United Utilities' SCaMP Project

A Decade of Monitoring Blanket Bog Restoration - what have we seen and what have we learnt?

S. Ross[1], G. Hammond[1], A. Keen[1] & C. Bullen[2]

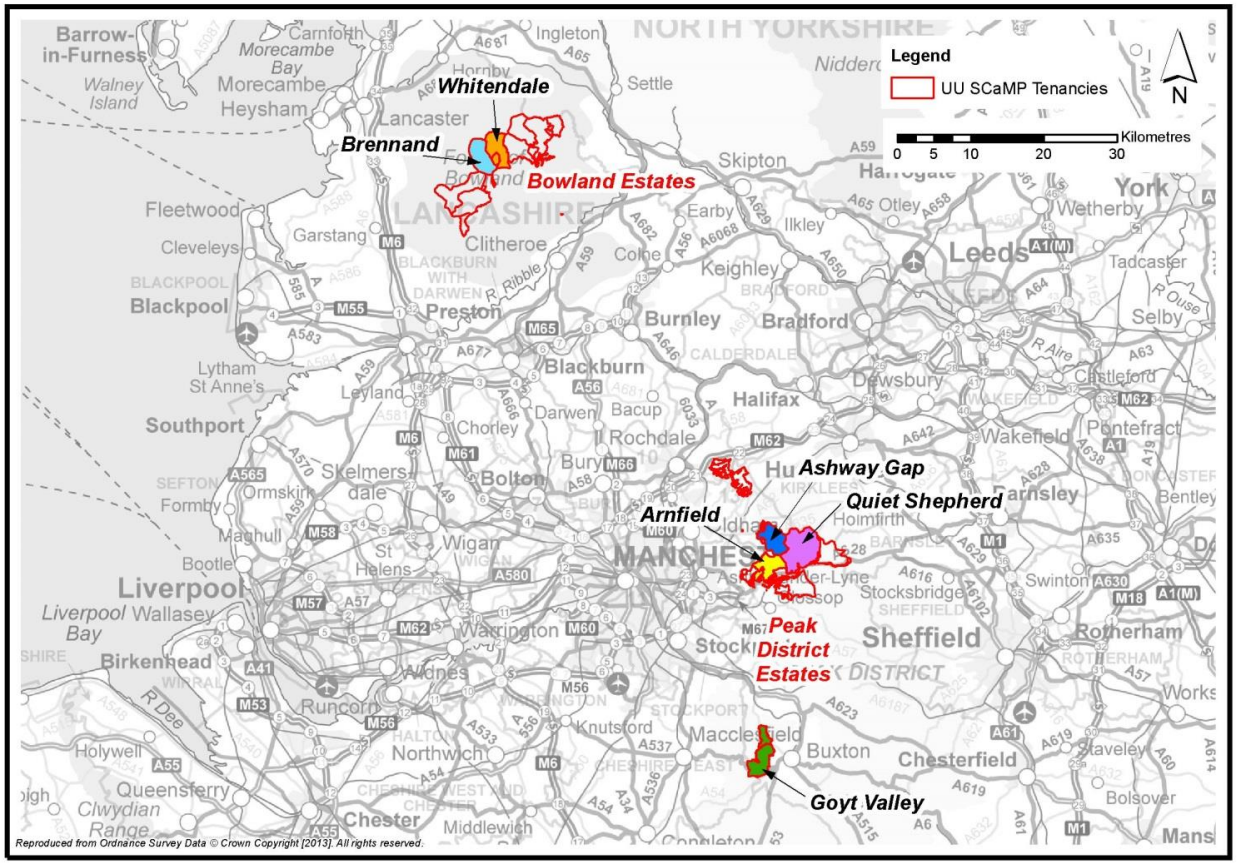
[1]*Penny Anderson Associates*

[2]United Utilities

United Utilities

Penny Anderson Associates Ltd
Consultant Ecologists

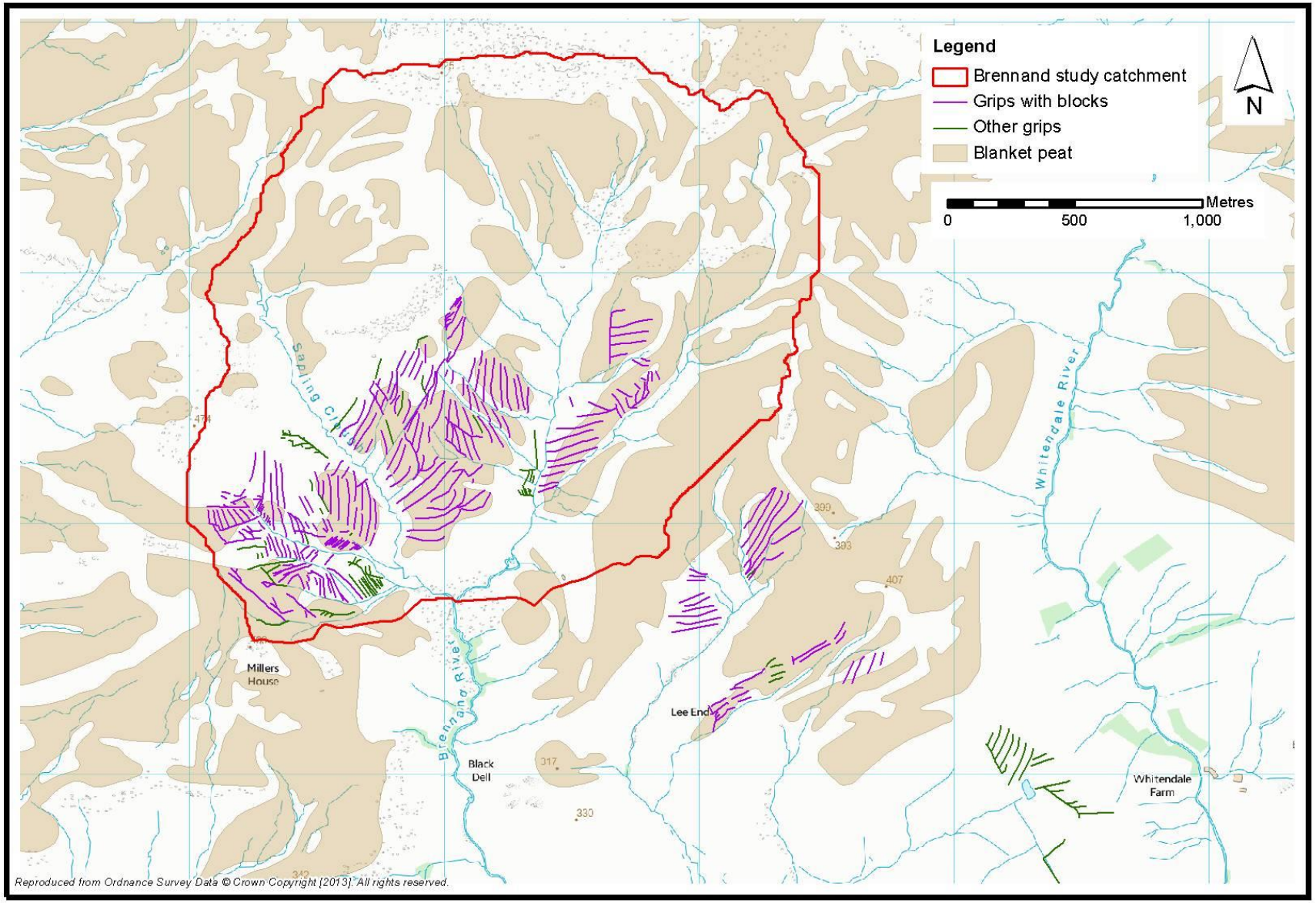
Introduction – what is SCaMP?



- Sustainable Catchment Management Programme (SCaMP).
- The project began in 2005/06 and continues to 2020.
- Monitoring restoration approaches.
- Long term dataset - begin to consider trajectories.

Prior to Restoration

- Significant artificial drainage (‘grips’) and gully erosion.
- Areas of extensive bare peat.
- Vegetation in poor condition.
- Loss of peat from the moorland.


Legend
Brennand study catchment
Grips with blocks
Other grips
Blanket peat
N
Metres
0
500
1,000
Sapling Clough
Whitendale River
Brennand River
Millers House
Lee End
Black Dell
