Long-Term Impacts of Nitrogen Deposition & Evidence of Recovery: Whim Bog and Moninea Bog

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CEH Edinburgh

IUCN UK Peatland Conference
Belfast, 3 October 2019

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Department of Agriculture, Environment and Rural Affairs
NIEA Northern Ireland Environment Agency
www.daera-ni.gov.uk
NitroPortugal
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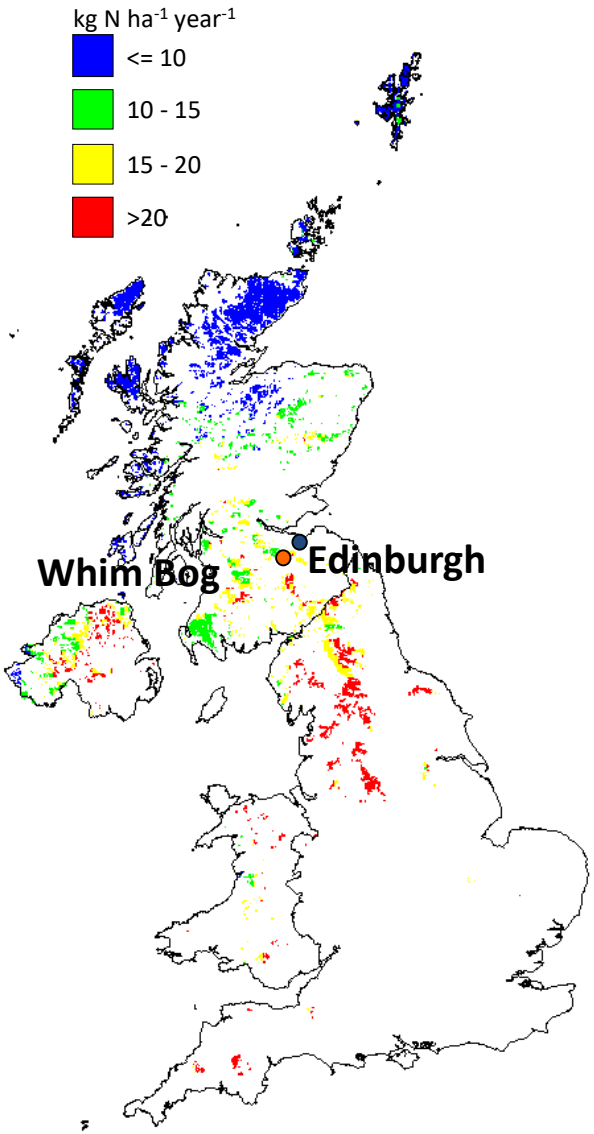
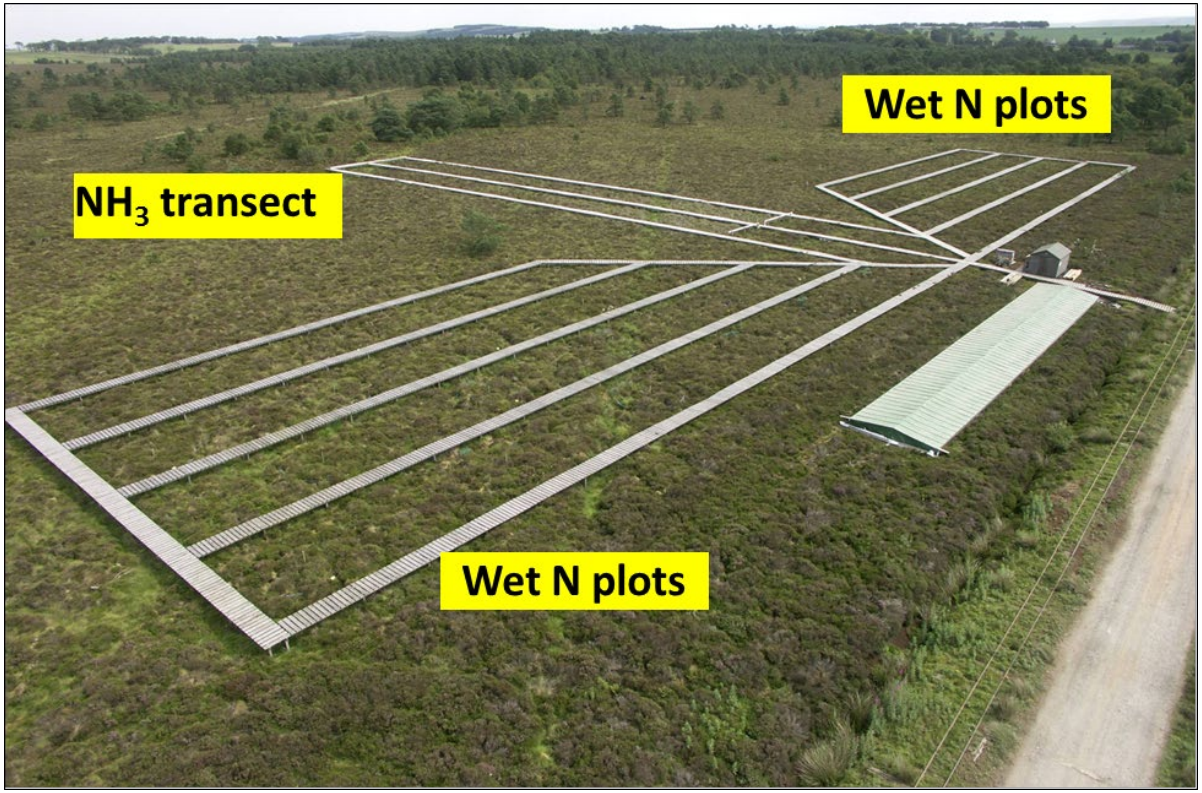
Whim Bog N-manipulation field site

