

Case study 37. Pumlumon Peatland Restoration for Floodwater Management

Author: Liz Lewis-Reddy

Main driver: Landscape restoration and management

Project stage: Ongoing, began 2005



Photo 1: Pumlumon Project (source: [Montgomeryshire Wildlife Trust](#))

Project summary:

The Montgomeryshire Wildlife Trust has been running the Pumlumon Living Landscape Project (Photo 1 and Map 1) since 2005, during which time it has developed and demonstrated the benefits of an ecosystem approach to landscape, people, the economy and wildlife. Rewetting upland peat bogs, through the blocking of drainage ditches, improves their condition and water retention capability, creates new areas for wildlife, and helps reduce climate affecting emissions. The Pumlumon project recognises that the future for upland farming is threatened; however, there is also awareness that the uplands of Wales offer vital economic opportunities both in terms of carbon and floodwater.

Key facts:

- The Pumlumon Living Landscape Project has identified a number of ditch blocking methods to support floodwater management works across of range of sites.
- The capital works cost to carry out effective flood water management techniques on degraded bog is minimal. However, it represents a potentially valuable economic opportunity for upland landowners.
- The data collected to date have been analysed by CEH Wallingford. The hydrological restoration carried out on Glaslyn has raised the water table by 5cm.



1. Contact details

Contact details	
Name:	Liz Lewis-Reddy (Montgomeryshire Wildlife Trust)
Lead organisation:	Montgomeryshire Wildlife Trust
Partners:	Defra, Natural Resources Wales, Powys County Council, Ceredigion County Council, Communities First Mahynlleth, Ecodyfi and Pentir Pumlumon, Dyfi Biosphere, Cambrian Mountains Initiative, Leeds and Bangor Universities, RSPB, Centre for Ecology and Hydrology (CEH) and Welsh Government
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2. Location and catchment description

Catchment summary	
National Grid Reference:	
Town, County, Country:	Straddling the counties of Powys and Ceredigion, Wales
Regional Flood and Coastal Committee (RFCC) region:	Wales
Catchment name(s) and size (km²):	400km ² of the Cambrian Mountains
River name(s) and typology:	Largest watershed in Wales, supplying water to the Wye, Severn, Rheidol, Dyfi and Leri

Water Framework Directive water body reference:	
Land use, soil type, geology, mean annual rainfall:	Peatland

3. Background summary of the catchment

Socioeconomic/historic context

The project area is home to 15,000 people, spread across 11 local communities. There are 250 farms in the project area and farming, forestry and tourism are the main economic activities.

Flood risk problem(s)

Not applicable

Other environmental problems

The need for the project came about when a habitat condition survey of the Pumlumon Site of Special Scientific Interest (SSSI) in 2000 revealed that these upland habitats of acid grassland, peat bog, heath and lakes were in a less than favourable condition.

4. Defining the problem(s) and developing the solution

What evidence is there to define the flood risk problem(s) and solution(s)

Not applicable

What was the design rationale?

Discussions between the Montgomeryshire Wildlife Trust and the statutory agencies between 2000 and 2004 concluded that restoring the condition of these habitats would require more of a socioeconomic solution (by persuading landowners and farmers to change their land management and farming practices) rather than a purely environmental one led by nature conservationists and the statutory agencies.

In May 2008, 2.3km of ditches were identified on 9ha of ground belonging to Mrs Hughes of Rhosygarreg. Over a 10 day period, 85 peat dams were created using a 3-tonne metal-tracked excavator with a toothed bucket at a cost of approximately £25 per dam, affecting the floodwater holding capacity of a 73ha catchment.

In August 2009, 3.4km of ditches were identified on 34ha of the Glaslyn nature reserve belonging to the Montgomeryshire Wildlife Trust. Over an 11 day period, 286 peat dams were created using a 3-tonne metal-tracked excavator with a toothed bucket at a cost of approximately £10 per dam, affecting the floodwater holding capacity of a 129ha catchment.

