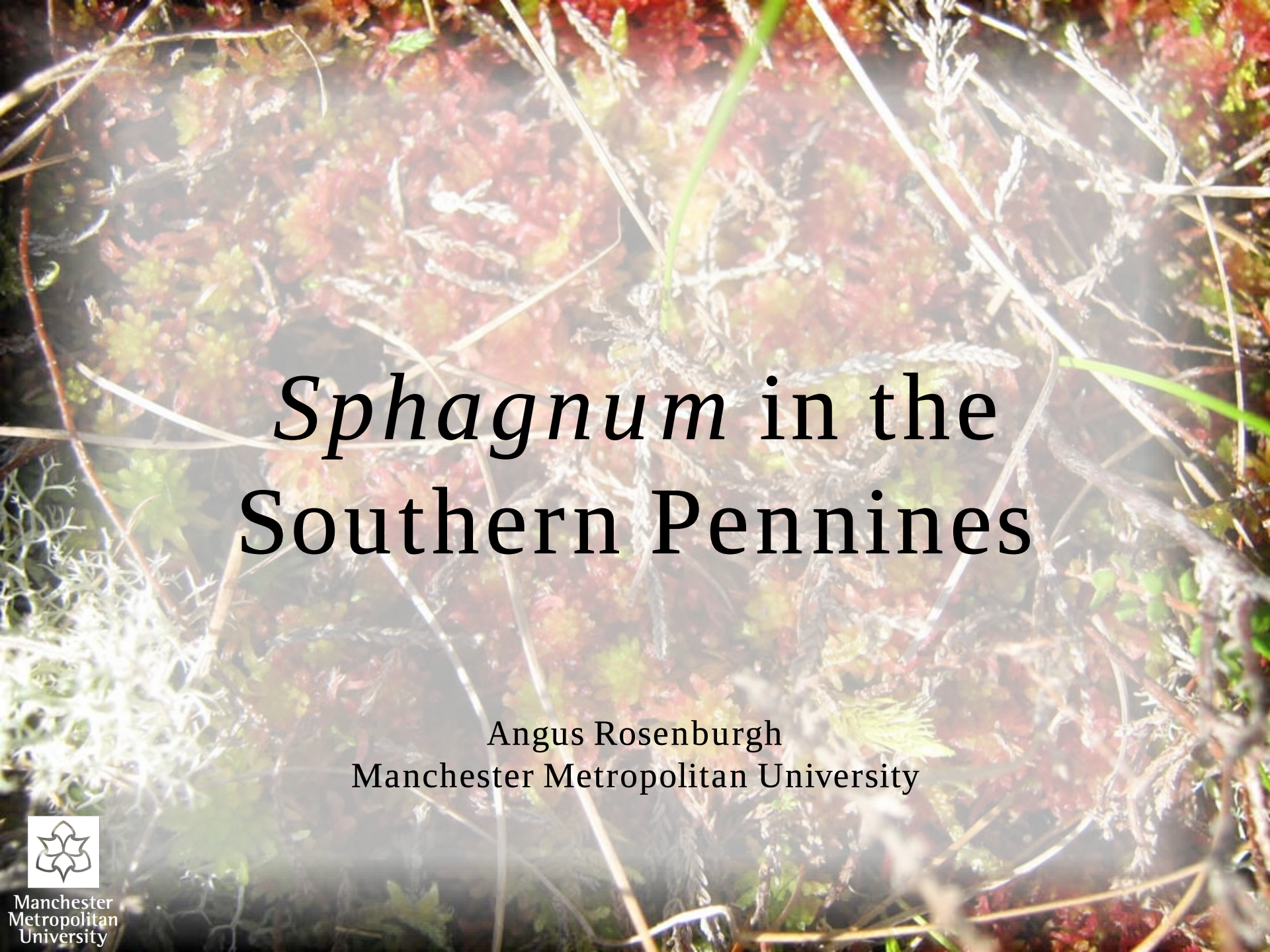

Sphagnum in the Southern Pennines

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Manchester Metropolitan University

