest drains, leading to both short and long-term pollution. Although largely unreported, a number of properties in the Forest suffer from occasional, but predictable, surface water flooding.

The impact of the porous limestones, and the extensive mining through the coal measures, means that ground water and ground water flows are significant. The main mine 'drain' point is at Norchard, where water can be heard roaring out of the ground as you approach the Dean Forest Railway's main visitor base. But other drains exist throughout the Forest, often evident by a discolouration as mineral contaminants are deposited on the surface after the water emerges from underground. The ground water movements are complex, and numerous 'dip-wells' are maintained by the Environment Agency to track the levels. A number of properties in the Forest suffer from ground water flooding, albeit less frequently than surface water flooding; but it is still a significant issue for those affected.

Ponds in the Forest are predominantly man-made, and are in a generally poor condition due to encroachment by trees. Artificial stocking of the larger lakes with fish also poses a risk to the native aquatic fauna due to direct predation and risk of disease.

WHERE DO WE WANT TO GET TO?

100 years from now we will see a Forest where the streams, lakes, ponds and wetlands no longer require anything but the most minor interventions for natural processes to function and for a healthy water environment to prevail.

Our vision is that water in the Forest will be seen, perhaps for the first time, as a vitally important, life-giving asset to be cherished and treated with respect.

Streams will choose their own courses across their flood plains, forming blockages, islands, braided channels and backwaters. The flood plains will largely be riparian woodland, with tree species that are appropriate to this wet situation such as willows, aspen and alder.

The wooded slopes of the valleys and plateaus will include areas of mire and wet heathland that will act as sponges, holding up sufficient water for our streams to flow healthily throughout the summer months, maintaining good water quality and providing a habitat for fish and other aquatic species. The fish and other aquatic animals in the streams will have free passage to move from the Wye and Severn right up into the headwaters of the brooks, as manmade barriers have been removed or bypassed. The natural corridors along the brooks and their tributaries will provide vital connectivity between other patches of semi-natural habitat within the Forest.

Beavers will have established territories in many parts of the Forest, bringing with them dams, ponds and wet meadows. These, in turn, will provide a home for a plethora of wildlife such as water voles, fish, invertebrates, such as dragonflies, and a range of wetland plants.

The streams, ponds, flood plains and wetlands will be accessible to people for leisure and for sustainable exploitation of resources, including timber production and the provision of drinking water. People will more fully understand the links between water in the Forest, and the water in their homes, and value the wildlife supported by a healthy system.

After heavy rainfall, water will no longer rush down our rivers in torrents to cause flash-flooding in our towns and villages. It will pass slowly through the system via well-structured and rich soils; along complex, meandered and messy channels and flood plains; reaching our communities in a naturally controlled and predictable flow.

WHAT ARE WE GOING TO DO?

Our commitments:

1 Identify and develop riparian zones to enhance connectivity and functionality of watercourses

2 Naturalise water channels by creating natural structures to build habitat diversity and slow the flow of water

3 Remove non-functional artificial barriers that restrict the movement of water and fish

4 Restore active mires and bogs to create habitat and reduce volumes of water flowing down and out of the Forest in storm conditions

5 Create and maintain ponds to support ecology

6 Manage water flow on operational sites to reduce soil erosion and excessive sedimentation, and modify our approaches to woodland drainage to allow them to function more naturally

7 Use beavers for engineering watery landscapes

1 Identify and develop riparian zones to enhance connectivity and functionality of watercourses

Our initial priority will be to complete a high level habitat mapping exercise, linked to the existing Forest of Dean Landscape Character work, to provide a landscape-scale framework to link habitats in a resilient and ecologically functional manner.

Connectivity, and ecological functionality of the watercourses, will be enhanced through identification and development of functional riparian zones. A functional riparian zone intercepts surface water flows before they meet a flowing stream or other drainage channel – forcing the surface water to slow down and filter through the ground vegetation before meeting the main channel. This slows the water down, and allows carried sediment to drop out. Within the riparian zone, the main channel should be functioning in a naturally diverse and ever changing way, connected to its flood plain.

2 Naturalise water channels by creating natural structures to build habitat diversity and slow the flow of water

Currently a great many of the Forest's stream, river and drainage channels have been artificially straightened and deepened. This needs to be reversed to slow the water down, allowing channels to meander and braid (split into numerous smaller channels). This can be done in numerous ways, but each site needs to be assessed on its own merits with appropriate assessment of risk, and respect for other land management principles (including built heritage). When naturalising streams, we will look to create a variety of naturalistic structures to build in habitat diversity.

3 Remove non-functional artificial barriers that restrict the movement of water and fish

The free movement of water and fish is restricted in numerous places by artificial barriers. Some of those barriers no longer form any useful function and could be removed. Others are still required, and more careful assessment of options needs to be made. In the main, forestry culvert pipes and bridges are too too small and, as they are replaced, we will look to increase the space for natural water flows. Our larger lake systems are all man-made, and often large volumes of water are artificially held back by aging or otherwise vulnerable dams. While we are not proposing to remove those lakes, we will review options to reduce risk and increase ecological values, while aiming to preserve amenity values, through re-engineering dams and out-falls.

4 Restore active mires and bogs to create habitat and reduce volumes of water flowing down and out of the Forest in storm conditions

Within the upper parts of the Forest core, we will look to areas of relict mire as the starting point to restore active mire / sphagnum bog. This is an important habitat in its own right, but will also have an important role in acting as a reservoir of water that can be naturally released during drought conditions to maintain stream flows. These bogs will also hold water in storm conditions, thus reducing the volumes flowing down and out of the Forest.

5 Create and maintain ponds to support ecology

We will look to supplement the existing pond network with collections of ponds within suitable locations (soils/ topography) where natural processes can operate to support an ecologically functional system, acknowledging that tree felling and scrub management may be required through time.

6 Manage water flow on operational sites to reduce soil erosion and excessive sedimentation, and modify our approaches to woodland drainage to allow them to function more naturally

We will refine the operational planning systems to take account of the increasing need for more detailed site by site assessments for water management, and encourage greater use of natural processes to achieve the required objectives. We will strengthen the link between operational plans and execution of those plans.

Management of surface flows from and across operational sites will be improved to reduce soil erosion and excessive sedimentation downstream.

We will modify our approaches to woodland drainage, and drain maintenance, aiming to reduce the artificiality of drains, and encouraging them to function more naturally – acknowledging that civil engineering assets need to be maintained, and that protection from water damage may require pro-active interventions. In making those interventions, we will be aware of the potential down-stream or down slope impacts. Equally, we will need to continue to manipulate soil water levels in some wooded locations, such as oak woods, to maintain conditions for healthy tree growth.

7 Use beavers for engineering watery landscapes

While the return of beavers to part of their former native range is a good conservation story in its own right, our interest in them is largely as a 'tool' for engineering watery landscapes to store water, mitigate storm flows and filter out contaminants to improve water quality. Beavers will provide much of the ecological functionality that we are looking to recreate through naturalisation of stream channels. The challenge with beavers is getting them to work in areas we want them, and stopping them straying into areas we don't. Currently, this is achieved through heavy duty fencing, but we don't want to see significant, large-scale fencing in the Forest long-term.

These are our principles of land management to safeguard and enhance our waterways and wetlands in the Forest of Dean.