Total N deposition 2003-2005 overlaid on the bog habitat distribution.

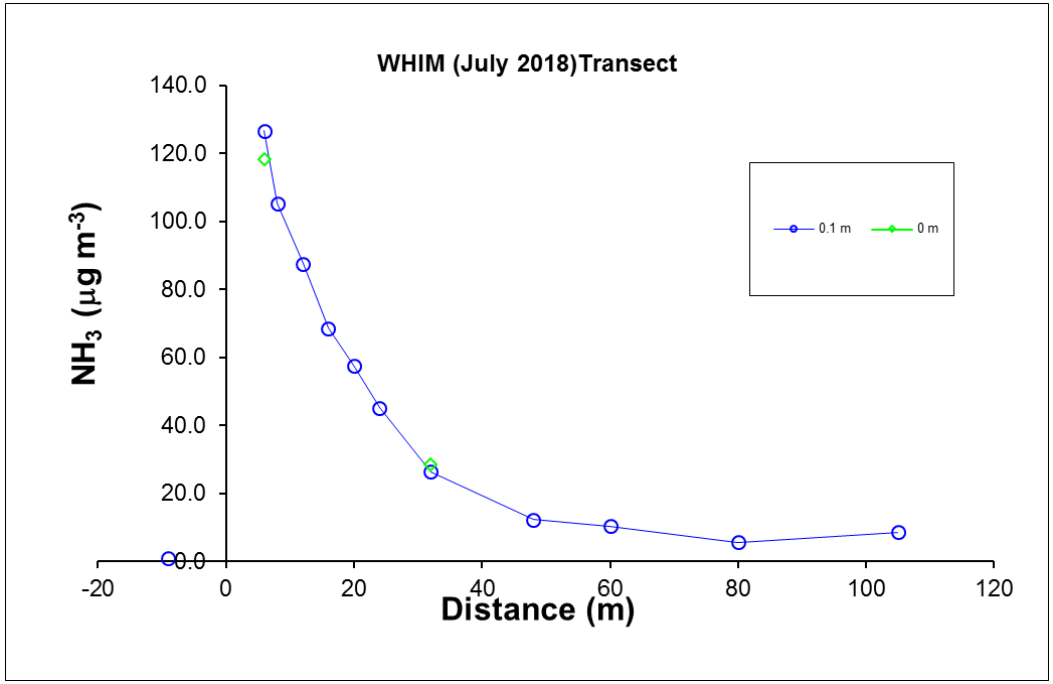


Globally unique, automated free air ammonia release and wet treatment plots

Since 2002



Ammonia concentration along the transect



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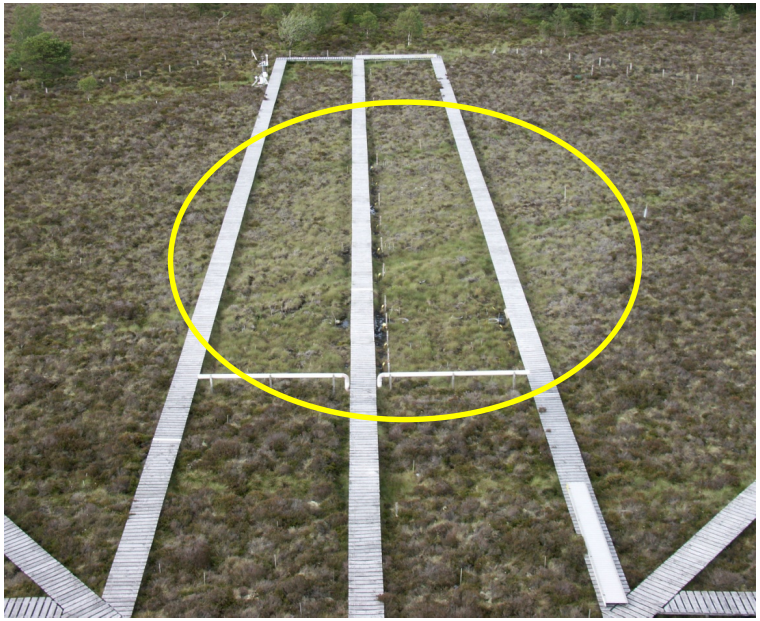