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Drivers of degradation

- Industrial pollution
- Drainage
- Grazing/ trampling
- Wildfire

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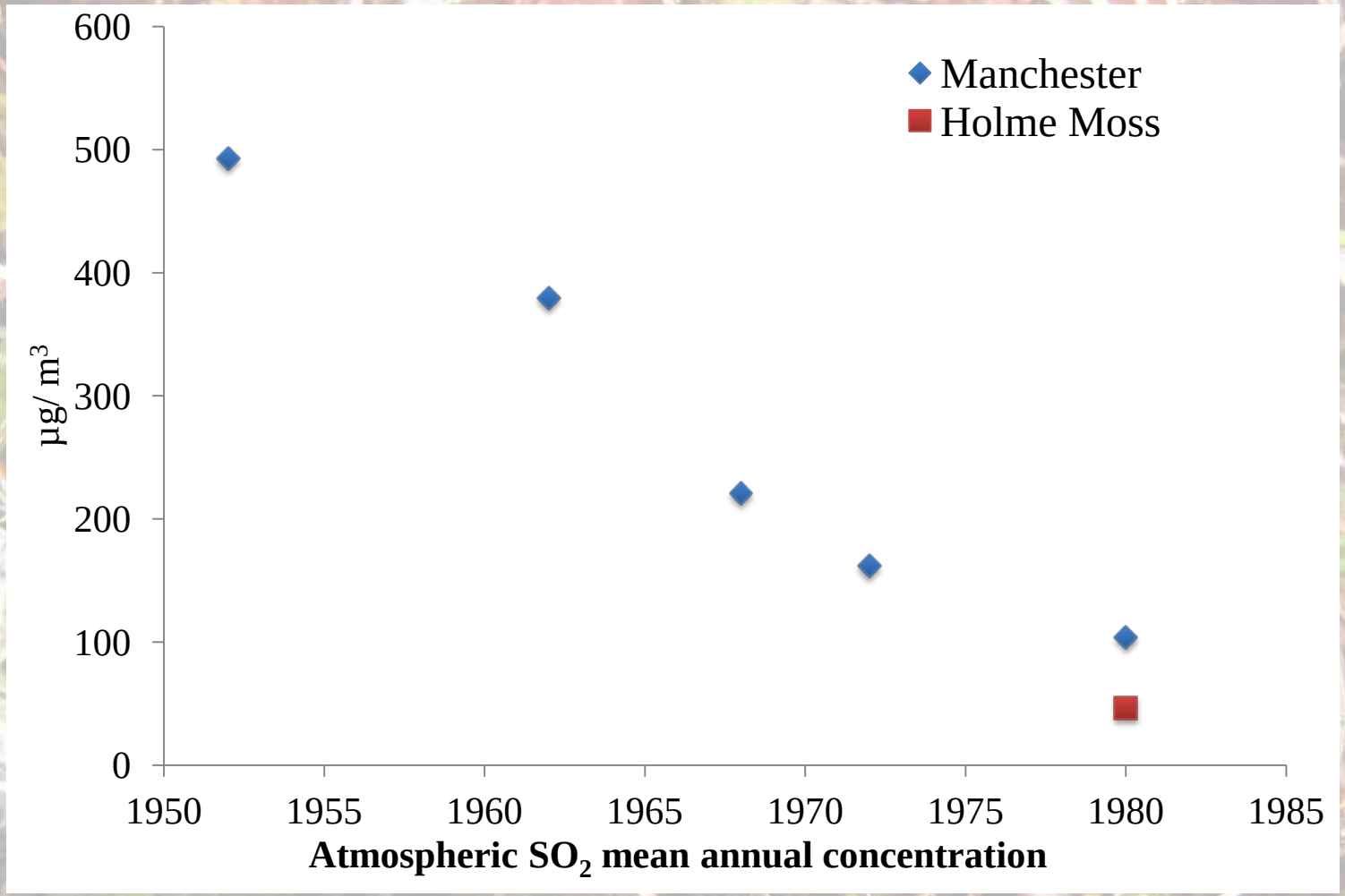
Improving conditions



(Ferguson & Lee, 1983; UK Air Quality Archive)

