



UPSTREAM MANAGEMENT

Upstream management, otherwise known as slow the flow, is a collective term for techniques used to manage flood risk and includes flood storage solutions as well as natural flood management (NFM). Upstream management is the alteration, restoration or use of landscape features to manage flood risk. One technique is moorland restoration.

MOORLAND RESTORATION

Much of the UK's moorland is heavily eroded due to pollution, over grazing and drainage. Heavy erosion of the peat in these areas increases water runoff from the moorland which adds to the flood risk downstream, contributing to flash floods. Restoring moorland can reduce the impact of flooding downstream by increasing the time it takes for rainwater to reach the rivers. Increasing surface roughness with vegetation results in overland flow rates being reduced, creating a 'wetter' catchment.

Stabilising bare peat

Heather brush and geo-textiles are used to form a network of vegetation to reduce peat erosion. Grasses are then sown and lime fertiliser is used to increase the pH of the soil to encourage the growth of vegetation, stabilising peat and reducing erosion.



Sphagnum moss

This species of moss is an important building block of peat formation, acting like a sponge soaking up more than 8 times its weight in water and staying wet long after soil has dried out. It helps to restore water tables, slow down water discharge and improve water quality.

Gully Blocking

Blocking grips and moorland drainage channels traps water and sediment which slows the flow of water and raises the water table. Impermeable (plastic) dams can be used to trap water, or permeable dams made of heather or peat, can be used to slow water and trap sediment.

Benefits

- Reduces downstream flood risk by increasing water storage and slowing down the flow of water across the land.
- Improves water quality and the ability of peatland to store carbon.
- Improves biodiversity by recovering moorland habitats.



CASE STUDY: Kinder Scout

Moors for the Future, in partnership with the Environment Agency, utilised upstream management techniques to restore degraded moorland in the upper catchment of the River Derwent to hold back water and increase the amount of time it takes to reach the river during heavy rainfall. This £1 million project between 2009 and 2015 aimed to demonstrate how using these techniques would affect flood risk.

Issues

- Heavily eroded peat in poor condition.
- Sphagnum moss, a species essential to the formation of new peat, was virtually wiped out.
- In 2009, 34% of the blanket bog contained severely gullied and bare peat areas.

Solutions

- Gully blocking 1,284 stone dams and 834 timber dams.
- Bare peat stabilisation using approximately 2,310 tonnes of heather shrub since 2003.
- Annual lime and fertiliser treatment.
- Planting of 38,000 plugs of moorland species.
- Grazing exclusion.

Benefits

- Average peak flows reduced by 30%.
- Average runoff slowed by around 20 minutes.
- 5km² of peat restored over 12 years.
- Gully blocking and re-vegetation resulted in the water table rising by 30%.