

Plant species and DOC response to the restoration of degraded fens in North-West Wales



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Project Objectives



- Impose cutting and grazing interventions on 2 previously abandoned plant communities
- Analyse water chemistry (anions, cations and DOC)



- Measure changes in vegetation
- Ascertain mechanisms that drive change in plant composition and water chemistry

Project Collaboration



- EU Anglesey & Llyn Fens LIFE project is the largest wetland restoration project in Wales (£3.5m invested)

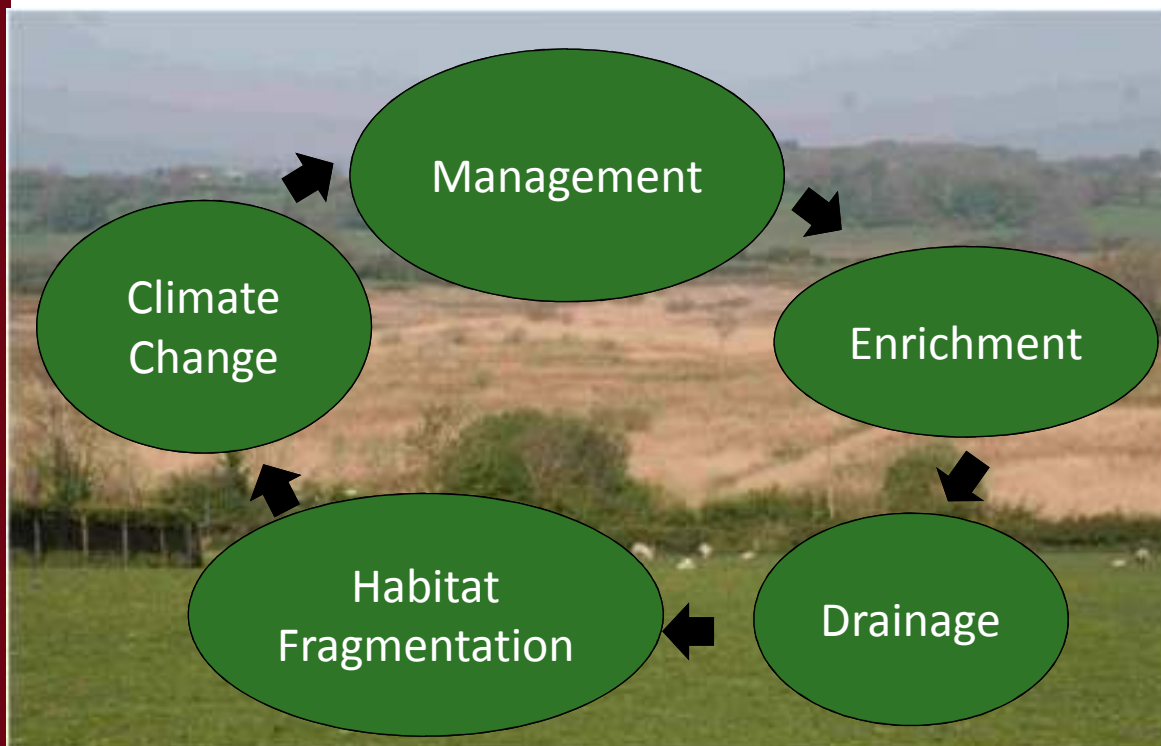
- Welsh water (industrial partner) interested in the effects on drinking water quality during and after restoration



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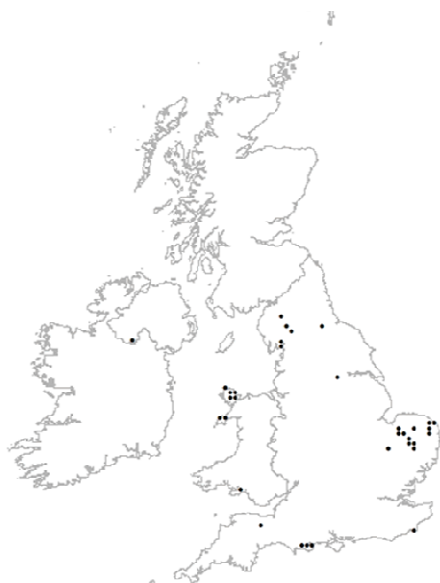
Fen Degradation