Whitendale Farm
474
399
393
407
317
330
342
Reproduced from Ordnance Survey Data © Crown Copyright [2013]. All rights reserved.

Restoration Measures

Restoration measures applied across 12,300ha blanket bog:

- 85km grips blocked with peat or plastic dams.
- 470ha eroding bare peat treated with grass ‘nurse’ crop, heather brash, and/or geojute textile.
- ‘novel’ coir roll installation.

Monitoring Approach

- Hydrology - peat water levels, stage discharge, rainfall gauges.
- Water colour (DOC), turbidity (POC). Spectrolyser deployed in the field.
- Vegetation quadrats within plots, including reference plots, & fixed point photography

What have we seen?

- Present the effects of:

  (1) grip blocking at Brennand and Goyt.
  (2) bare peat restoration at North Longdendale.

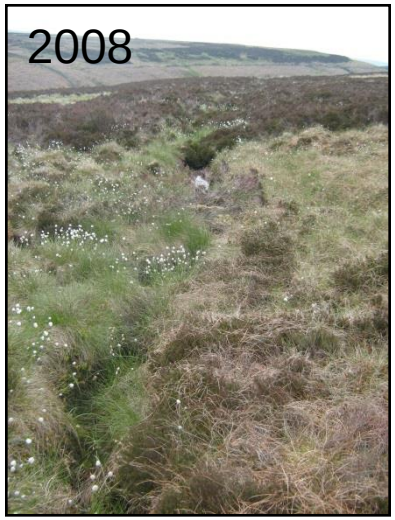
  - What did we observe on the ground?
  - What changes did we record in the vegetation?
  - What changes did we monitor in terms of water levels in the peat?

