Atmospheric Nitrogen input to Ballynahone Bog: measuring, modelling & understanding ecological impacts

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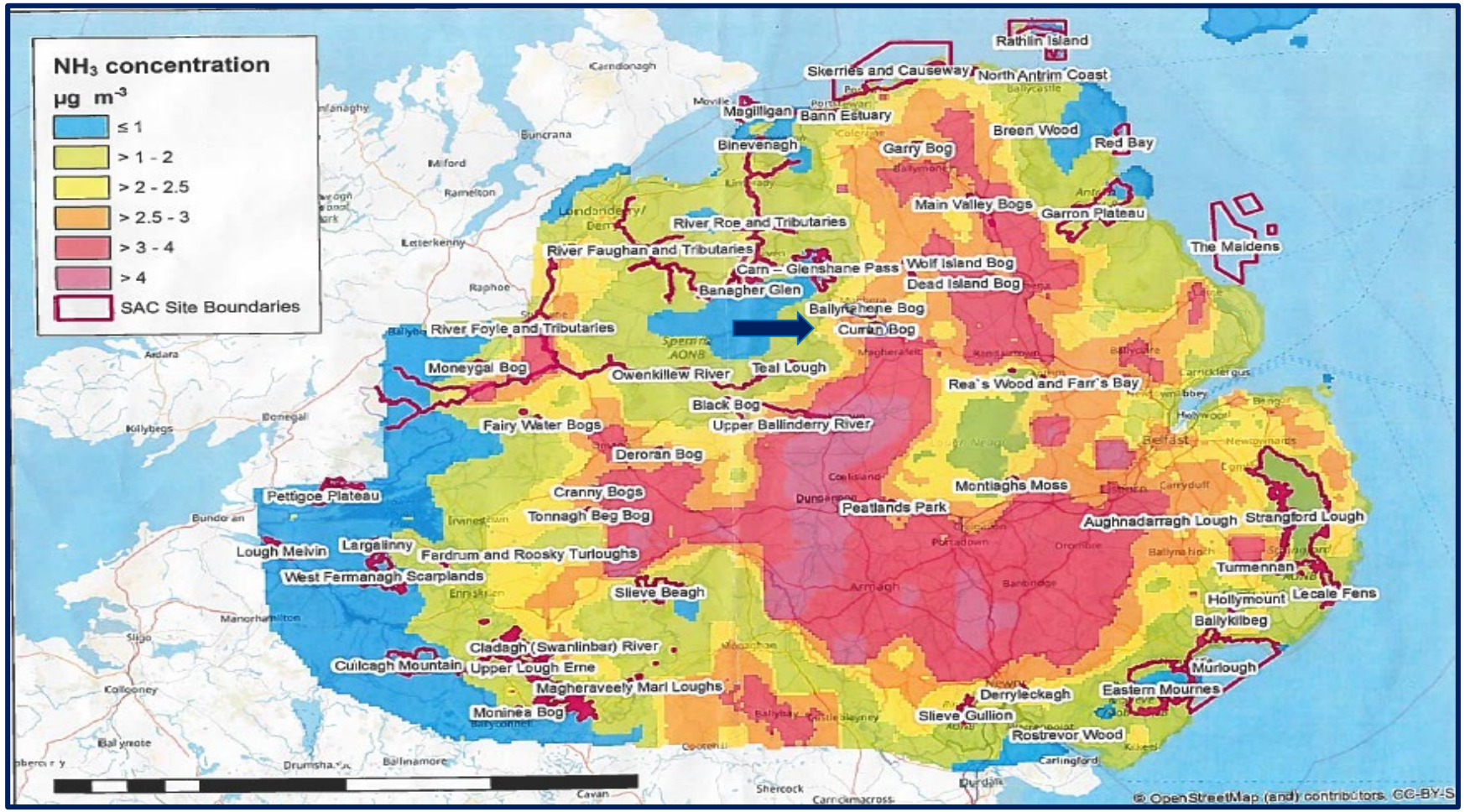
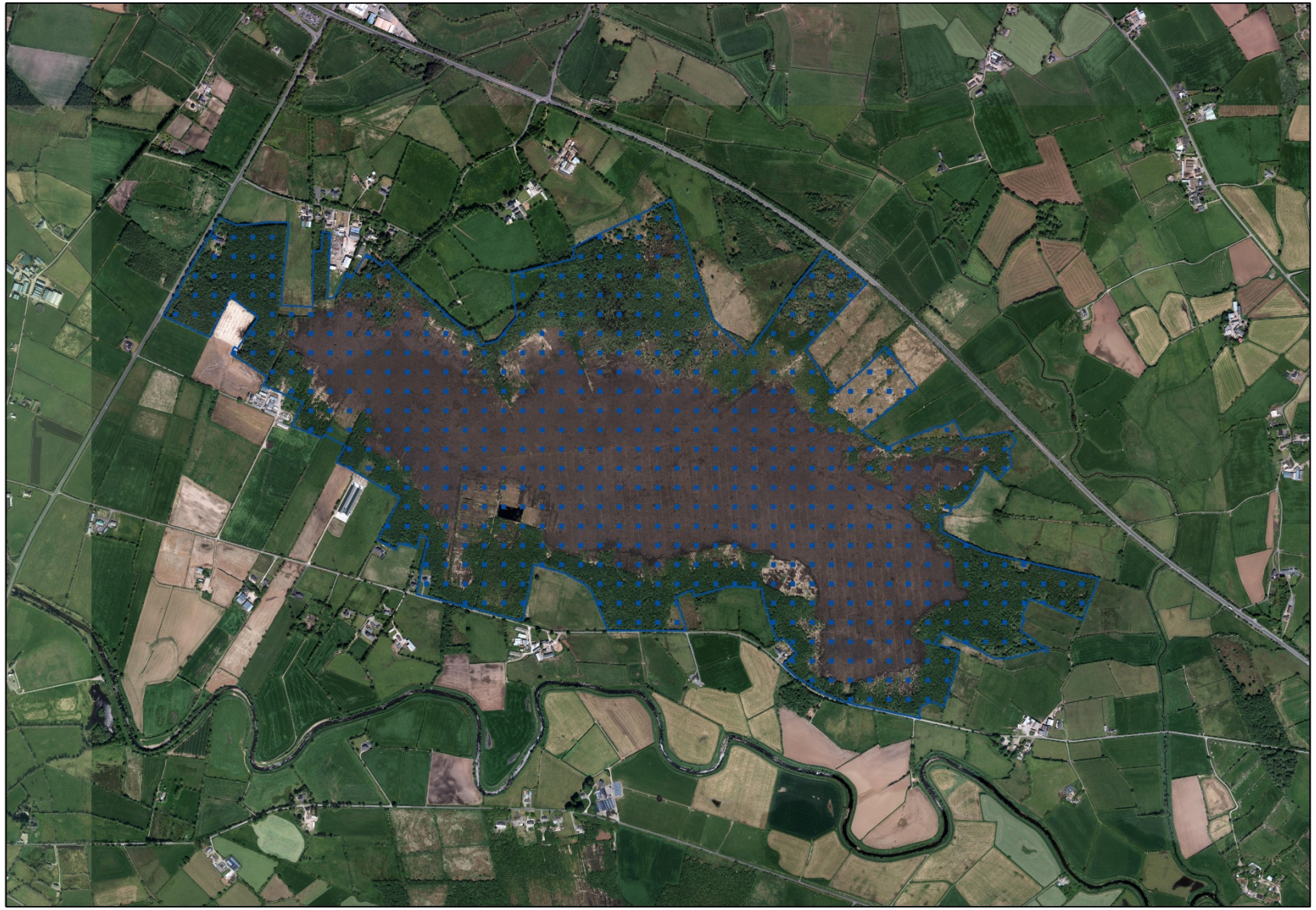
NI SACs - Ammonia concentrations (2015)