NH_3 damage on vegetation

....and is replaced by *Eriophorum vaginatum*



All *Sphagnum* and most *Calluna* has disappeared……

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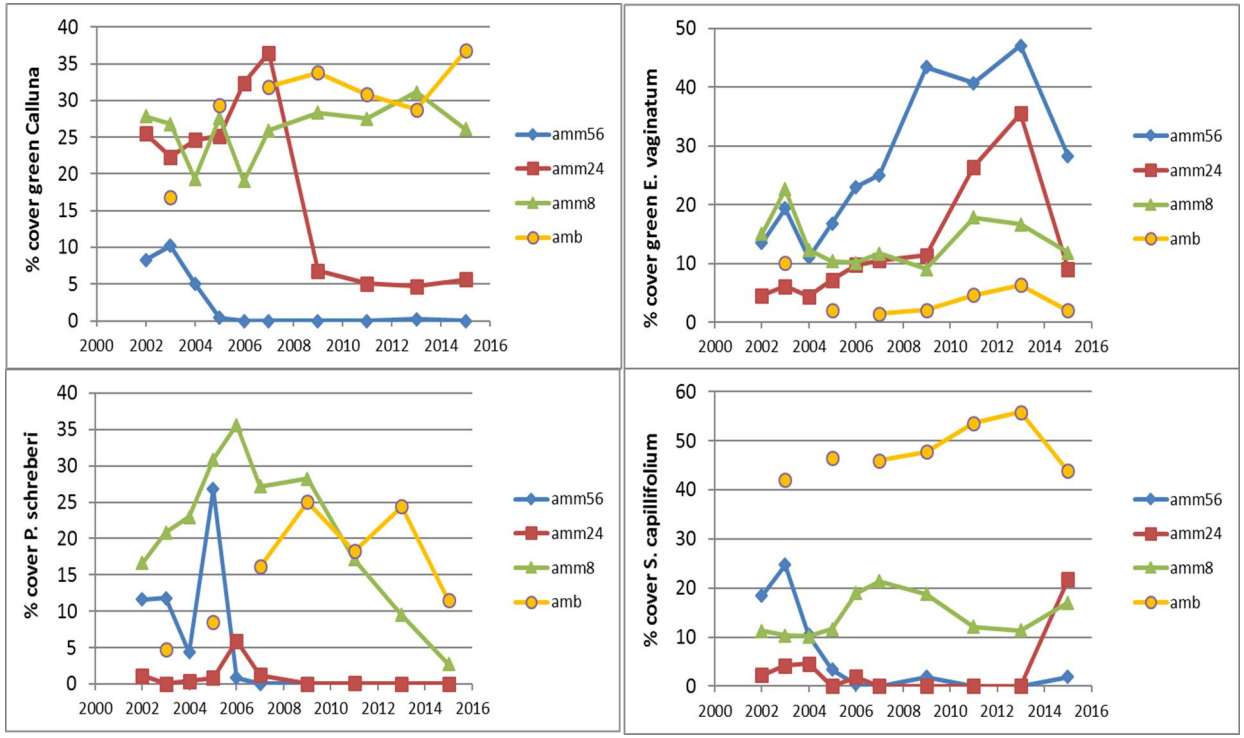
Species cover (%) dry deposition