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Restoration

- Lime
- Fertiliser
- Heather brash
- Grass nurse crop
- Plug plants

- Geo-textiles
- Gully blocking

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Black Hill, 2005

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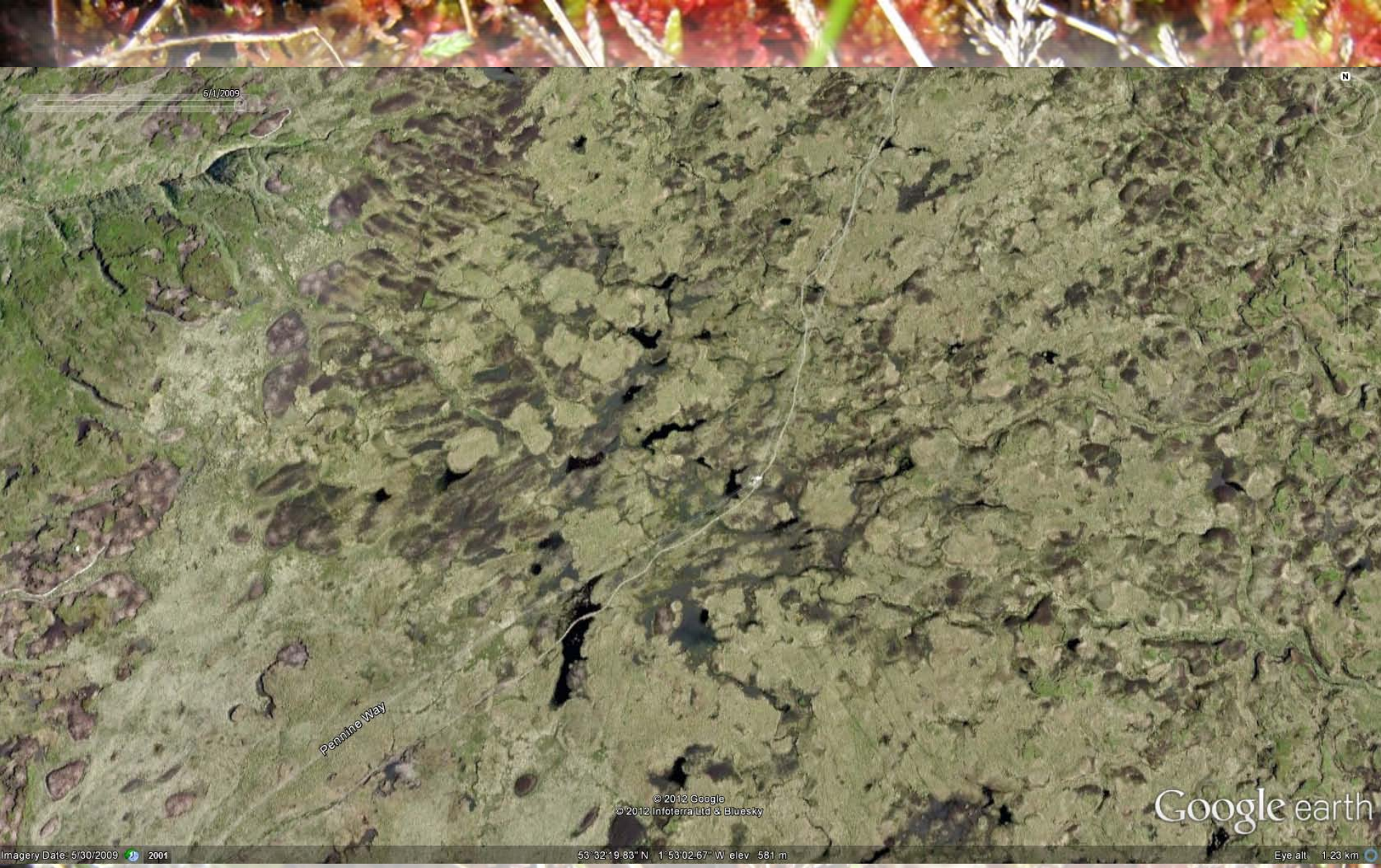

Black Hill, 2009

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Photos: Moors for the Future