Ballynahone Bog – Active Raised Bog



Project Aims and Objectives

- in partnership with Centre for Ecology & Hydrology

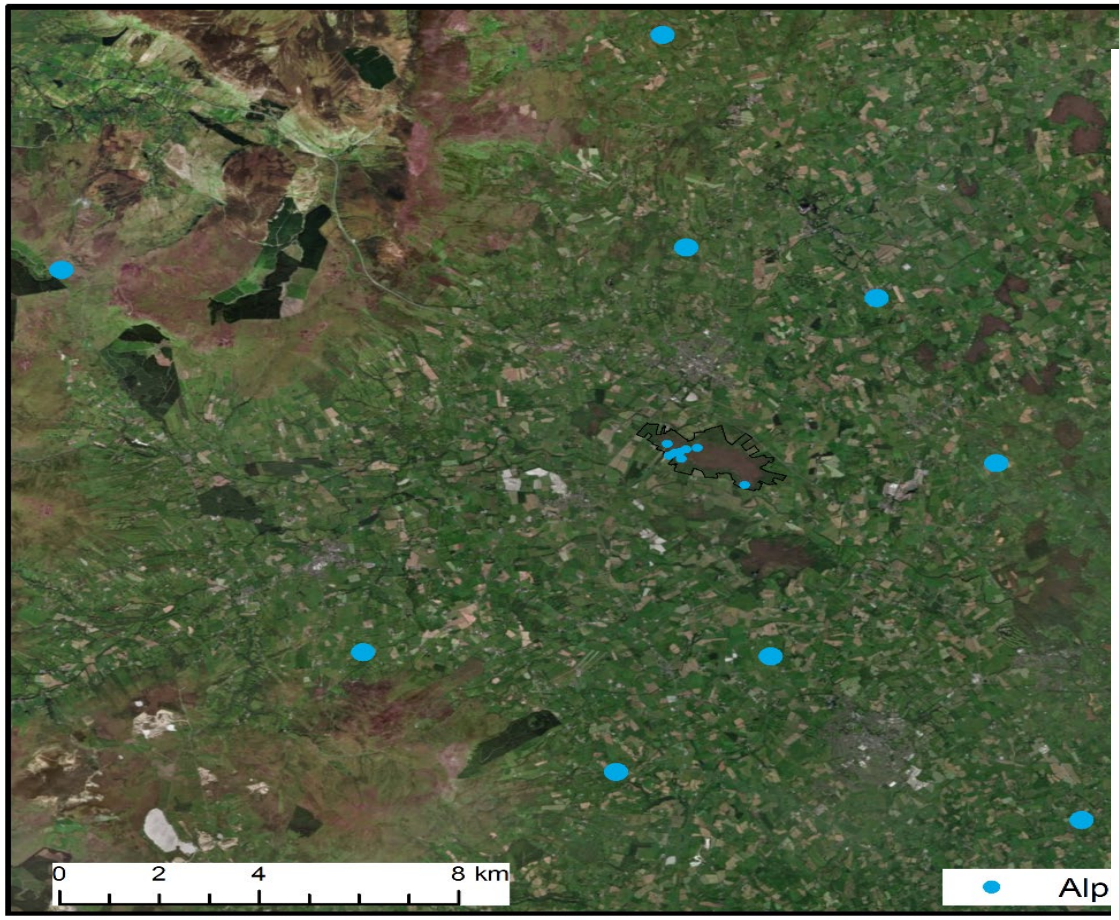
(Project Completion Date: March 2020)

As NH3 is highly spatially variable, identifying & quantifying the sources of N input to sites at the landscape scale is essential for developing effective mitigation plans.

Project scope includes:

1. NH3 monitoring
2. Bio-monitoring
3. Modelling

Measuring NH3 concentrations – Set-up of ALPHA samplers



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, the GIS User Community

Figure 1. Ammonia monitoring at Ballynahone Bog. Brown rectangles show the site of new poultry houses (to the left of Site 1). Red markers indicate placement of atmospheric ammonia sampling sites.