Dry N deposition



Decrease % cover of:

- *Calluna vulgaris*
- *Sphagnum capillifolium*
- *Pleurozium schreberi*

Increase % cover of:
Eriophorum vaginatum

Moninea Bog

Farm close to edge of Moninea Bog

Visits in 2007 and in 2017

Farm closed in 2009/2010

- NH_3 air concentrations
- Vegetation
- Chemical analysis

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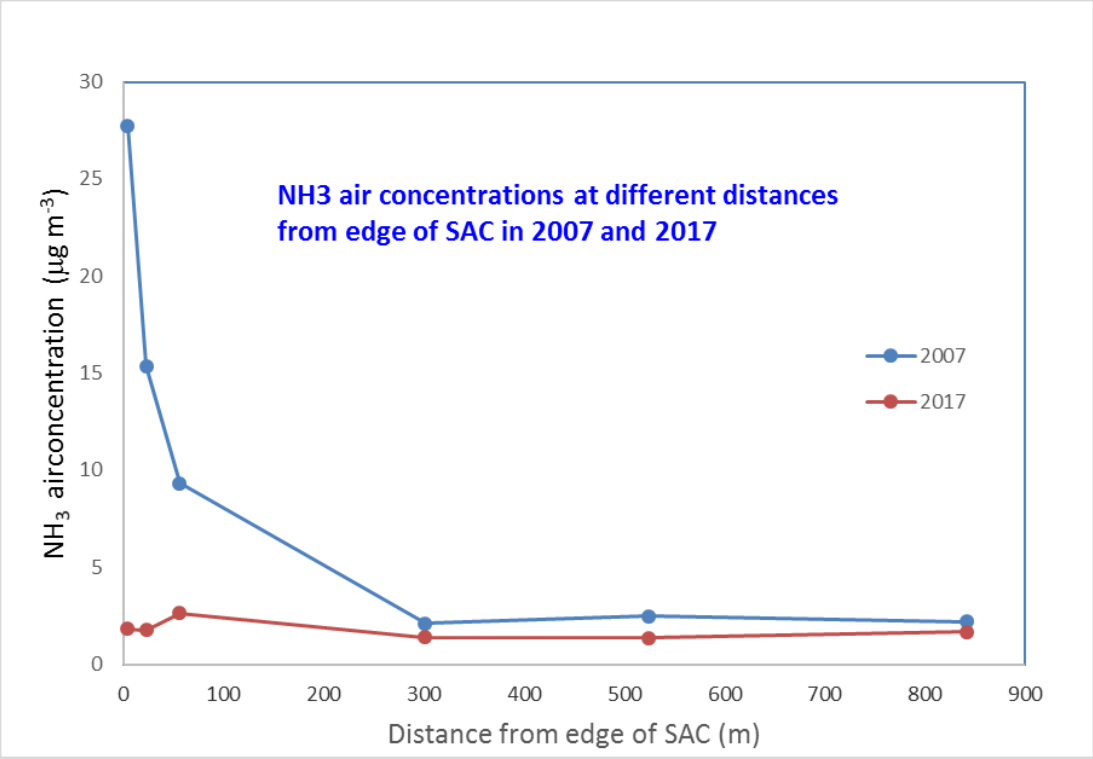
NH_3 air concentrations



February-March average

2017

2007

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What did we see?

What did we see?