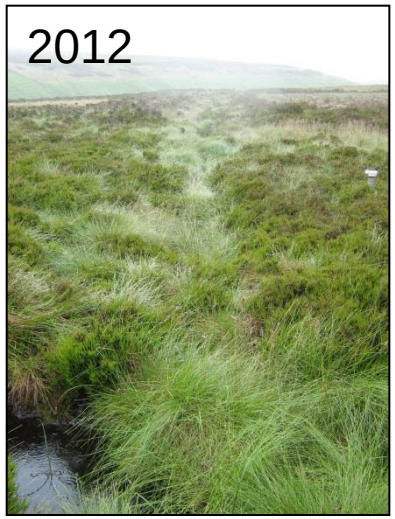
- What can we say about trajectories of blanket bog restoration under these different restoration scenarios?

Results

Goyt – grip blocking

Goyt: Grip Blocking





On **Goyt** there is visible evidence of the benefits of blocking grips:

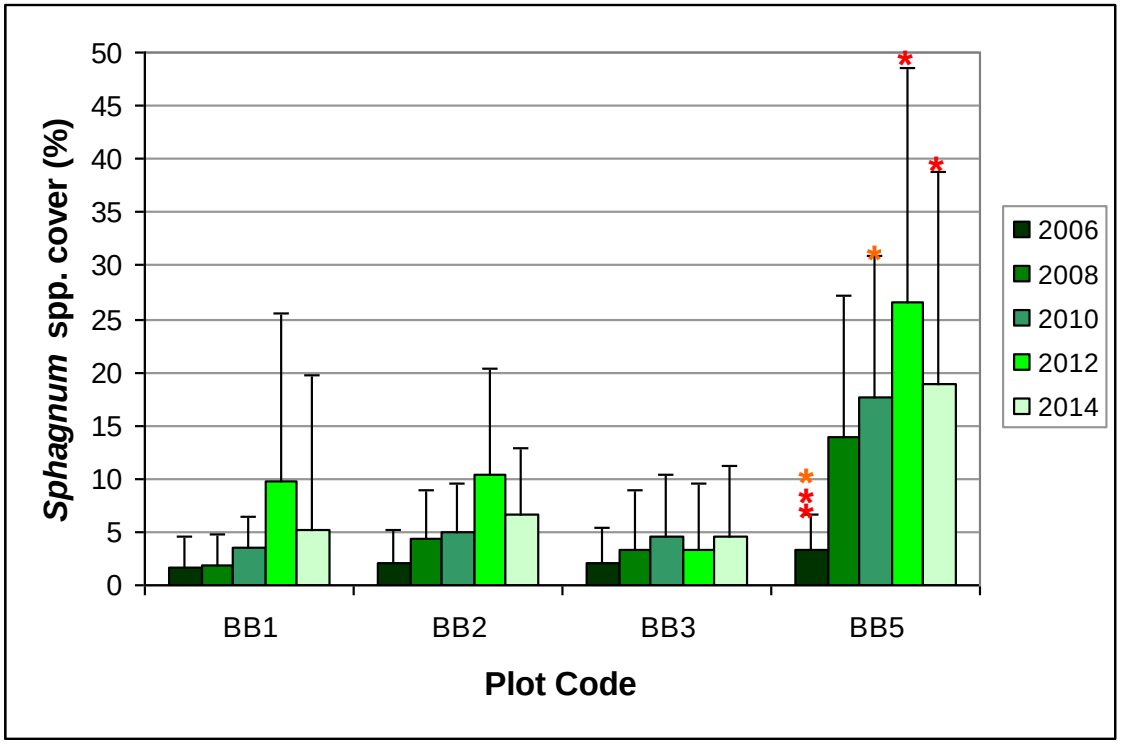
Heather expands.

Hare's-tail cottongrass is filling in the grip.

Sphagnum (bog-moss) is developing in the pools formed by grip blocking.

