AGRI-FOOD
& BIOSCIENCES
INSTITUTE

biomass connect

Leading | Protecting | Enhancing

Agri-Environmental Technologies Unit

SRC Willow

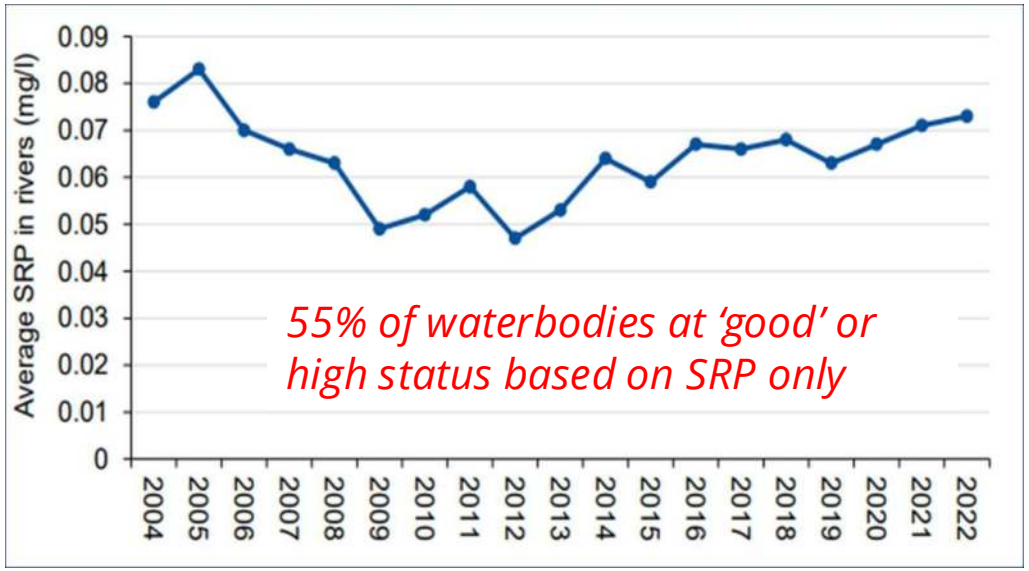
Water management on farm

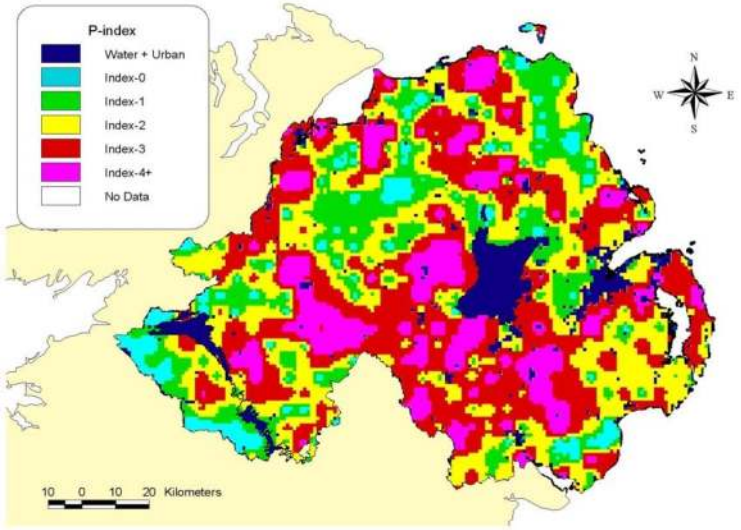
Chris Johnston

7th November 2024

afbini.gov.uk

SRC willow for pollution and waste management





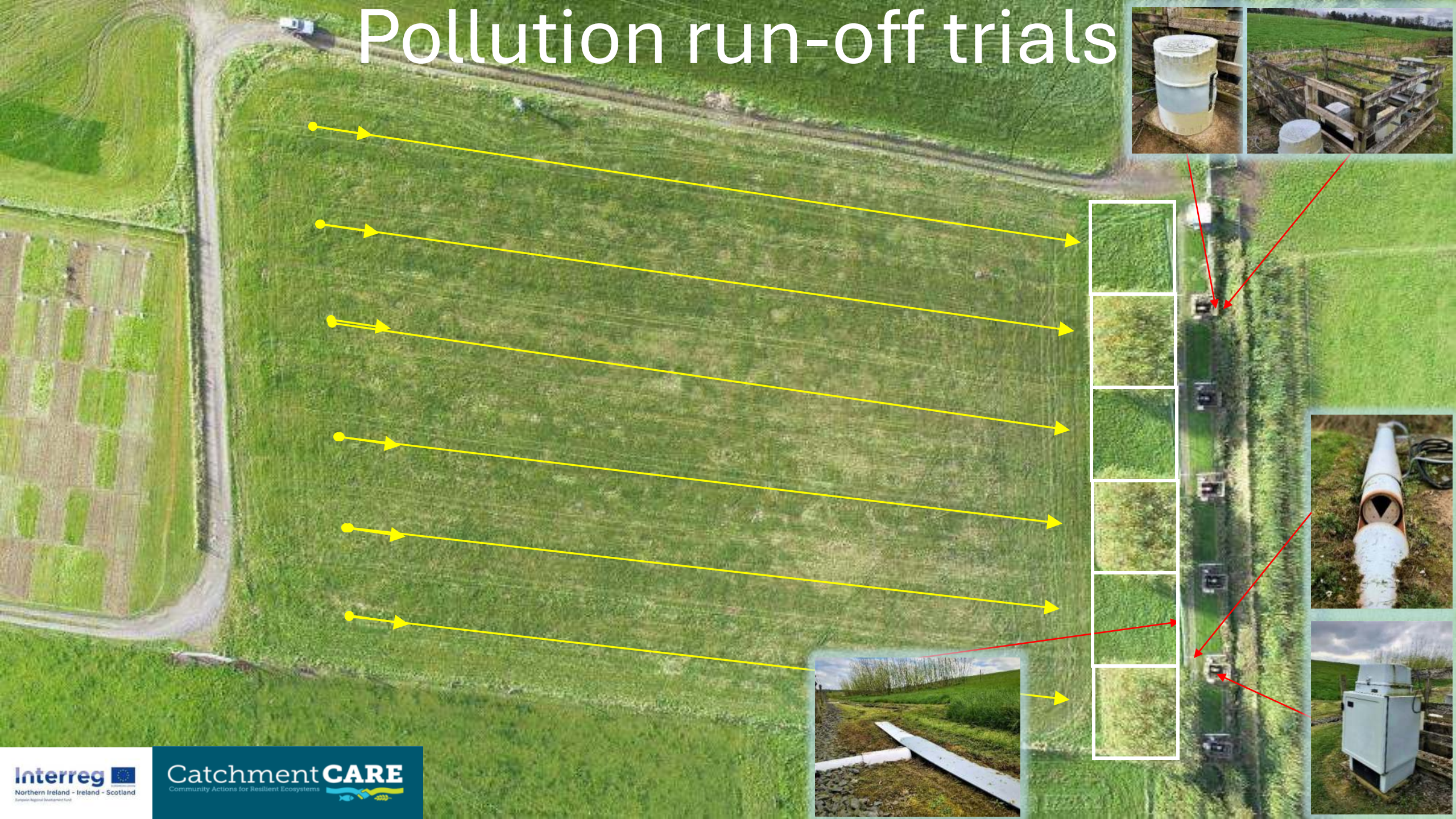
Why Willow

- Literature & AFBI Research shows ….
  - High Establishment, Yield & Growth Rates
  - High Transpiration rates
  - Progressive breeding programs
  - Established management, Agronomy & husbandry practices
  - Efficiently utilises and removes nutrients
  - Protects groundwater
- Activity on soil physical properties
  - Increases surface roughness / impedance to flow
  - Increases soil hydraulic conductivity.
  - Decreases the soil Moisture
  - Reduces volumetric & nutrient runoff
  - Increases Soil organic C
  - Regular fine root turnover & regrowth
  - High microbial activity in intensively root colonized