Project summary

Area of catchment (km²) or length of river benefitting from the project:	400km ²
Types of measures/interventions used (Working with Natural	Ditch blocking and engagement with local landowners

Processes and traditional):	
Numbers of measures/interventions used (Working with Natural Processes and traditional):	
Standard of protection for project as a whole:	Not applicable
Estimated number of properties protected:	Not applicable

How effective has the project been?

The data collected to date have been analysed by CEH Wallingford and the hydrological restoration carried out on Glaslyn has raised the water table by 5cm

5. Project construction

How were individual measures constructed?

Excavators were used to block ditches.

How long were measures designed to last?

Indefinitely

Were there any landowner or legal requirements which needed consideration?

Collaboration with Pillar 2 agri-environment scheme holders had to be managed carefully to ensure actions were in addition to what was already being funded.

6. Funding

Funding summary for Working with Natural Processes (WWNP)/Natural Flood Management (NFM) measures

Year project was undertaken/completed	Began initial scoping in 2000 First work in 2005 Project is ongoing
How was the project funded:	Multiple sources of funding from a wide range of partners Pilot Payment for Ecosystem Services (PES) scheme
Total cash cost of project (£)	Total cost to date: £1.9 million
Overall cost and cost breakdown for WWNP/NFM measures (£)	85 peat dams at a cost of approximately £25 per dam 286 peat dams at a cost of approximately £10 per dam Total: £4,985 Also tree planting (not costed) which increases water absorbency

WWNP/NFM costs as a % of overall project costs):	0.3% (just includes ditch blocking)
Unit breakdown of costs for WWNP/NFM measures:	2.3km of ditches were identified on 9ha of ground: over a 10 day period, 85 peat dams were created at a cost of approximately £25 per dam, affecting the flood water holding capacity of a 73ha catchment 3.4km of ditches were identified on 34ha of the Glaslyn nature reserve: over an 11 day period, 286 peat dams were created at a cost of approximately £10 per dam; affecting the flood water holding capacity of a 129ha catchment
Cost–benefit ratio (and timescale in years over which it has been estimated):	

7. Wider benefits

What wider benefits has the project achieved?

Work on the Pumlumon Project has improved the capacity of the habitats to deliver ecosystem services for water supply, recreation, water quality regulation and flood regulation. The project has demonstrated 'proof of concept' by delivering ecosystem services through visible and sustainable changes in landscape quality, biodiversity, access and economic well-being throughout the project area but principally in the uplands, on the flanks of the Pumlumon Mountains and in the Dyfi Valley.

How much habitat has been created, improved or restored?

1,013ha of habitat under conservation management including 309ha of restored peatland and 65ha of regenerating woodland

8. Maintenance, monitoring and adaptive management

Are maintenance activities planned?

Management of land is ongoing and the project still underway.

Is the project being monitored?

The water table, surface flow, flow rates in blocked and unblocked drains, and rainfall level continue to be monitored.

Has adaptive management been needed?

High rainfall levels immediately post restoration resulted in some peat dams not holding. Further funding needs to be identified to return to site to repair damage.

9. Lessons learnt

What was learnt and how could it be applied elsewhere?

The willingness of the landowning community to engage with ecosystem services projects is not a

limiting factor. However, it is essential that any emerging mechanisms engage with the landowners from the beginning. This will ensure buy-in and take-up as well as help to overcome some of the early challenges faced by the project team. The landowning community have a lot to offer with regards to putting land management measures to control floodwater in place and their expertise should not be taken for granted.

Reinventing the wheel rather than taking advantage of existing partnerships and linkages can result in 'scheme fatigue'. The trust and relationships that has developed over the course of this project is immensely valuable, especially when attempting to address societal needs with radical and innovative ideas. Future work would have a much greater chance of success if it were to take advantage of these existing relationships rather than trying to build new ones.

10. Bibliography

MILLWARD, A., 2014. *Defra PES pilot evaluation of the Pumlumon Project: Pumlumon Living Landscapes Project*. Defra, London.

Project background

This case study relates to project SC150005 'Working with Natural Flood Management: Evidence Directory'. It was commissioned by Defra and the Environment Agency's [Joint Flood and Coastal Erosion Risk Management Research and Development Programme](#).