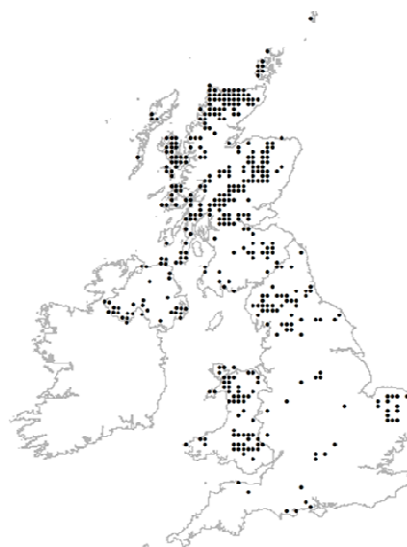
Geographical Distribution



Calcareous Fens

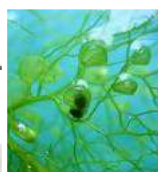


Alkaline Fens



Fen Character

- Peatlands
- Net global sinks for C captured from atmospheric C
- Minerotrophic
- Oligotrophic
- Poor/rich fen
- Topogenous/soligenous
- Heterogeneous
- High biodiversity



Questions and Hypotheses



Q1. How will cutting vegetation affect plant composition?

H1 Change in floristic composition and plant diversity



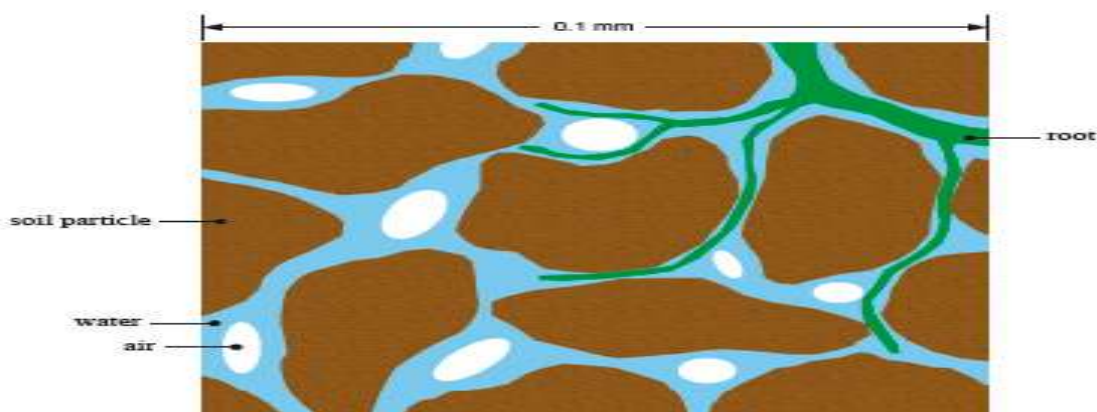
Hypotheses



Q2(i) Nutrients

How will cutting vegetation affect pore water chemistry?

H2 Cutting and removing plant biomass will reduce nutrient concentration in pore water



Hypotheses



Q2(ii) DOC

How will cutting vegetation affect pore water chemistry?