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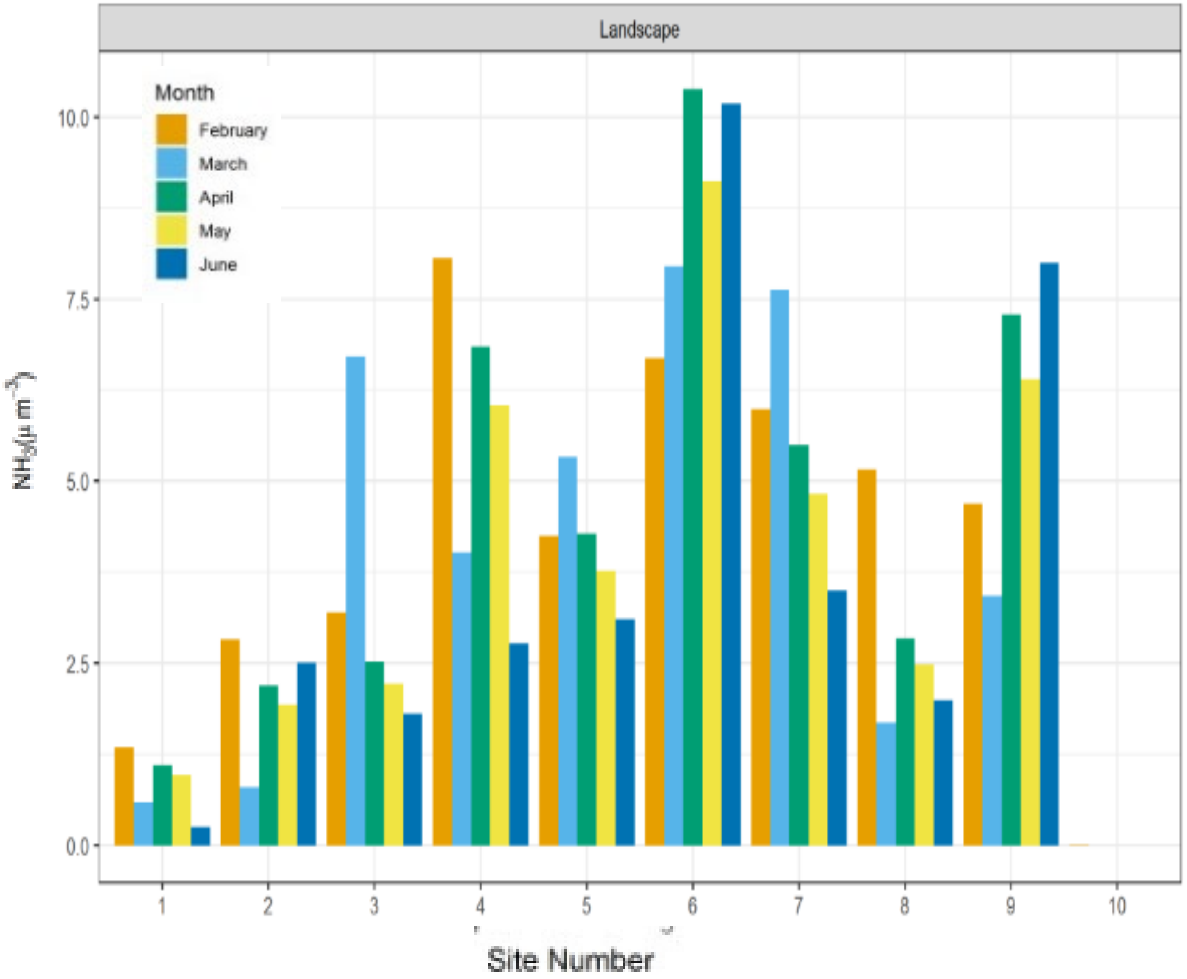