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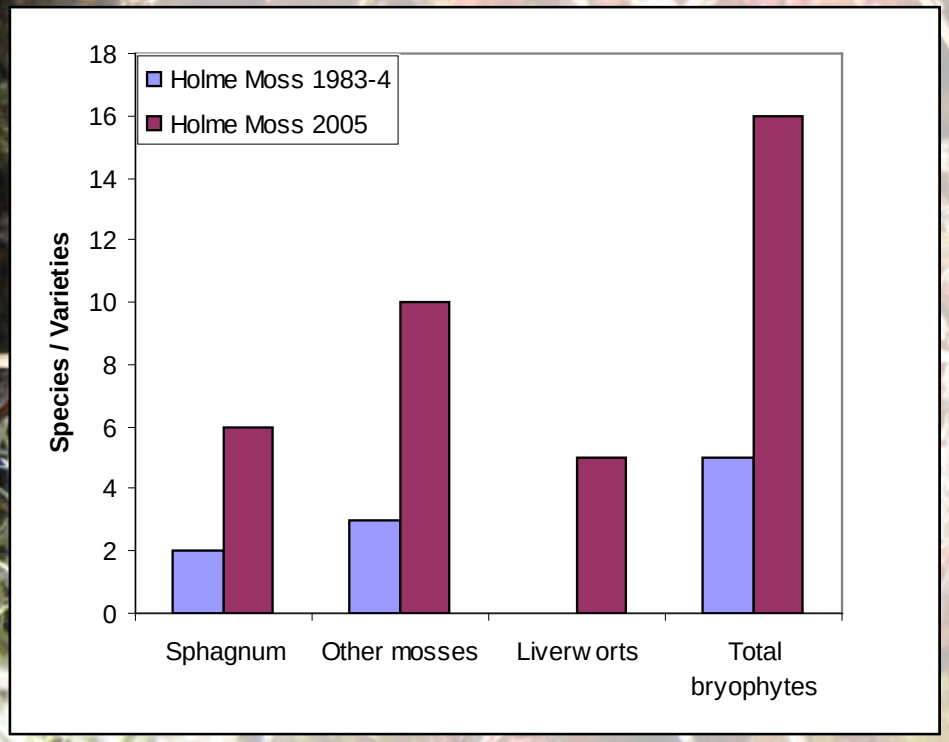
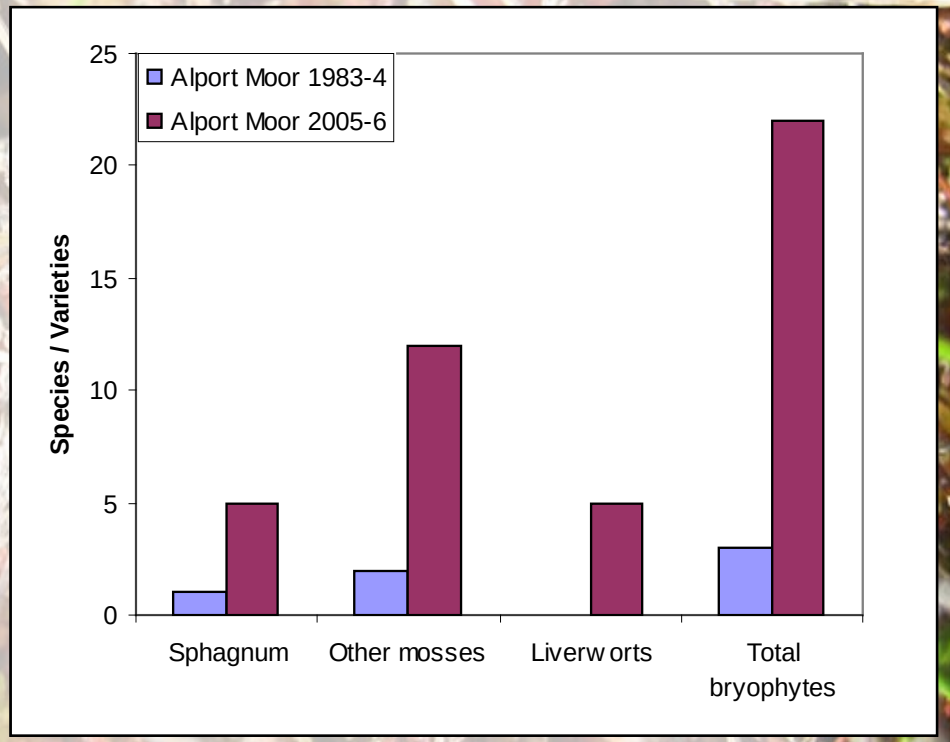
Improving conditions