Goyt: Grip Blocking

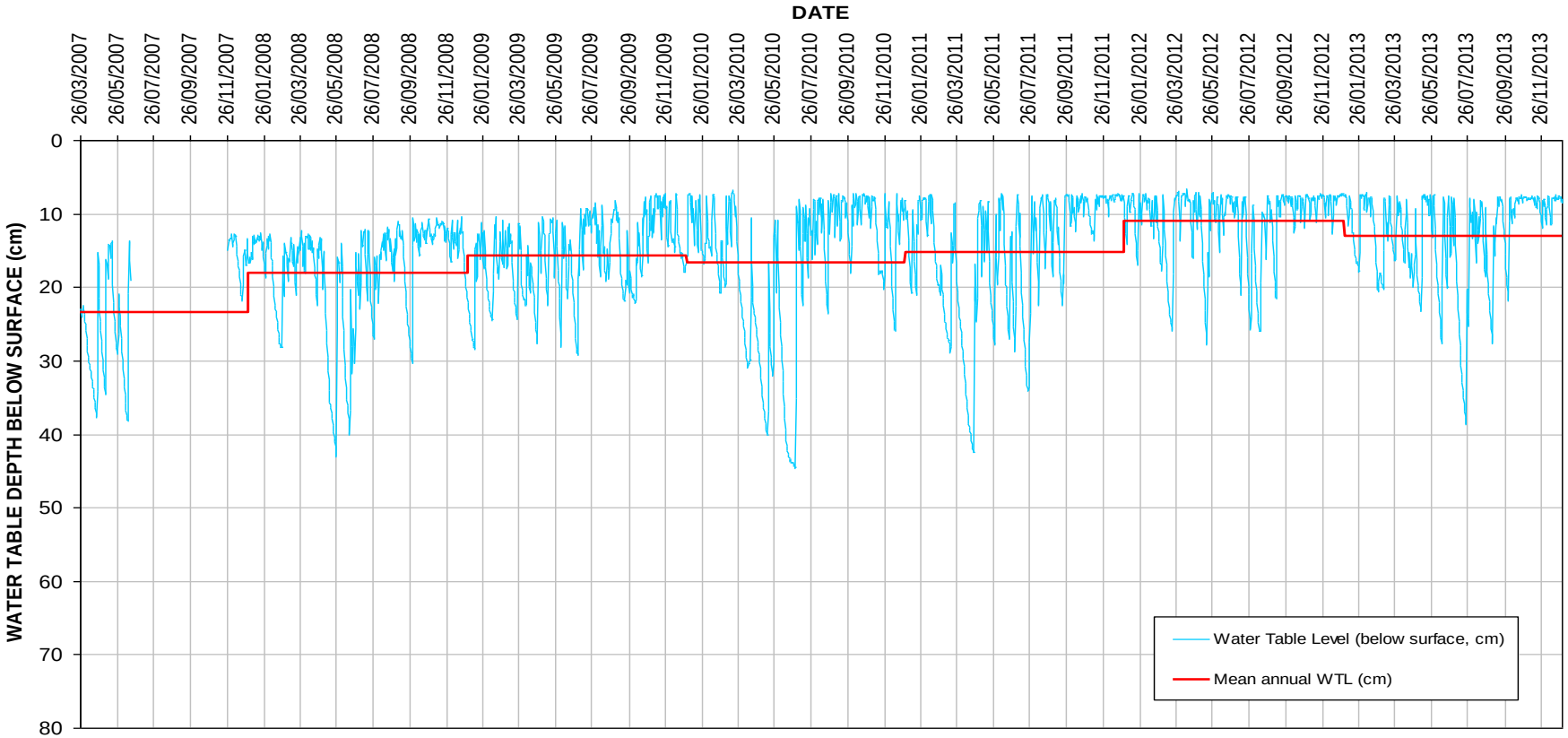
Significant increases in *Sphagnum* cover at **Goyt**



- BB1 & BB2 = grips blocked 2006, with peat dams.
- BB3 = grips left un-blocked until 2010, then blocked with peat dams.
- BB5 = grips blocked 2006, with peat & plastic dams.

Goyt: Grip Blocking

The **Goyt** monitoring shows consistent trend towards higher and more stable **peat water levels** over time



Results

Brennand – grip blocking

Brennand: Grip Blocking

May 2007

Feb 2009

Oct 2012

June 2013

June 2014

June 2016

On **Brennand** there is also visible evidence of the benefits of blocking grips, even on large drains/grips.

Heather and hare's-tail cottongrass increase along the edges.

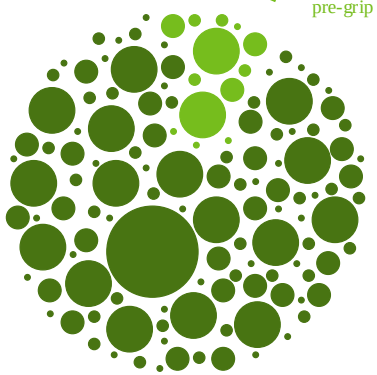
Sphagnum (bog-moss) forms patches within the deeper pooled water, expanding from the edges.