H3 Pulse of DOC in **short-term** during/post intervention

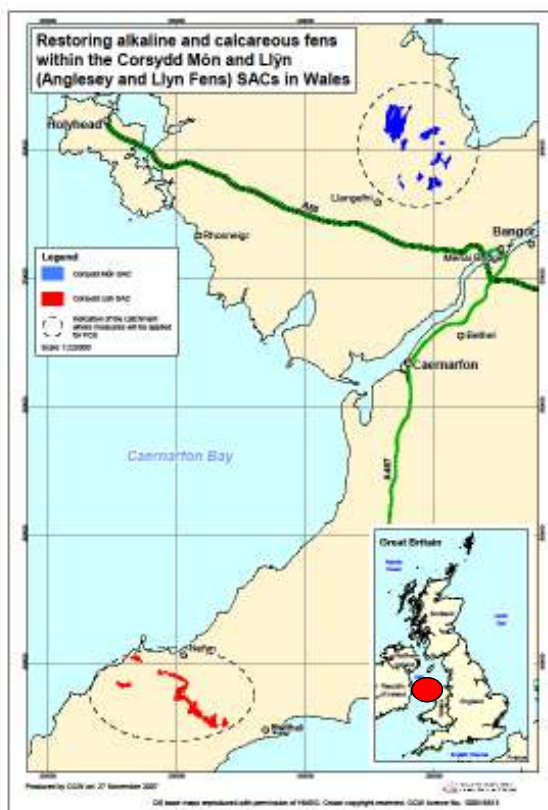


H4 Reduction in DOC once biomass removed in **medium-term**

Site Location, Anglesey (North Wales)



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BANGOR
UNIVERSITY



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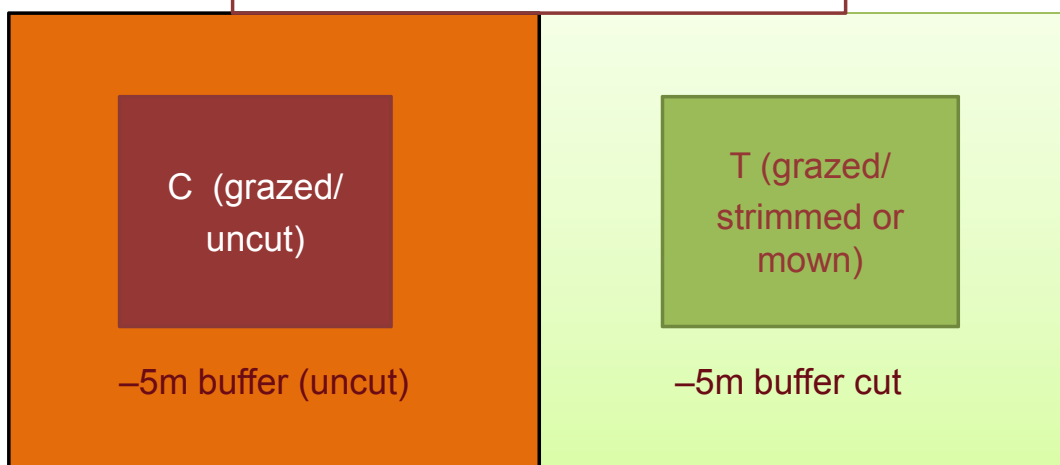


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Experimental Design



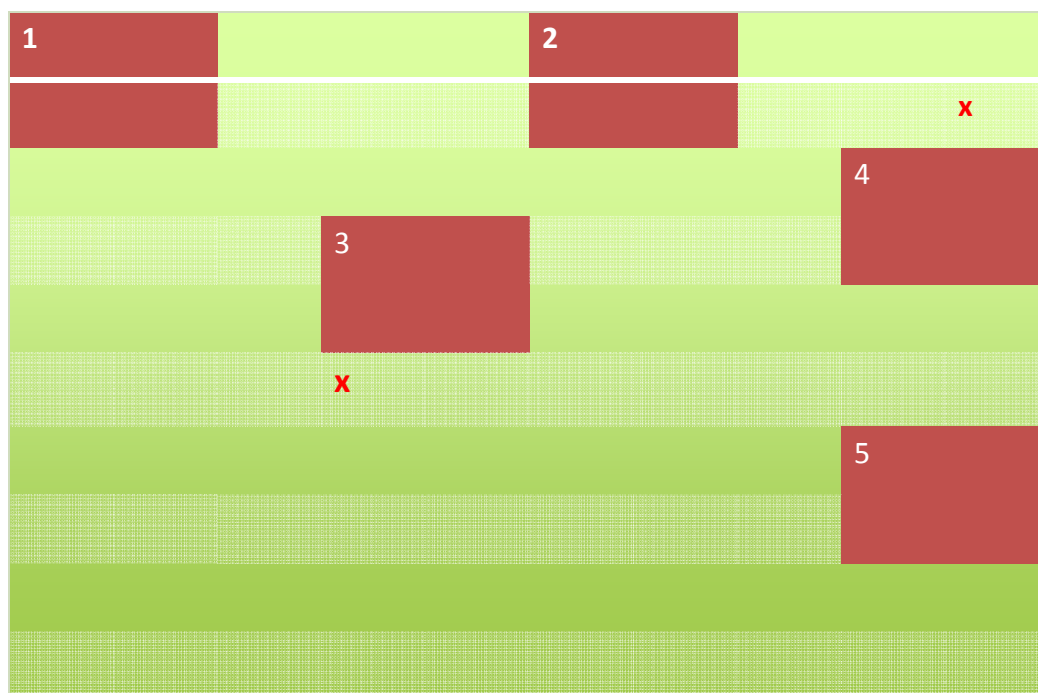
-Plots 10m x 10m)