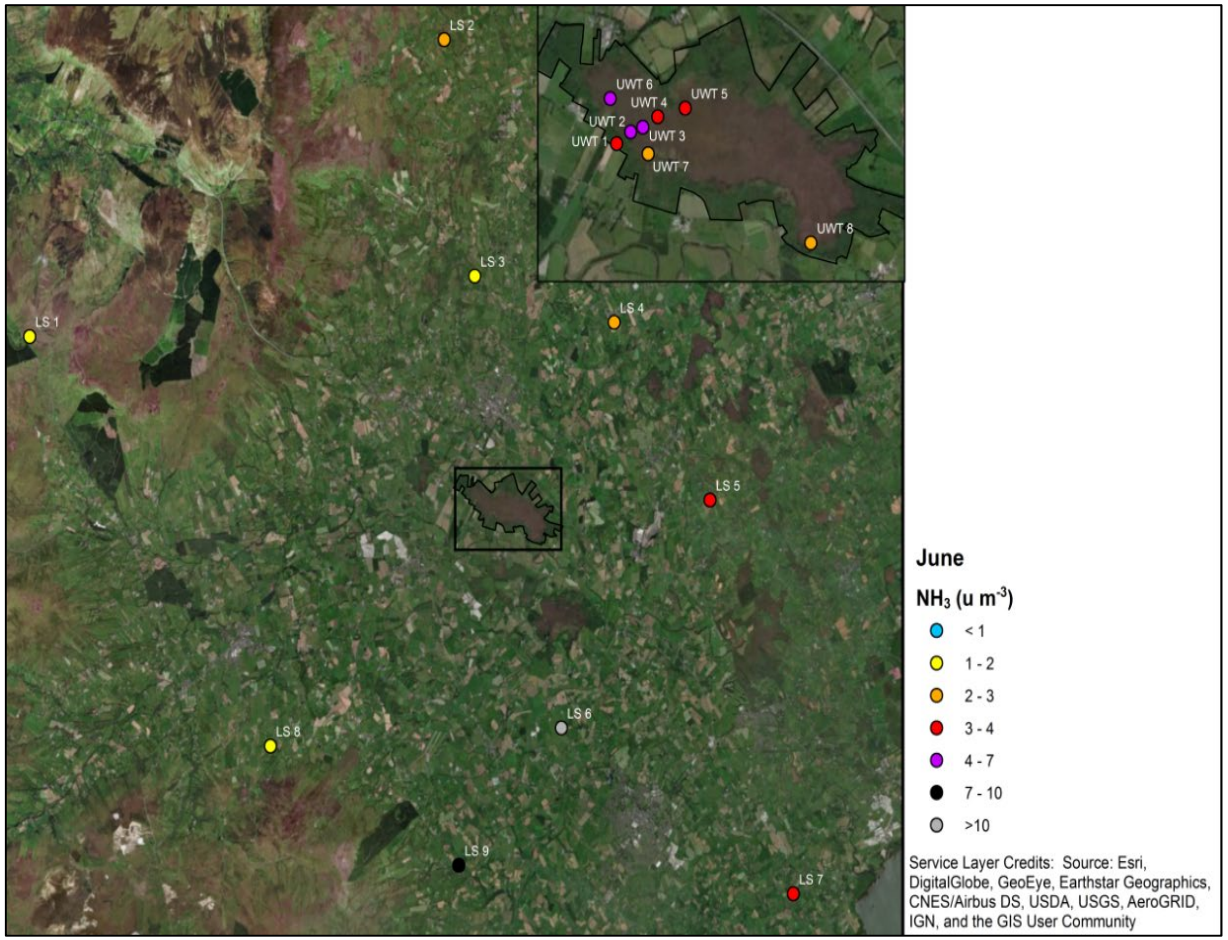
NH3 concentrations – Landscape





