

Objectives

- The Nitrogen release from Cover Crops (NiCCs) project aims to quantify the impact of contrasting cover crop mixes and destruction methods on over winter nitrate leaching, soil nitrogen supply and the performance of the following two cash crops in the rotation

Methodology

- Replicated (x3) plot experiments; cover crops drilled in August/September 2021 at 2 commercial arable farms in Hertfordshire & West Sussex
- Over winter (2021/22) **nitrate (NO₃) leaching** losses were measured approx. every 2 weeks
- Soil mineral nitrogen (SMN) & cover crop N** measured in January/February 2022 at cover crop destruction

Treatments

- Control: *Stubble & weedy cover*
- Mix 1: *Phacelia (20%) and oil radish (80%)*
- Mix 2: *Non-brassica mix: Japanese Oats (45%), Buckwheat (45%); Phacelia (10%)*

Different destruction methods (glyphosate vs. chopping or rolling) have been used to better understand the potential of growing cover crops without glyphosate

Results

- At both the Hertfordshire & West Sussex sites, Mix 1 and Mix 2 reduced over winter NO₃ leaching losses by c.90% & 70% respectively compared to the control which lost 9 and 23 kg/ha N by leaching, respectively (Figs 1 & 2.)

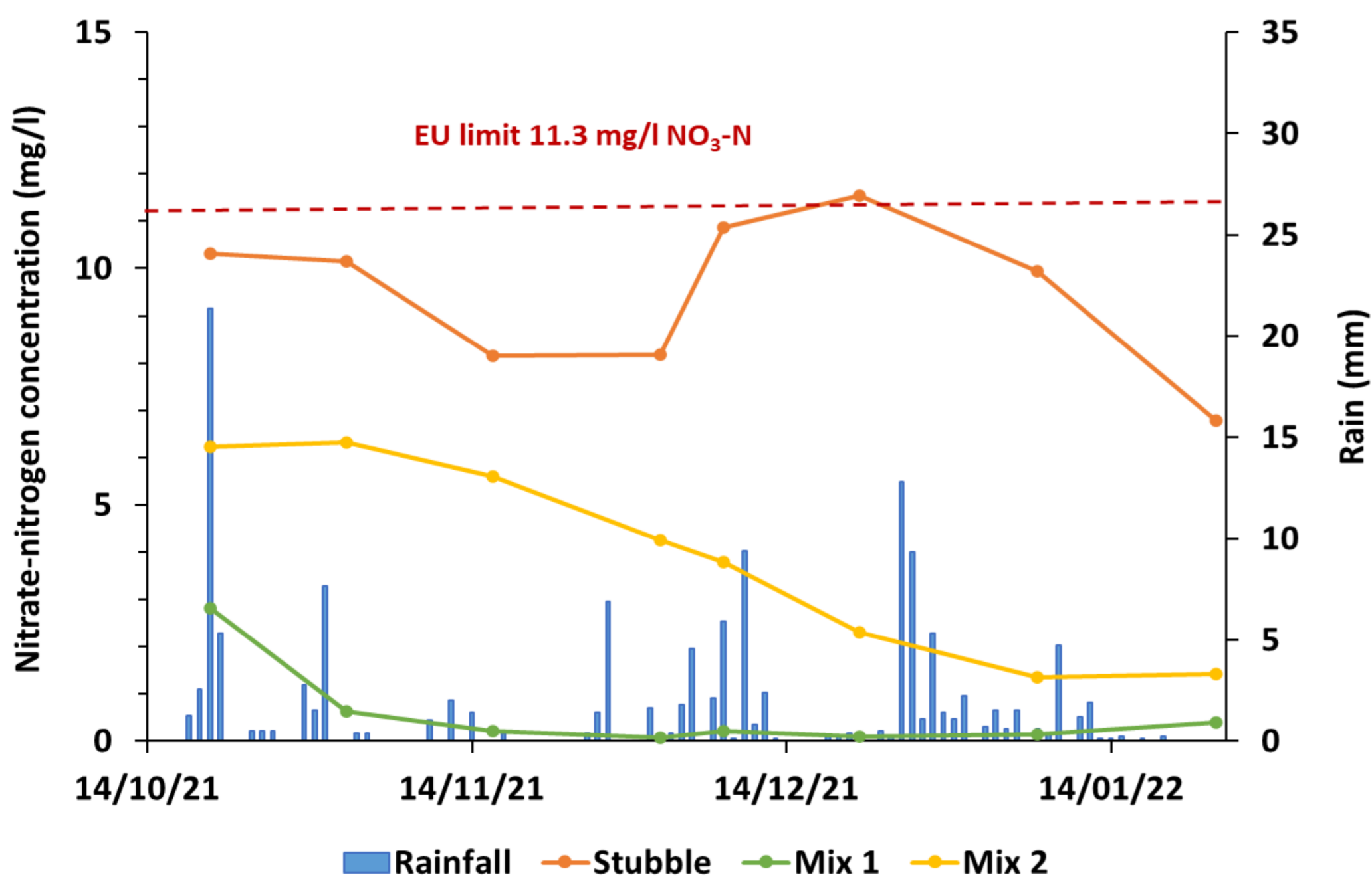


Figure 1. Nitrate concentrations in the drainage water over winter 2021/22 at the Hertfordshire site

Acknowledgements: The work is funded by Affinity Water and Portsmouth Water, with the seed mixes kindly supplied by RAGT seeds UK. This is a collaborative project, working very closely with our host farmers, who are conducting farm operations, ensuring the results are representative of commercial practice.

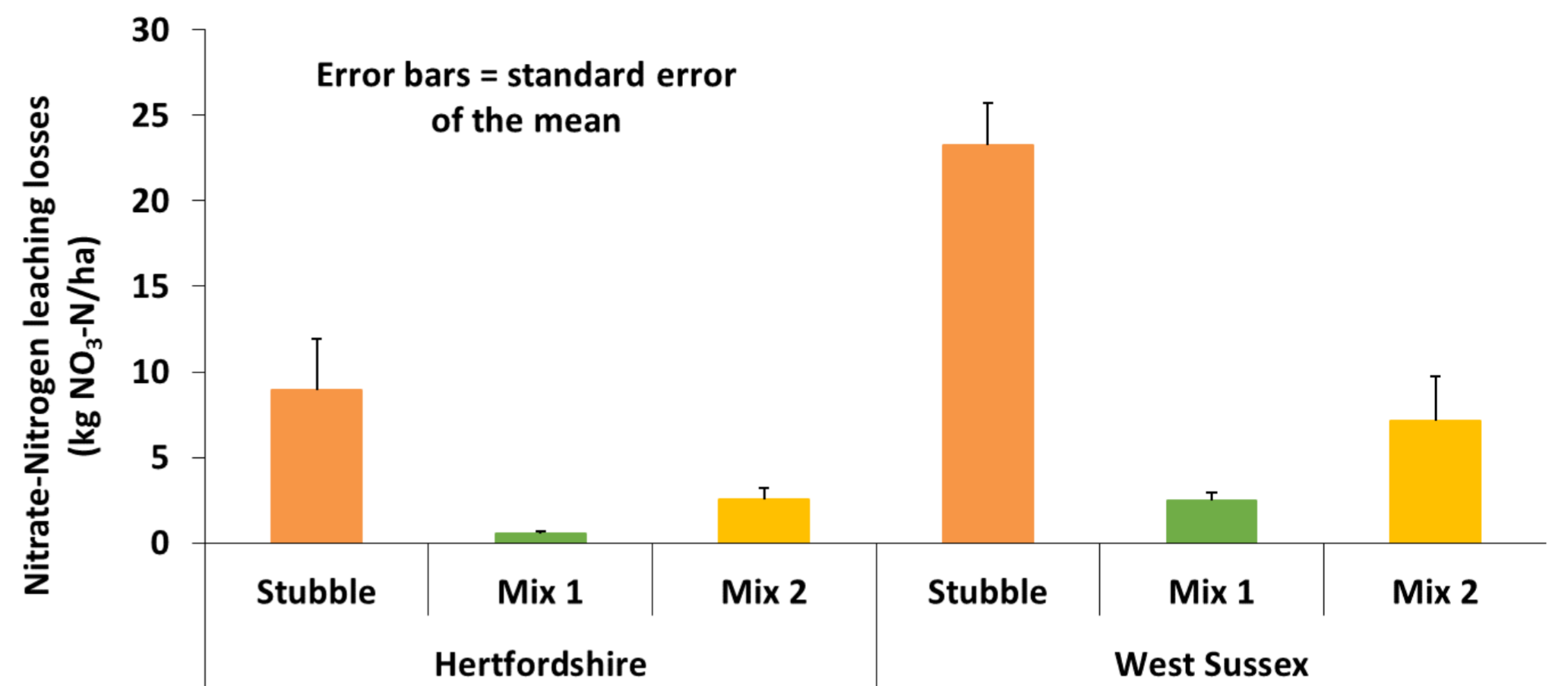


Figure 2. Total overwinter nitrate leaching losses at both sites

- Spring soil nitrogen supply (SMN + cover crop N) was up to 30 kg/ha greater where a cover crop (Mix 2) had been grown (Fig 3.)