Holme Moss

Alport Moor

(Caporn *et al.*, 2006)

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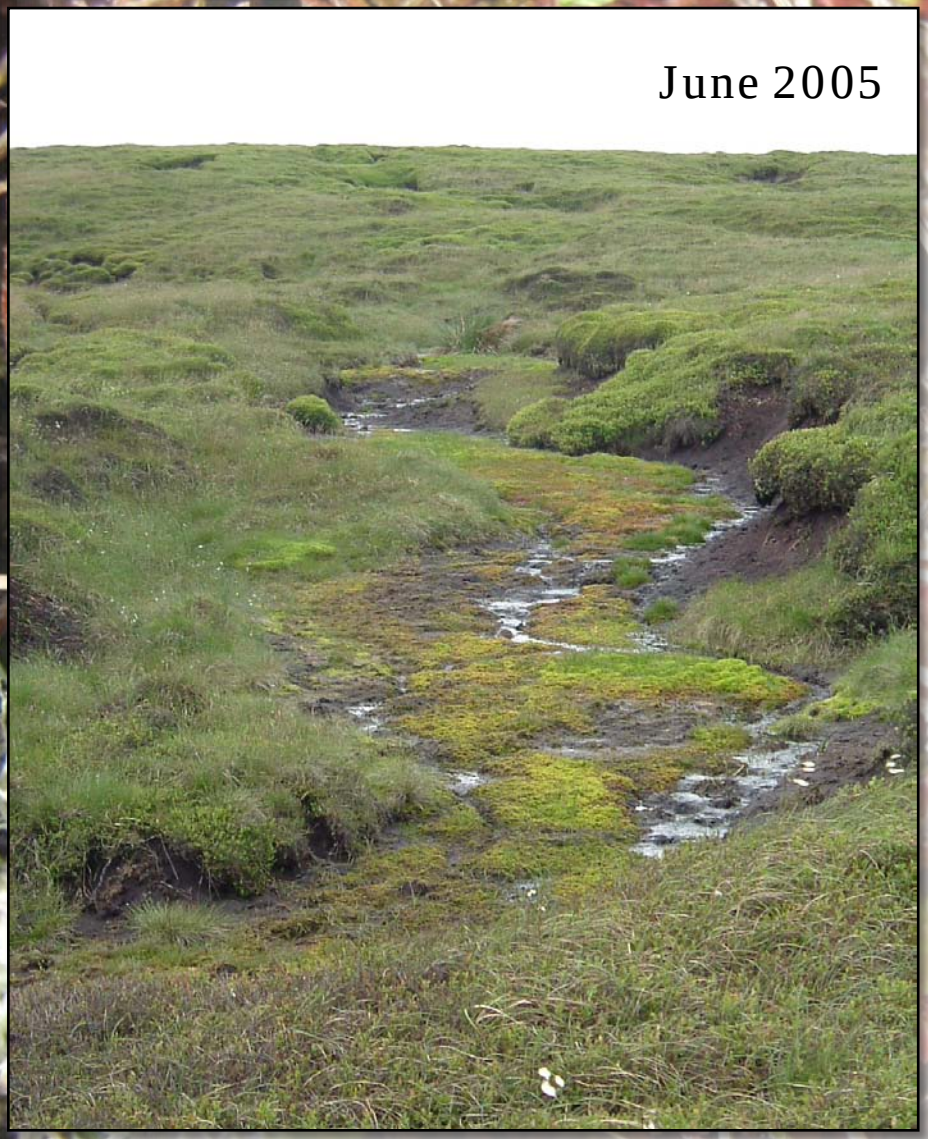