Polytrichum

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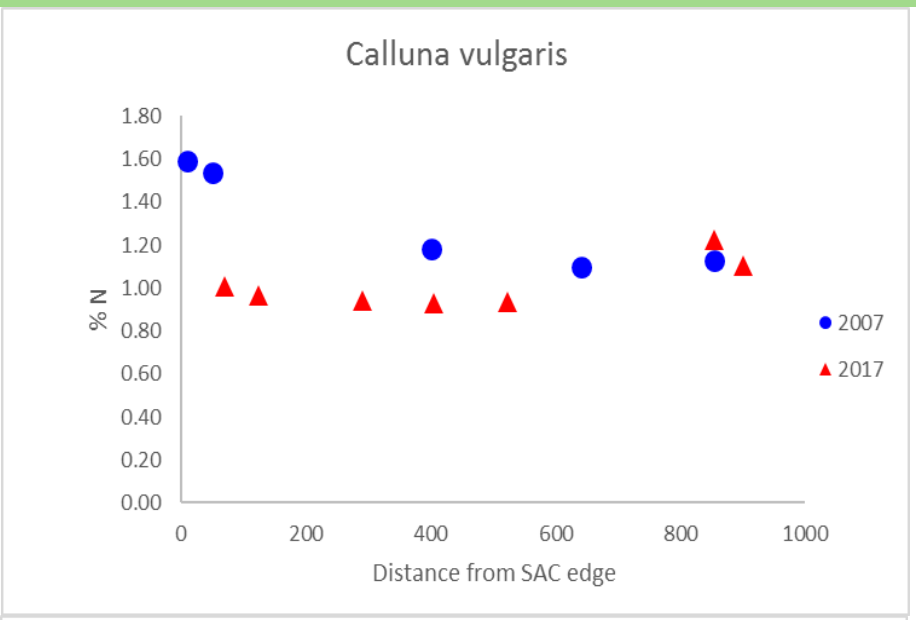