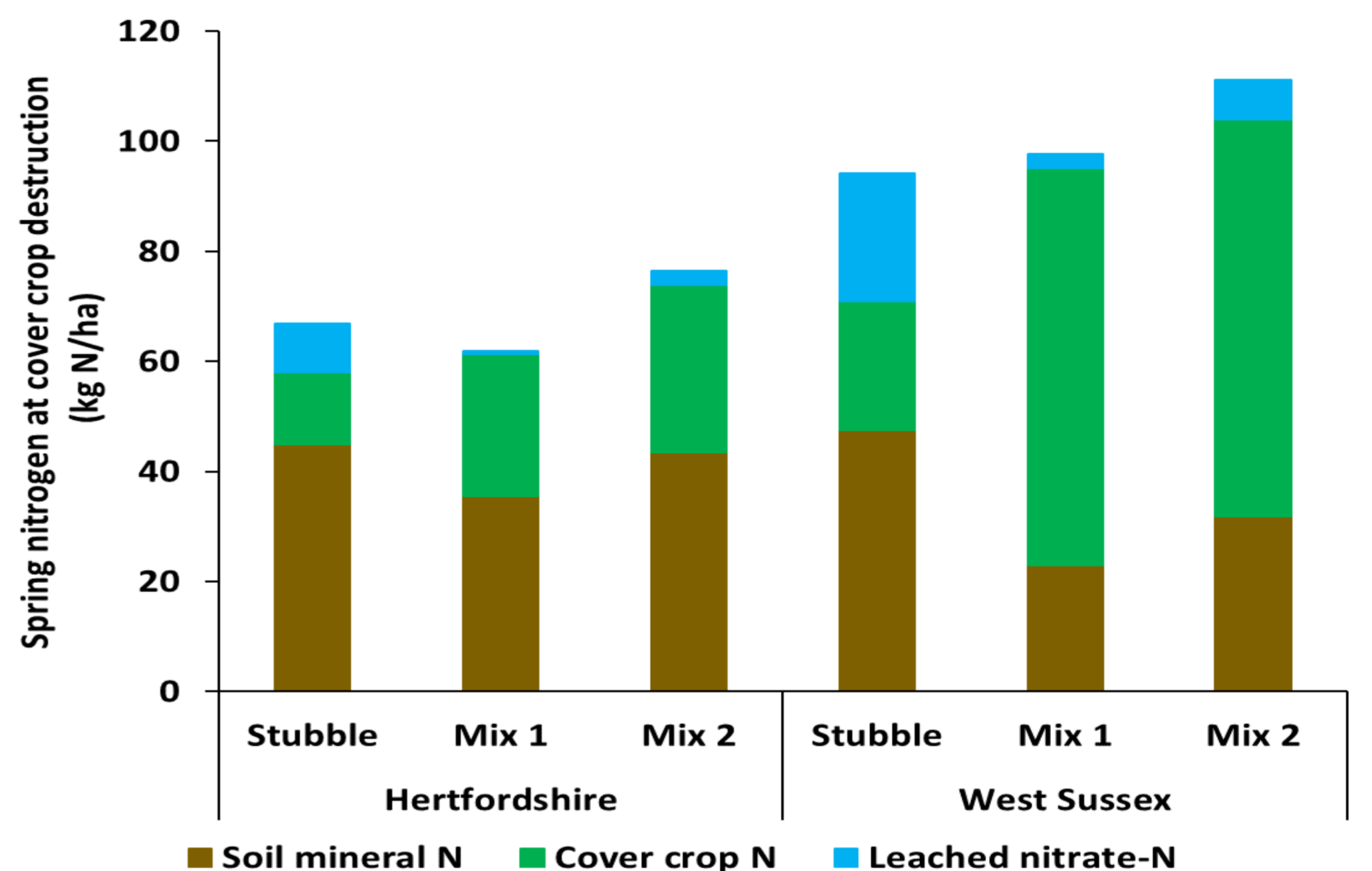


Figure 3: Spring nitrogen balance at both sites

- The fate of nitrogen retained in the cover crops is the focus of ongoing work, with topsoil mineral N being measured to track it's release to the growing spring crop, following different destruction techniques; a) chop & shallow incorporate, b) glyphosate, c) rolling on a frost



Next steps

- The potential legacy effect of these treatments will be determined in 2022/23
- Results will be used to underpin advice for growers on the appropriate management of cover crops, to maximise N recovery and minimise nitrate leaching