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NH3 concentrations on Ballynahone Bog

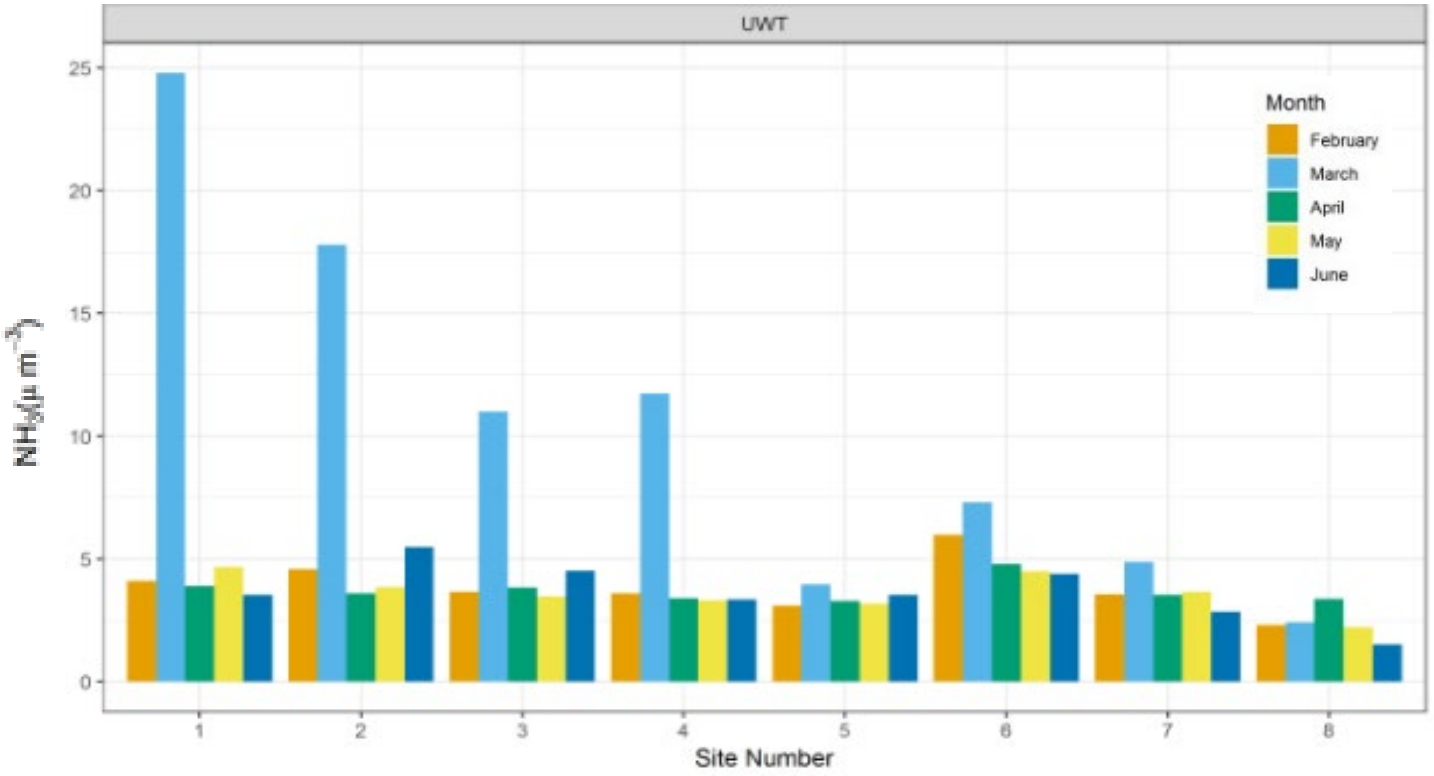
Estimated pollution

Ballynahone Bog SAC
Nitrogen Deposition (N)
22.54 kg N/ha/yr
Ammonia Concentration (NH_3)
2.93 µg/m^3

Source: National Air Emissions Inventory – Based on 2013-15 data
www.apis.ac.uk/srcl

Critical level (NH_3) 1µg/m^3
Critical load (N) 5 kg N/ha/yr

Actual Pollution



Data Source: Centre for Ecology and Hydrology and Ulster Wildlife (2014-19)