Brennand: Grip Blocking

Brennand 2007

10.1%

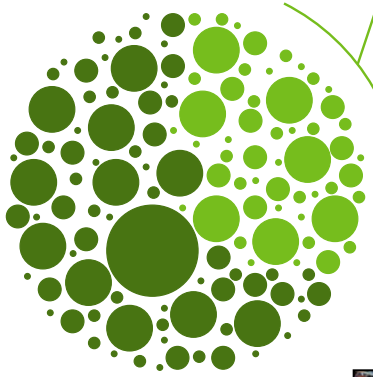
Average *Sphagnum* species cover across 5 sample sites, pre-grip blocking



Brennand 2017

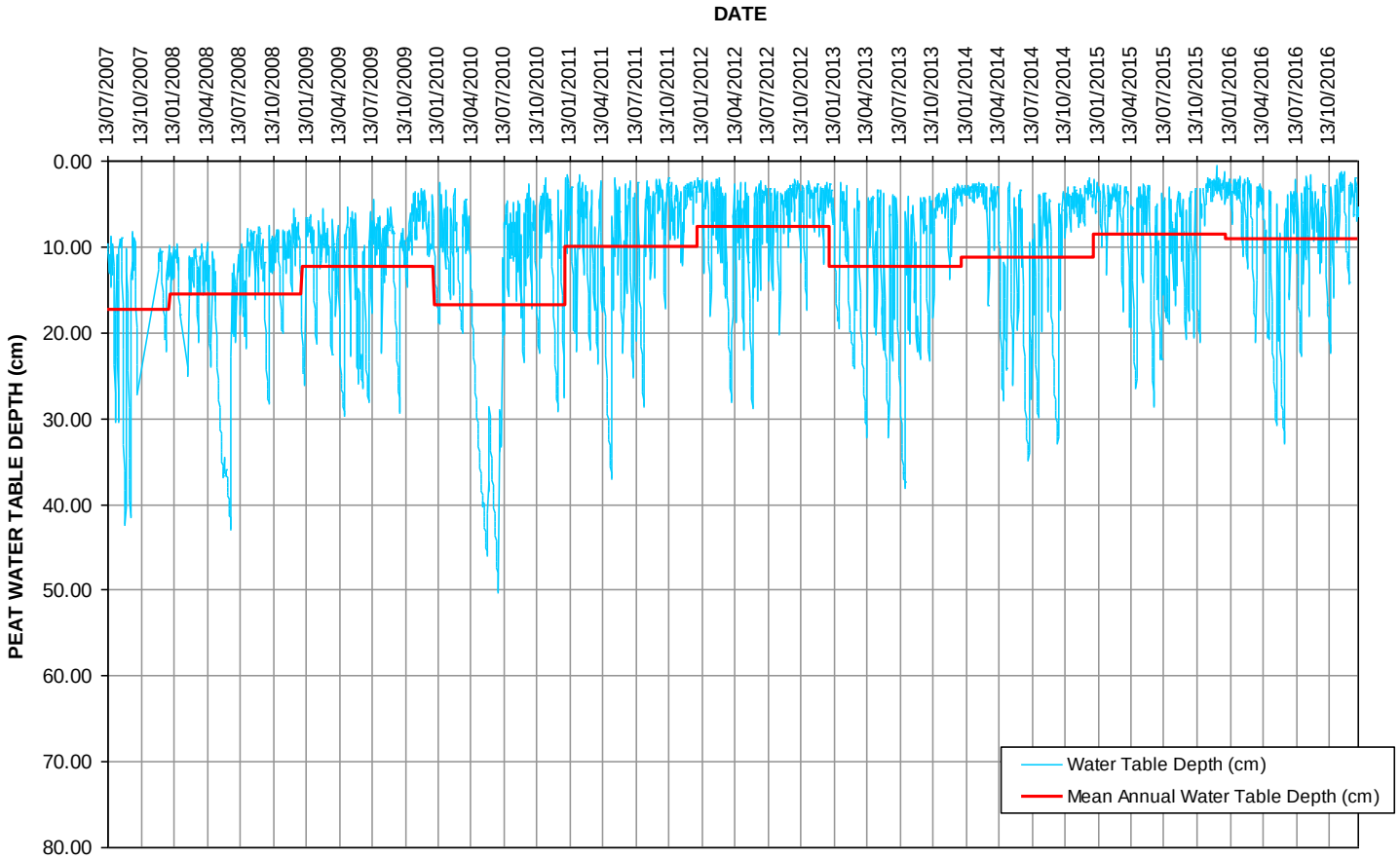
37.5%

Average *Sphagnum* species cover across 5 sample sites, post-grip-blocking



- Significant increases in *Sphagnum* cover over time.
- Small increases in some typical bog plants.