Schematic diagram of paired plots



Experimental Design



Methodology Vegetation Surveys



Completed October 2011 recording:

- Height range for vegetation groups (Shrubs/ Gramminods/Forbs and Bryophytes)
- % litter and % bare ground
- Species presence and % cover
- Abundance (domin value)
- Photograph taken

Methodology

Pore water sampling



- Piezometers constructed with 10cm length of 1mm slotted pipe
- Inserted to a depth of 20cm (sampling depth ~10-20cm)
- Water sampling undertaken monthly

Plant Community 1

Cladio molinietum



Cladio molinietum
(Large Scale Mowing)
& Grazing



Cladio molinietum
(Large Scale Mowing)



Plant Community 2

M13 *Schoenus nigricans*- *Juncus subnodulosus* mire



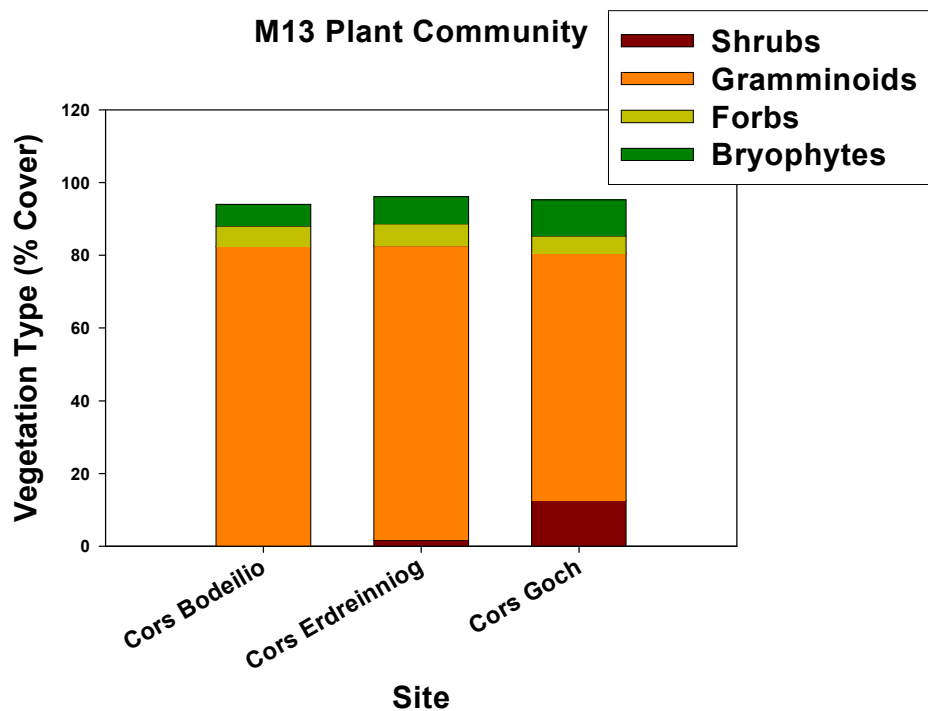
***M13 Schoenus nigrican-Juncus subnodulosus* (Hand cutting and grazing)**