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Bio-monitoring

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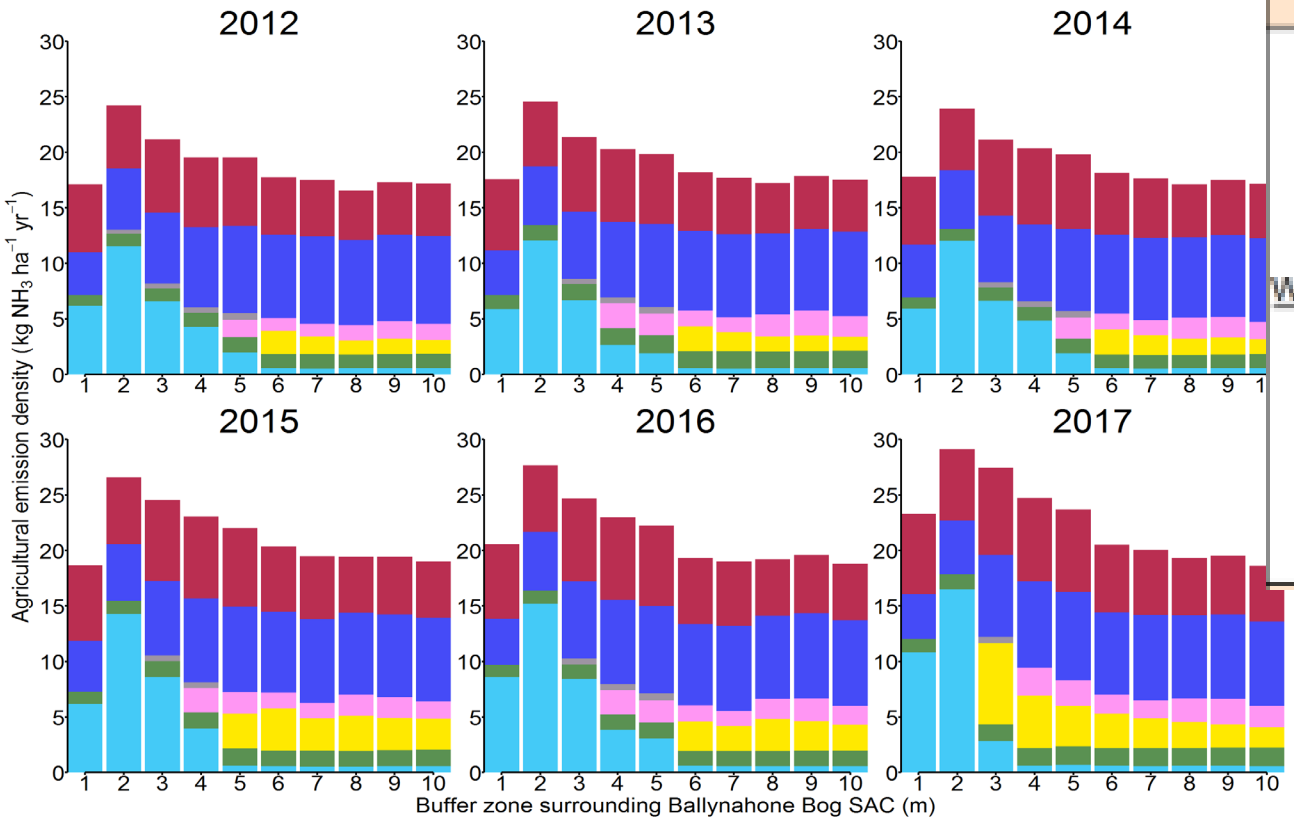
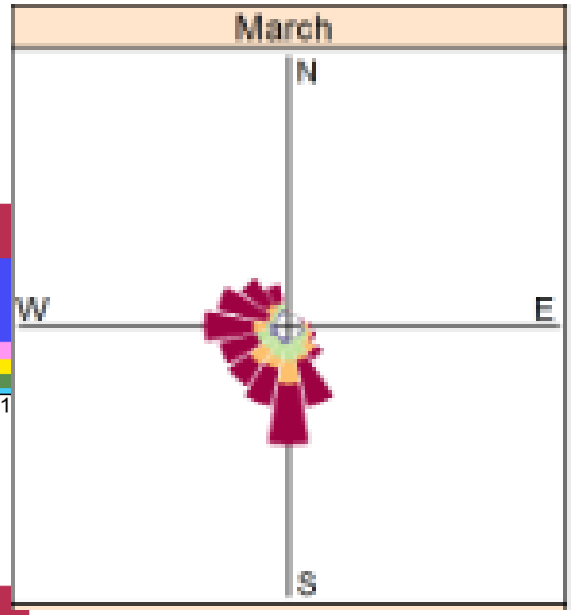
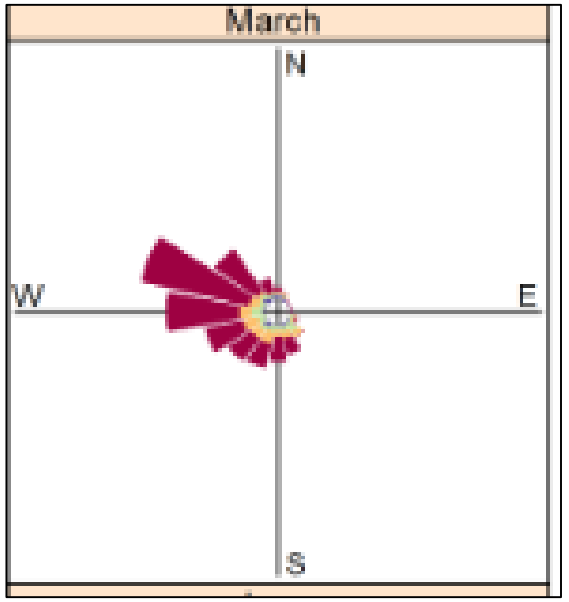
Modelling emissions