Near Hern Clough, Bleaklow

Photo: S.Caporn

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The big questions

1. Are the biogeochemical characteristics of degraded Pennine peatlands limiting the performance of *Sphagnum*?

2. Can we re-introduce *Sphagnum* as part of the restoration works?

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Effect of biogeochemistry

- Comparison with intact sites
- Vegetation recorded, vegetation, peat and porewater samples

- Peat pH, moisture content, total C & N
- Porewater metals, nutrients & pH
- Extractable metals & nutrients
- Total metals
- Vegetation total metals, total C & N

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Sampling

- 10 samples per intact site
- 20 samples per degraded Pennine site – 10 with *Sphagnum*, 10 adjacent without
- Inter- and intra-site comparison

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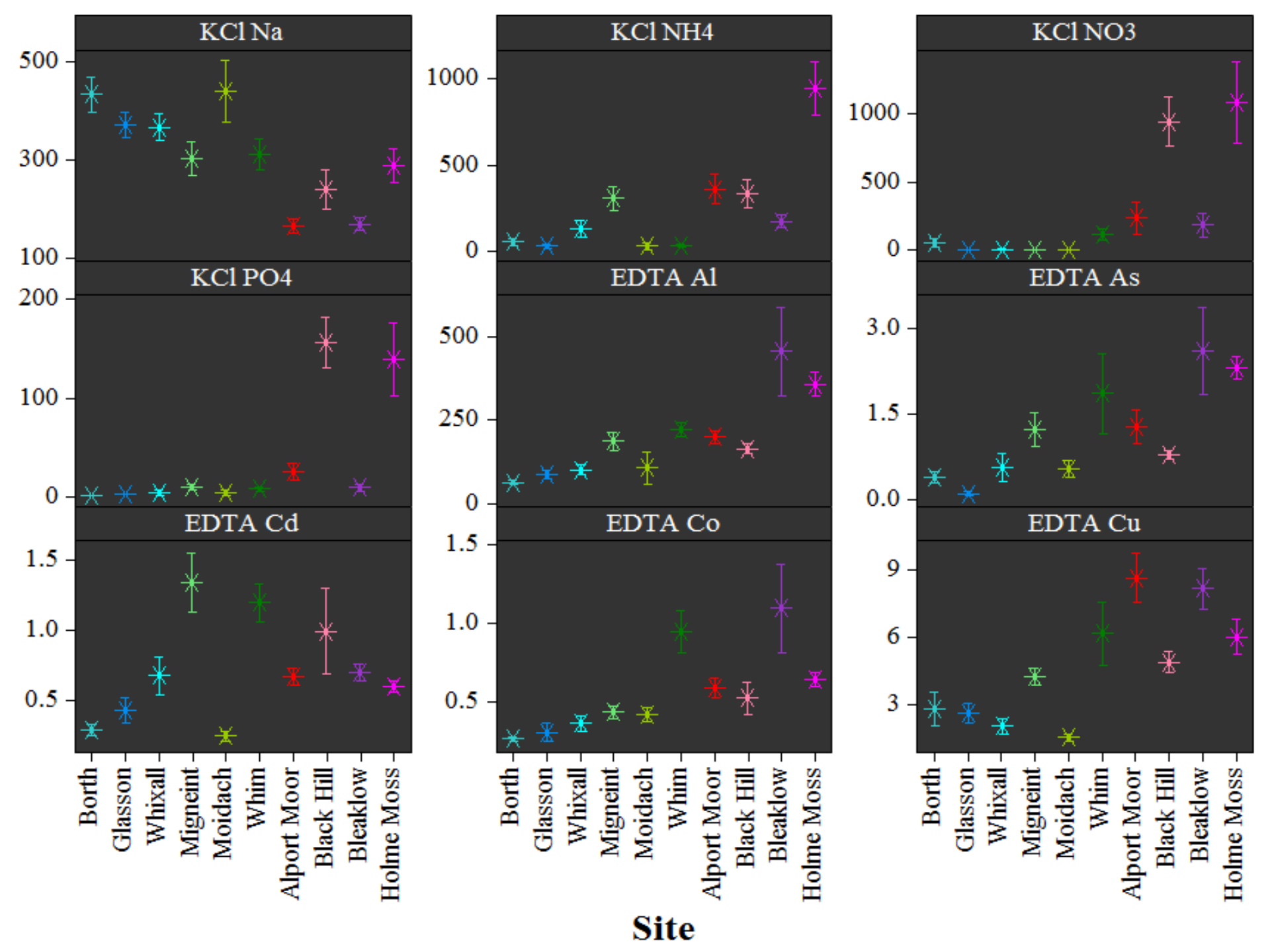
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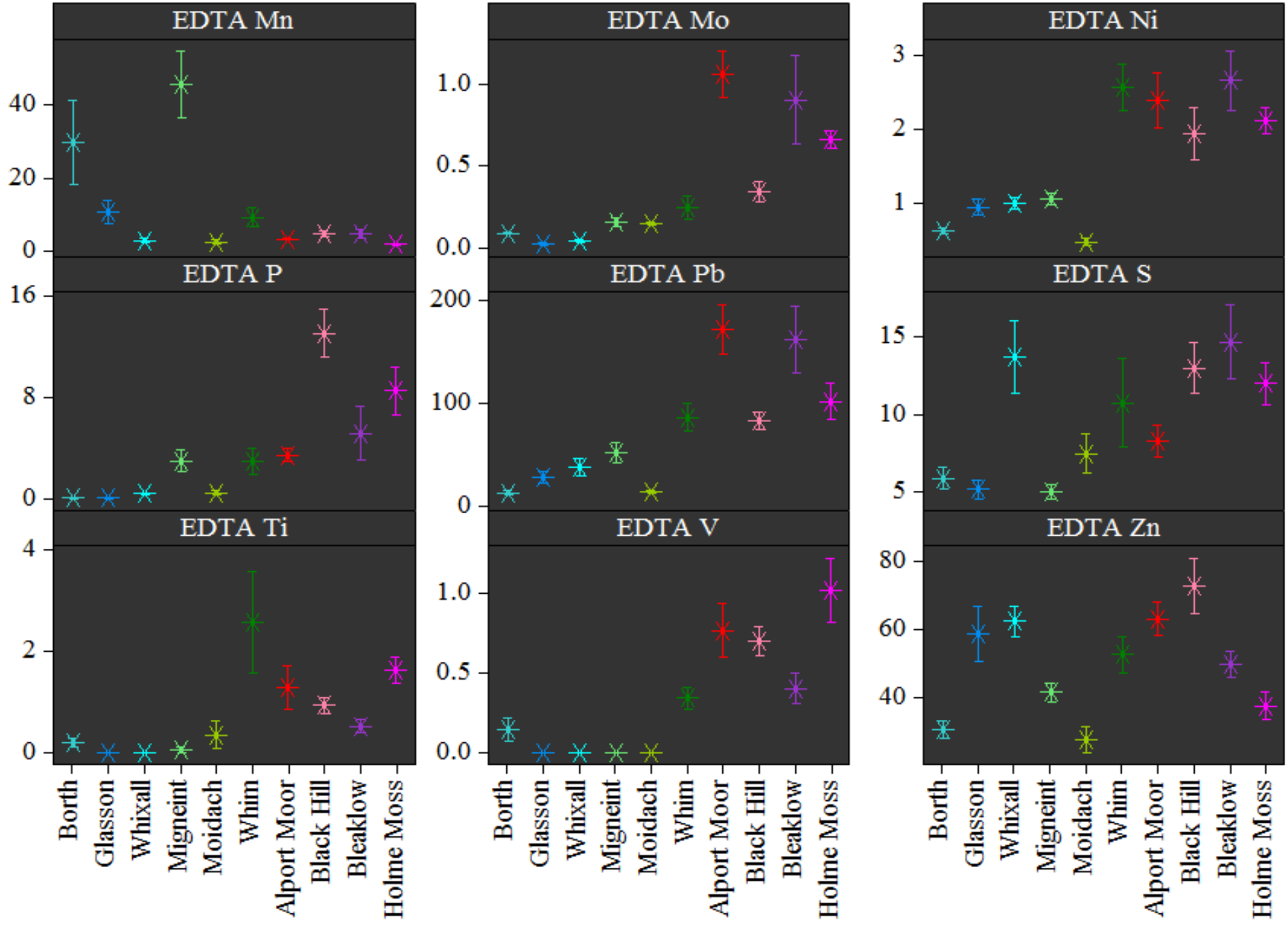
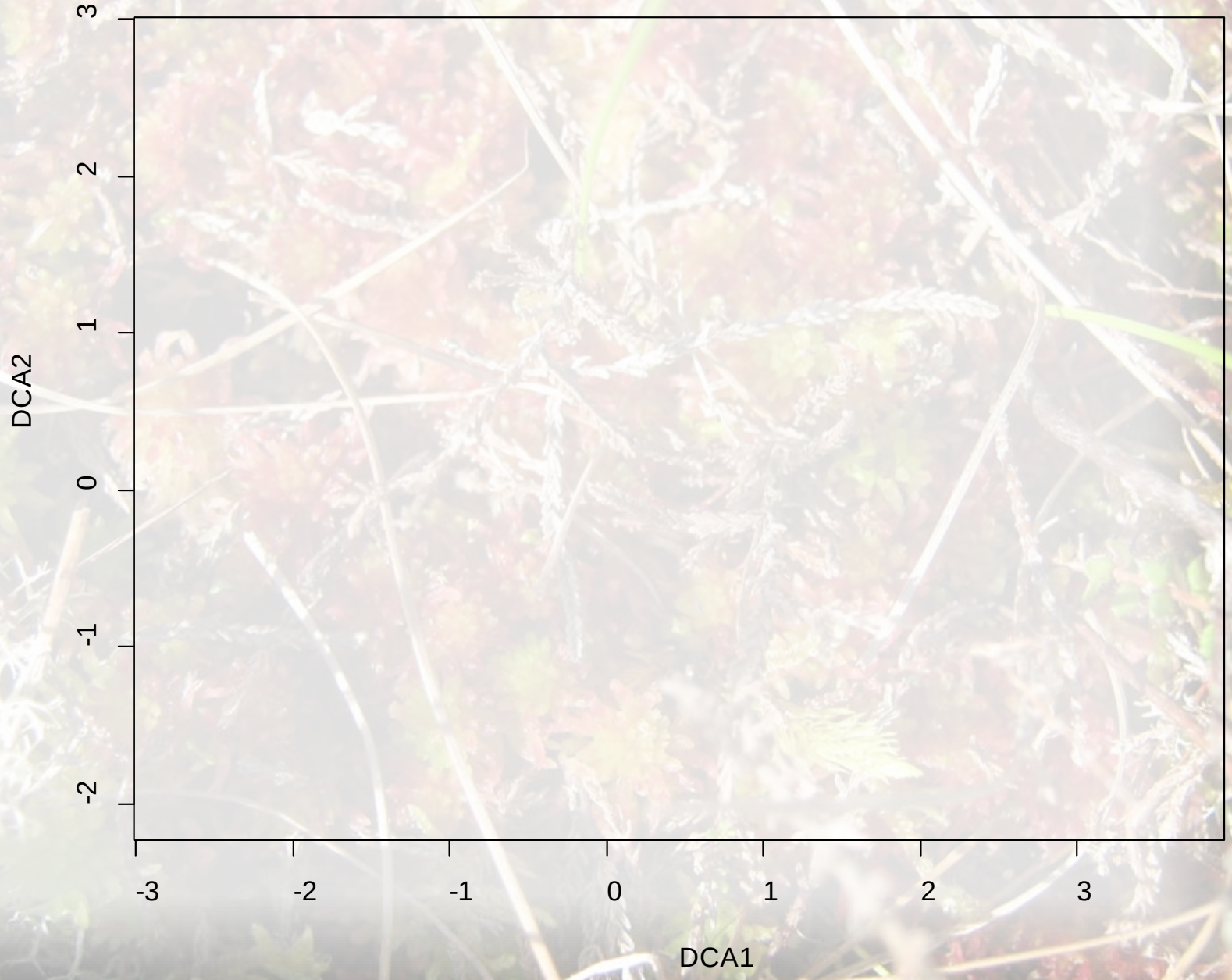
KCl NH4
KCl NO3
KCl PO4
EDTA Al
EDTA As
EDTA Cd
EDTA Co
EDTA Cu
Borth
Glasson
Whixall
Migneint
Moidach
Whim
Alport Moor
Black Hill
Bleaklow
Holme Moss
Site