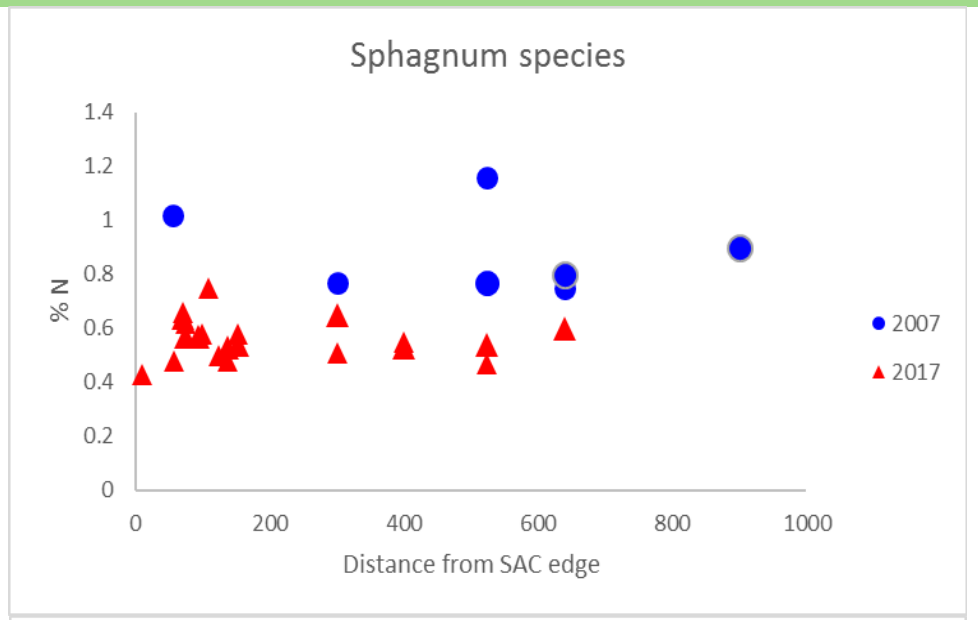
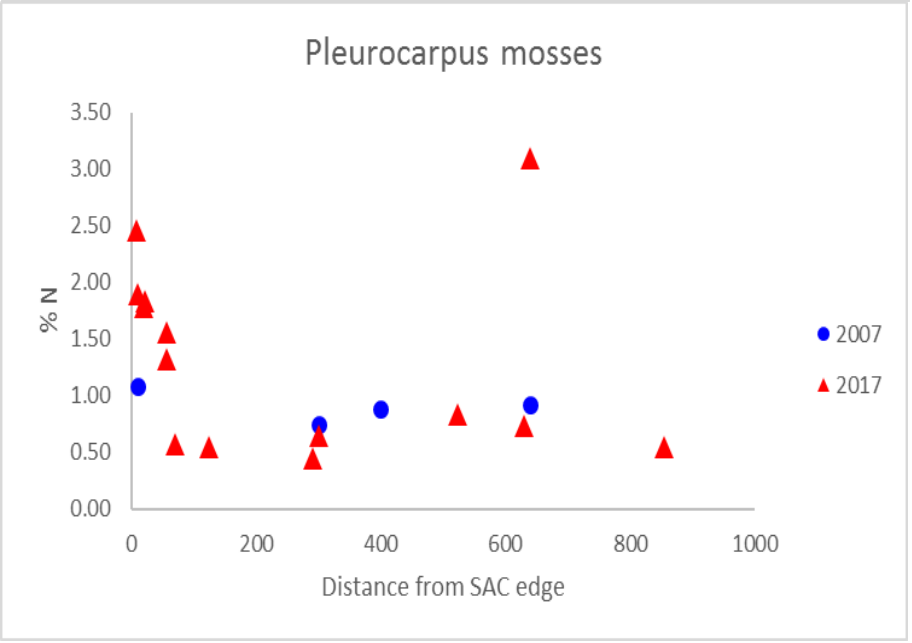
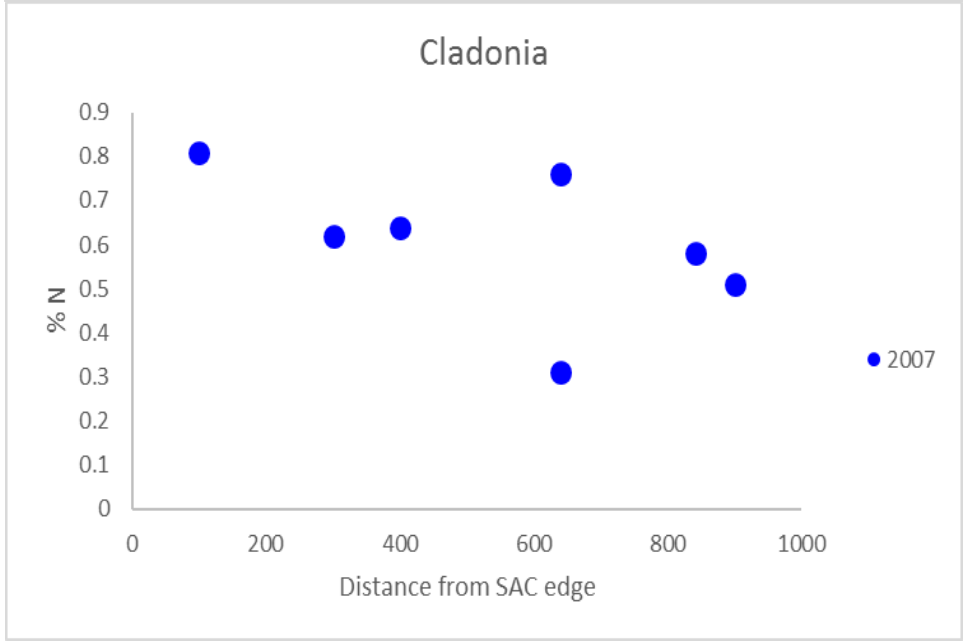
%N (dry weight)