M13 *Schoenus nigrican-Juncus subnodulosus* (Hand cutting)



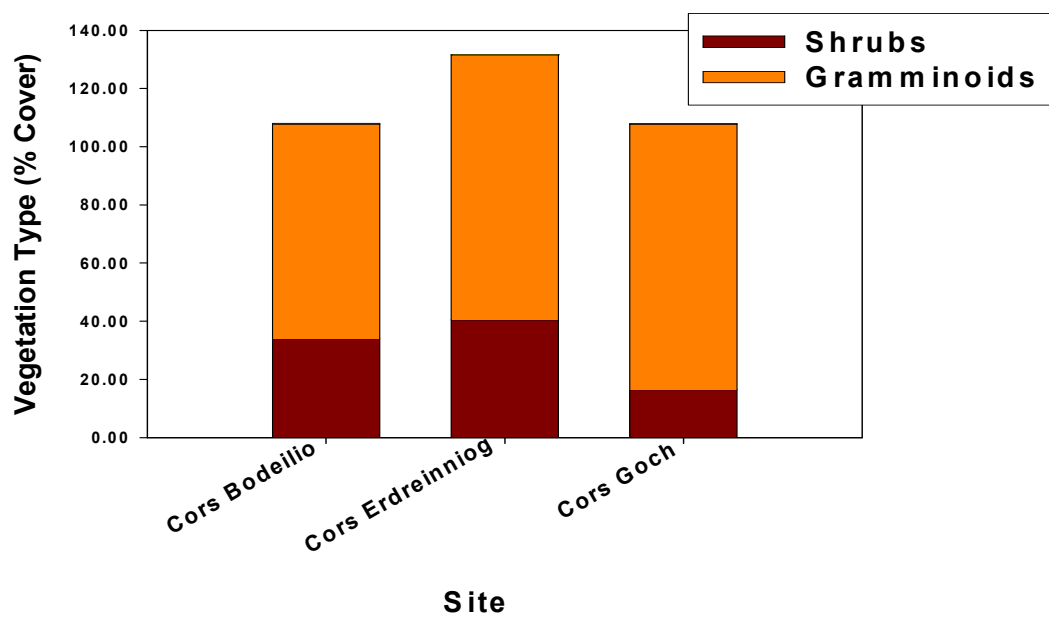
Baseline Vegetation Results



Baseline Vegetation Results



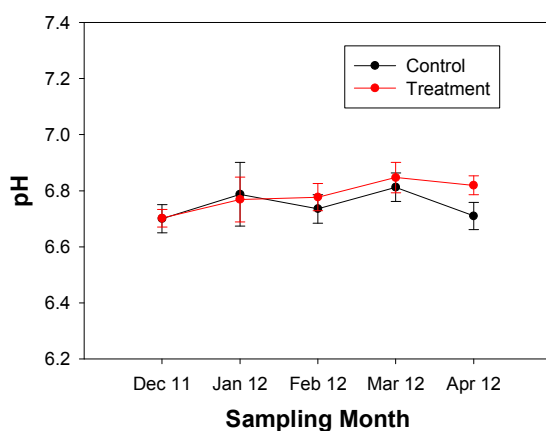
Cladio Plant Community



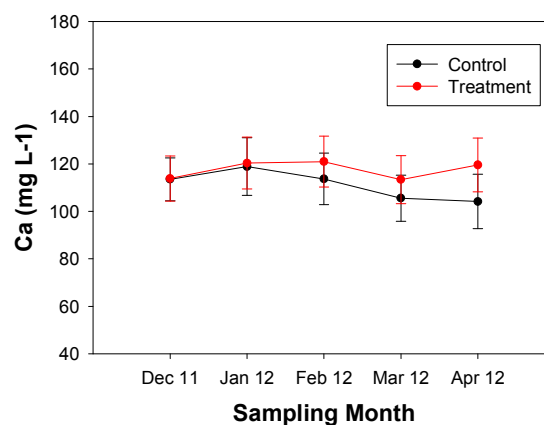
Baseline Water Chemistry pH and Calcium Results