*contains all emissions sources that would be disclosive if they were not aggregated with other categories





Met station has been installed on the bog by UW to give local accurate wind data

Emission Density Modelling by sector for 1 -10 km zones around the bog

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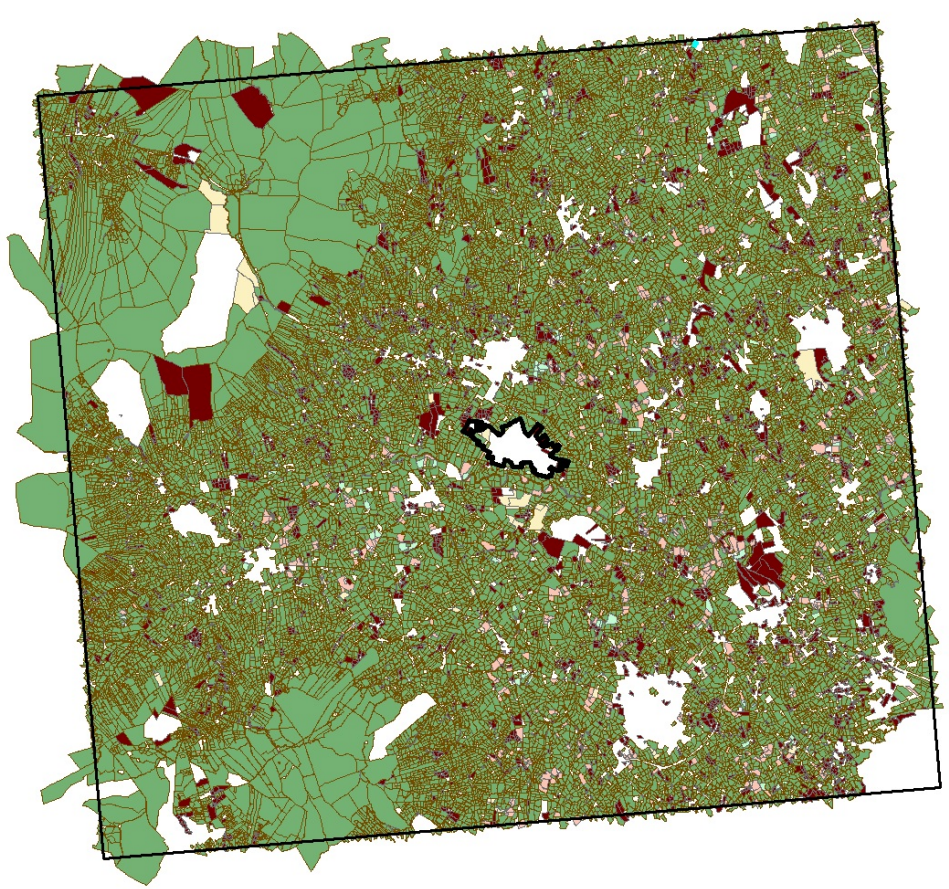
Next Steps:

- Build a detailed emission field and complete modelling
- Determine influence of sources on the local concentration field and consider on farm mitigation
- Knowledge dissemination – public, stakeholders
- Process vegetation samples
- ALPHA samplers to be collected monthly for 12 months
- Tree-gap monitoring