Calluna vulgaris
% N
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
Distance from SAC edge
2007
2017


Sphagnum species
% N
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
200
400
600
800
1000
Distance from SAC edge
2007
2017


Pleurocarpus mosses
% N
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
200
400
600
800
1000
Distance from SAC edge
2007
2017

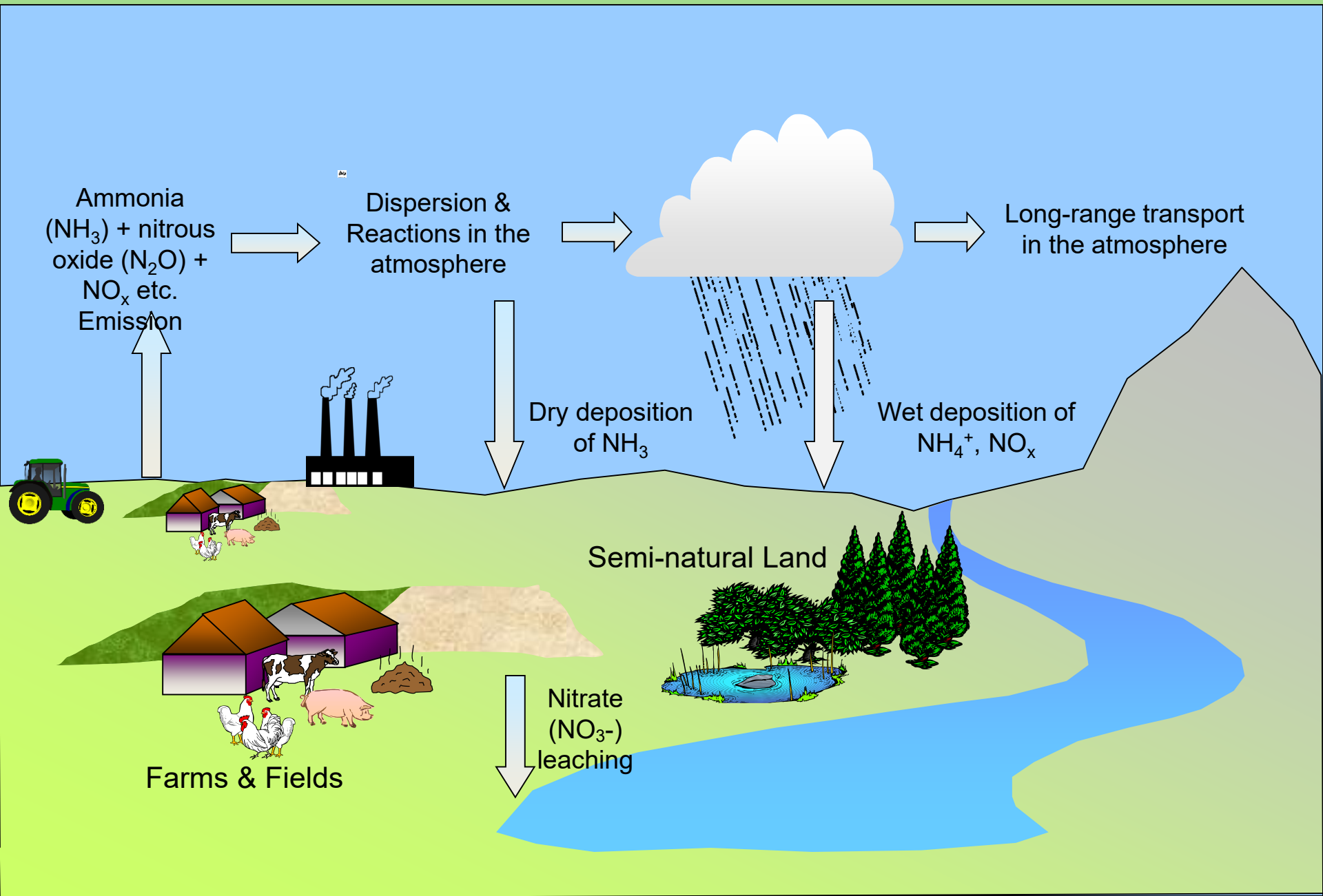

Cladonia
% N
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
200
400
600
800
1000
Distance from SAC edge
2007