EDTA Mn
EDTA Mo
EDTA Ni
EDTA P
EDTA Pb
EDTA S
EDTA Ti
EDTA V
EDTA Zn
Borth
Glasson
Whixall
Migneint
Moidach
Whim
Alport Moor
Black Hill
Bleaklow
Holme Moss
Site



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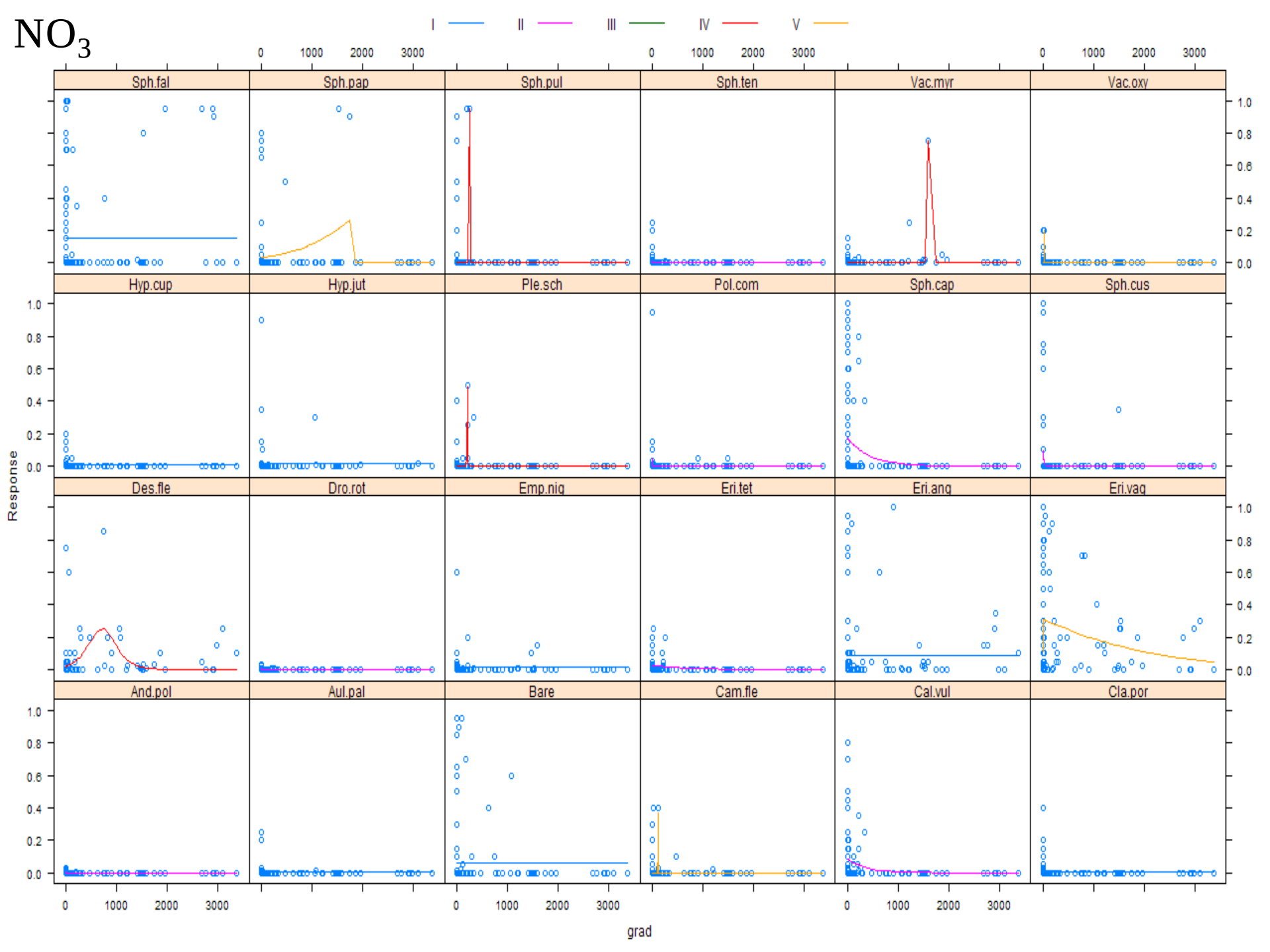
Pb

I
II
III
IV
V
Sph.fal
Vac.oxy
Hyp.cup
Sph.cus
Des.fle
Eri.vag
And.pol
Cla.por
Response
grad


NO3
I
II
III
IV
V
Sph.fal
Sph.pap
Sph.pul
Sph.ten
Vac.myr
Vac.oxy
Hyp.cup
Hyp.jut
Ple.sch
Pol.com
Sph.cap
Sph.cus
Des.fle
Dro.rot
Emp.nig
Eri.tet
Eri.ang
Eri.vag
And.pol
Aul.pal
Bare
Cam.fle
Cal.vul
Cla.por
Response
grad
0
1000
2000
3000
0.0
0.2
0.4
0.6
0.8
1.0

Next steps

- Regression analysis to establish causes
- Relationship with vegetation chemistry
- Link with depositional data

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Summary

- Conditions are improving; less pollution and restoration works
- *Sphagnum* will survive and persist
- Likely to be pollution legacy limiting success

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- Supervisory team, MMU –
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  Neal & Barbara Wright

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