Brennand: Grip Blocking

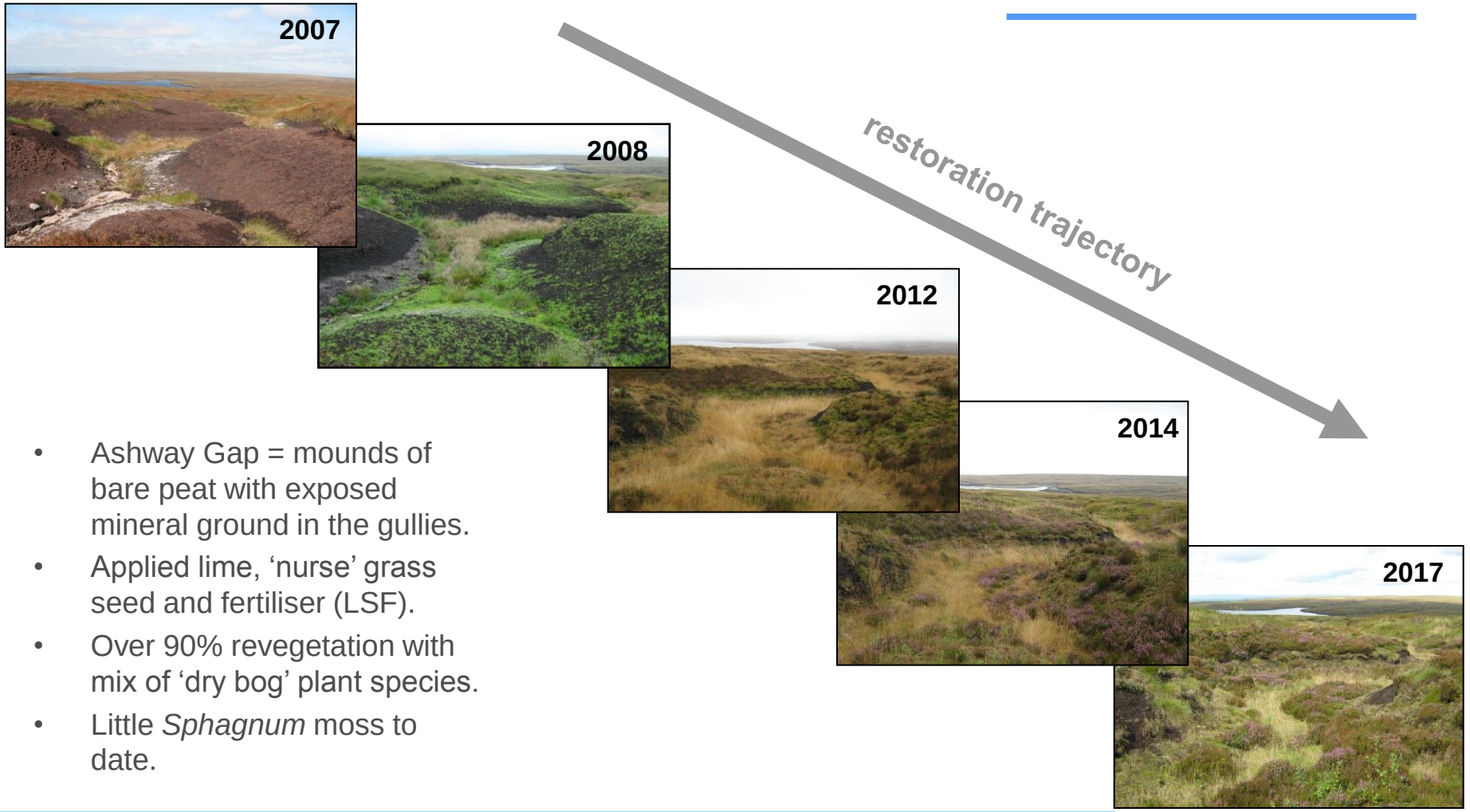


Peat water levels at **Brennand** show a trend towards increasing annual mean and more stable water levels, but some variation over time.

Results

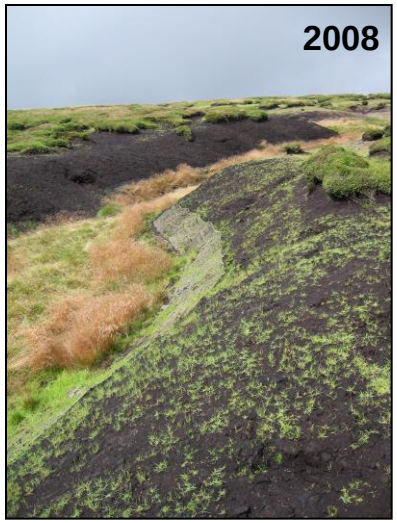
Ashway Gap, Quiet Shepherd & Arnfield – bare peat restoration

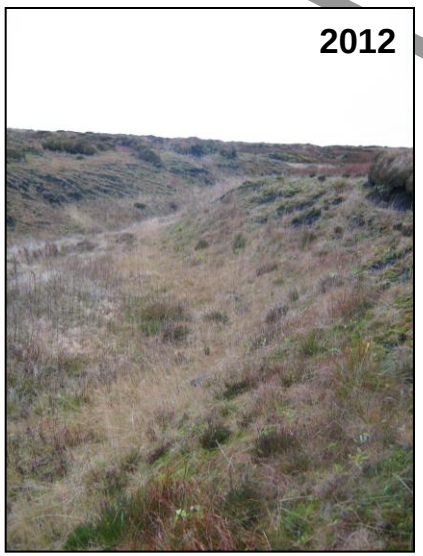
Ashway Gap: Bare Peat Restoration



- Ashway Gap = mounds of bare peat with exposed mineral ground in the gullies.
- Applied lime, ‘nurse’ grass seed and fertiliser (LSF).
- Over 90% revegetation with mix of ‘dry bog’ plant species.
- Little *Sphagnum* moss to date.