M13 Plant Community



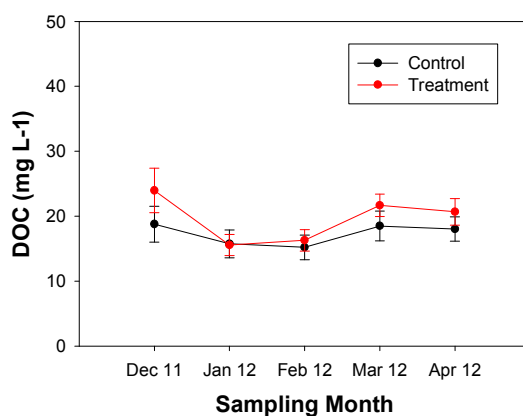
M13 Plant Community



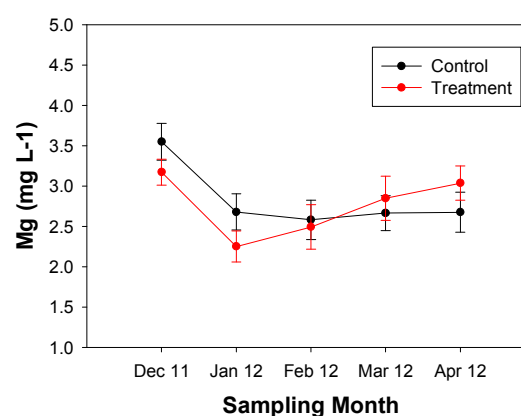
Baseline Water Chemistry DOC and Magnesium Results



Cladio Molinietum Plant Community



Cladio Molinietum Plant Community

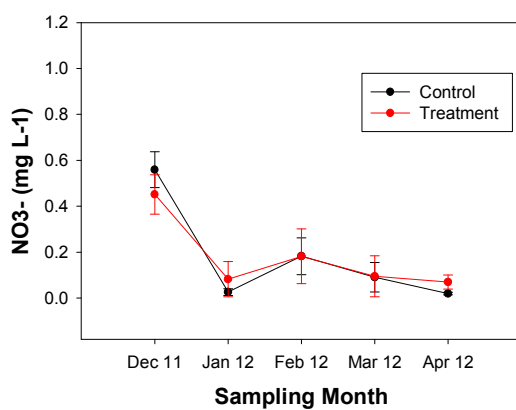


Baseline Water Chemistry

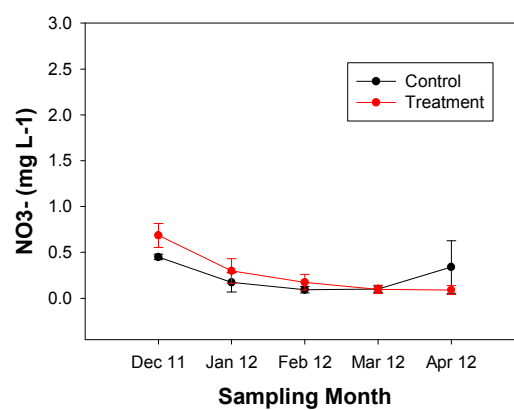
Nitrate Results



M13 Plant Community



Cladio Molinietum Plant Community



Summary



- How **cutting/grazing** interventions affect **fen vegetation** and **DOC exports**
- **Baseline vegetation** data illustrates **degradation** in both plant communities
- **Positive relationship** between **pH** and **Ca**
- **DOC** 'appears' to be increasing in concentration (treatment) in **Cladio Molinietum**
- **Nitrate reduction** evident in both plant communities

Acknowledgements

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- Janine Guest
- LIFE Team Staff