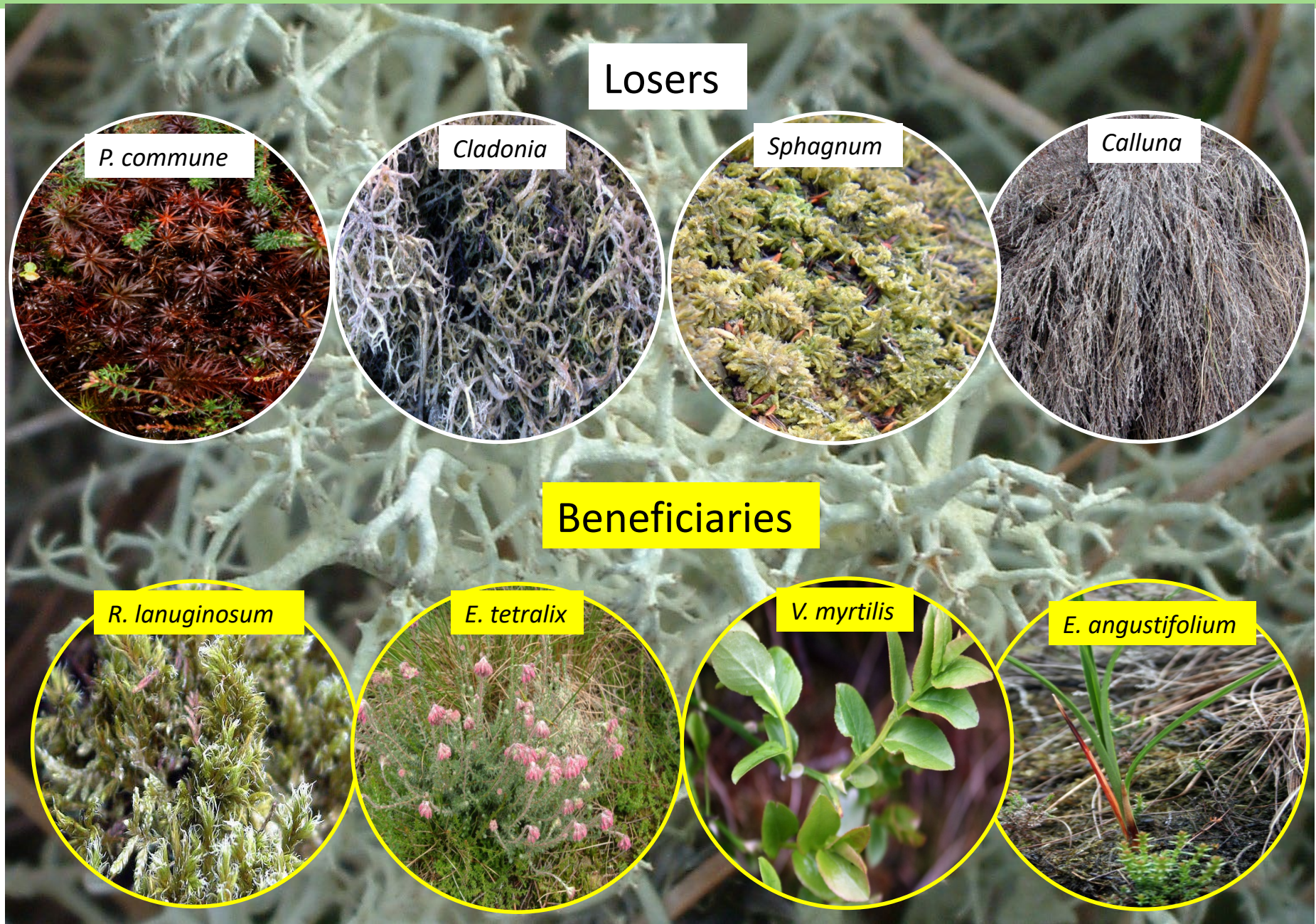
Conclusions

There are signs of recovery, but there is still a long way to go!!

Thank you!!

What is atmospheric Nitrogen and where does it come from

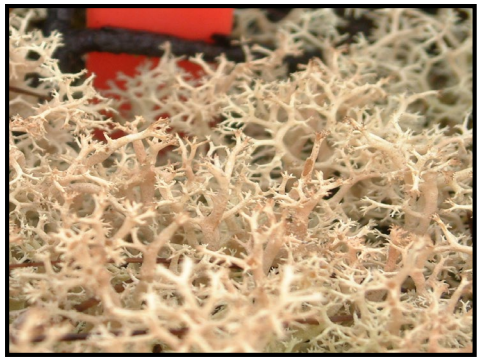



Losers
P. commune
Cladonia
Sphagnum
Calluna
Beneficiaries
R. lanuginosum
E. tetralix
V. myrtilis
E. angustifolium

Cladonia portentosa visible damage symptoms

Ammonia

Pretreatment ‘clean’



‘Pinking’ due to NH_3 & strong sunlight with 5 weeks. Reversible.

Bleaching of apices & increase in algae in the necromass

Bleaching and early stage of disintegration of the apices

Loss of apical structure

Total disintegration and increase in algae

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Sphagnum damage symptoms ammonia transect

‘Clean ‘

Initial damage

Capitulum loose

Disintegration and surface slime

Loss of capitulum structure & slime

Final disintegration