Quiet Shepherd: Bare Peat Restoration



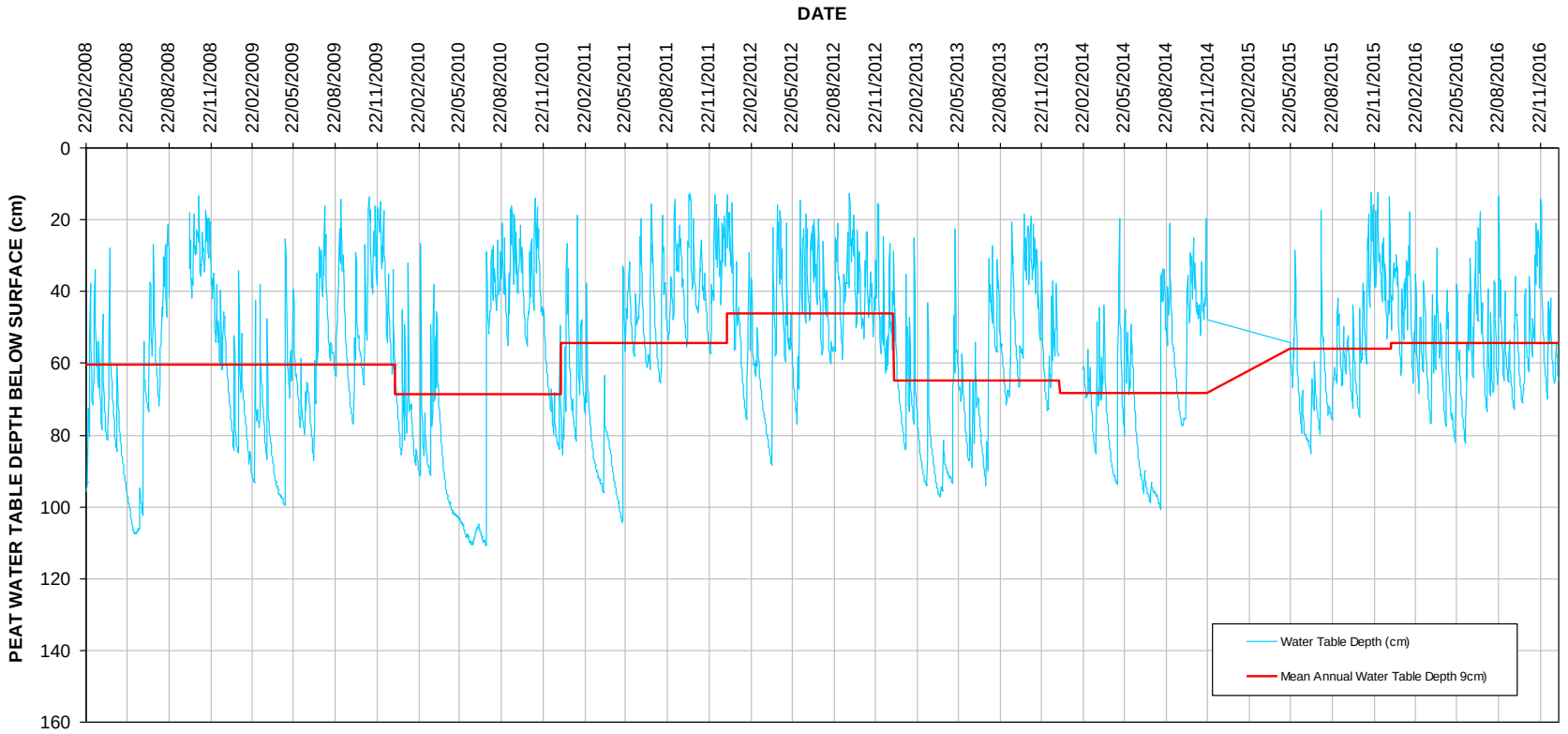


restoration trajectory

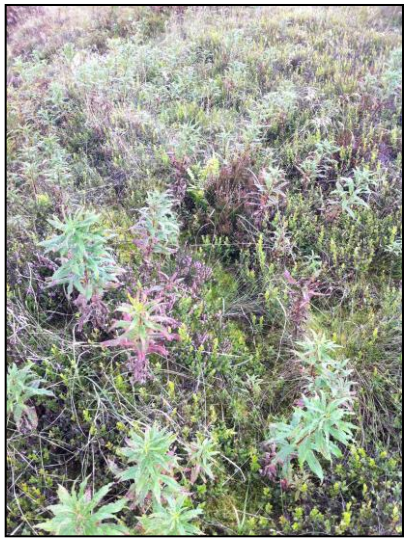
- Quiet Shepherd = gullies with bare peat sides.
- Applied LSF with heather brash and geotextile.
- Revegetated with ‘dry bog’ plant species.
- Good general moss cover.
- Little *Sphagnum* moss to date.
- Some ‘non-bog’ plants occur.

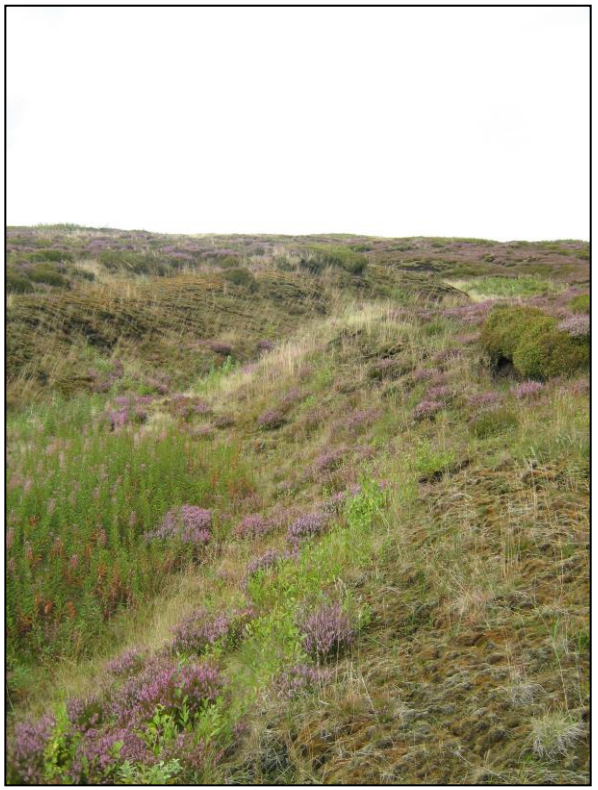
Ashway Gap: Bare Peat Restoration

The **peat water levels at Ashway Gap** remain compromised due to highly degraded nature of the site, and vulnerable to local weather conditions.

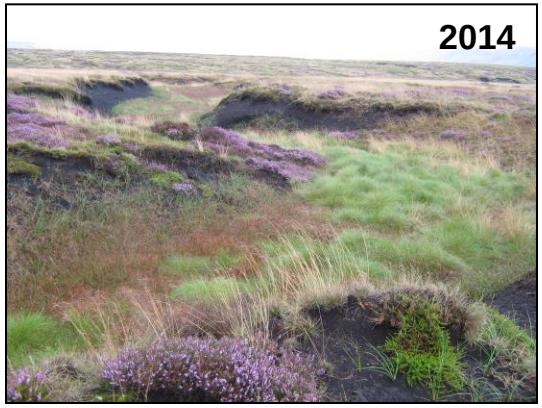


When to return to management?



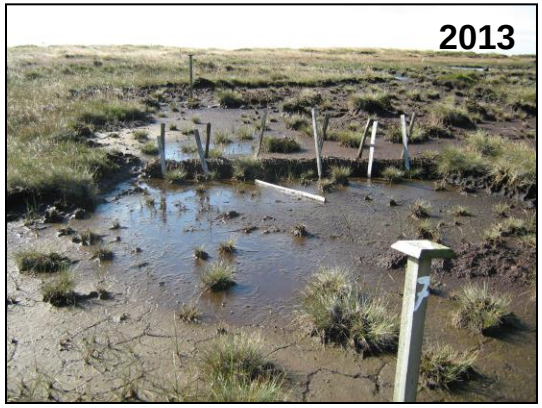


Limited Intervention



- Arnfield Moor – area retained with minimal treatment (no LSF, etc)
- Shows some gradual expansion of vegetation, largely common cotton-grass.
- Mostly on the more shallow slopes.
- Very few ‘non-bog’ plants.
- A very long term option.

Limited Intervention



- Ashway Gap – area retained with minimal treatment until 2013.
- Shows very limited re-vegetation – largely common cotton-grass.
- Treated with LSF sometime between 2014 and 2016.
- Good re-vegetation by 2017.

What have we learnt?

- *Sphagnum* cover increases where present, can respond quickly (within 5 years) if there is a greater original cover (c.10% or more) under grip blocking.
- Significant reductions in bare peat and increases in vegetation cover can occur within 5 years under LSF. Nurse crop does diminish over time.
- Adding heather brash to LSF areas encourages more rapid re-vegetation of slopes, and geojute is important on steeper slopes.
- Plant diversity increases over 5 to 10 years, on LSF areas this includes some 'non-bog' plants – introduced by seed and/or encouraged by lime and fertiliser treatments?
- Limited intervention can be appropriate on some sites.

- Water table levels are generally increasing (+12cm) and stabilising under grip blocking over the 10 year period. Some variation due to annual weather variation – generally within 10cm of the surface on average.
- Water tables responding only slightly (+5cm) on highly eroded areas after 10 years, still 60cm below surface on average.

Many thanks to all those involved in the monitoring project over the last decade.

Thank you for listening!

United Utilities

Penny Anderson Associates Ltd
Consultant Ecologists