Diffuse Pollution runoff management

Preventing losses of applied nutrients, sediment and soil P

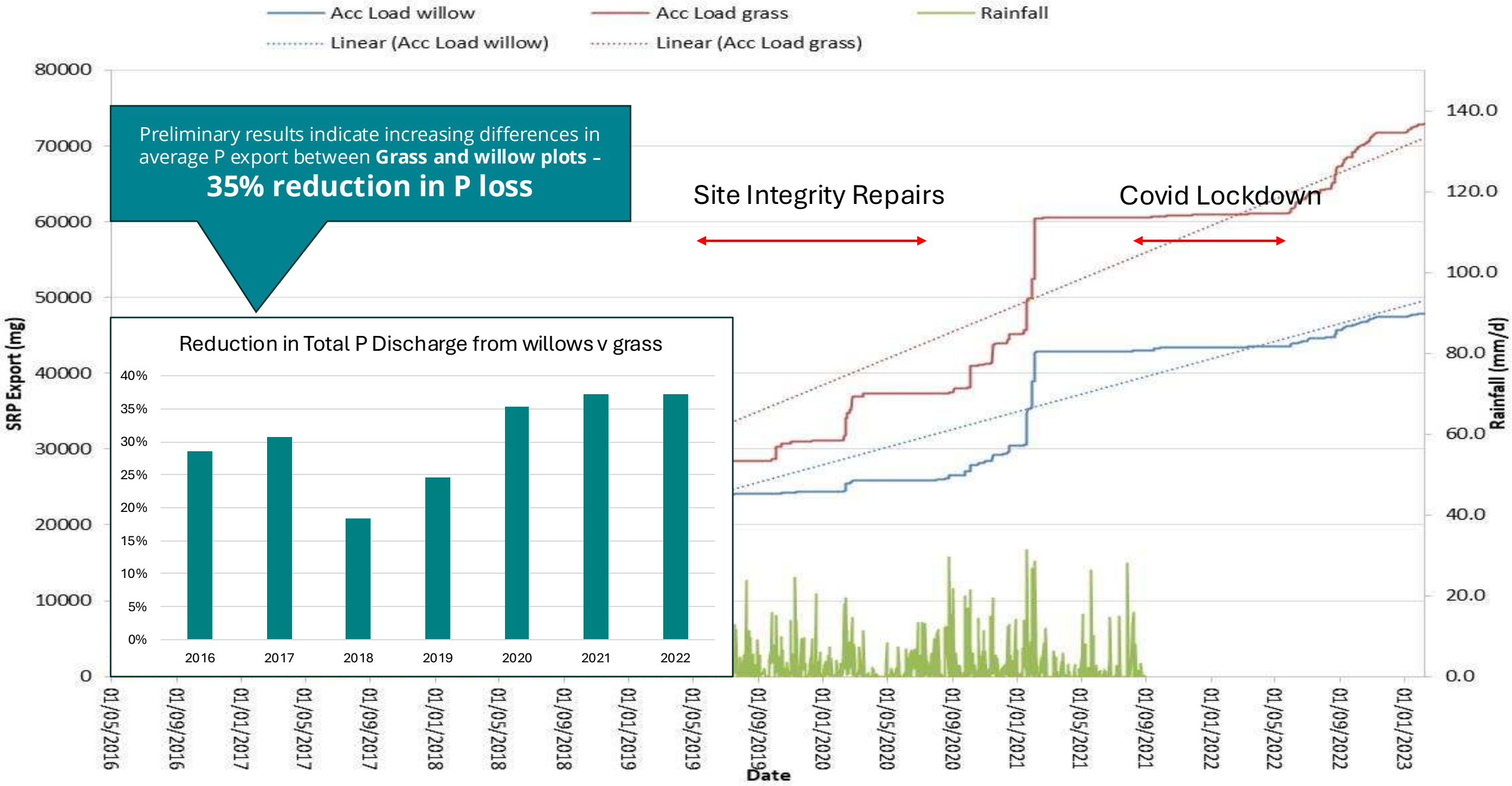
Pollution run-off trials



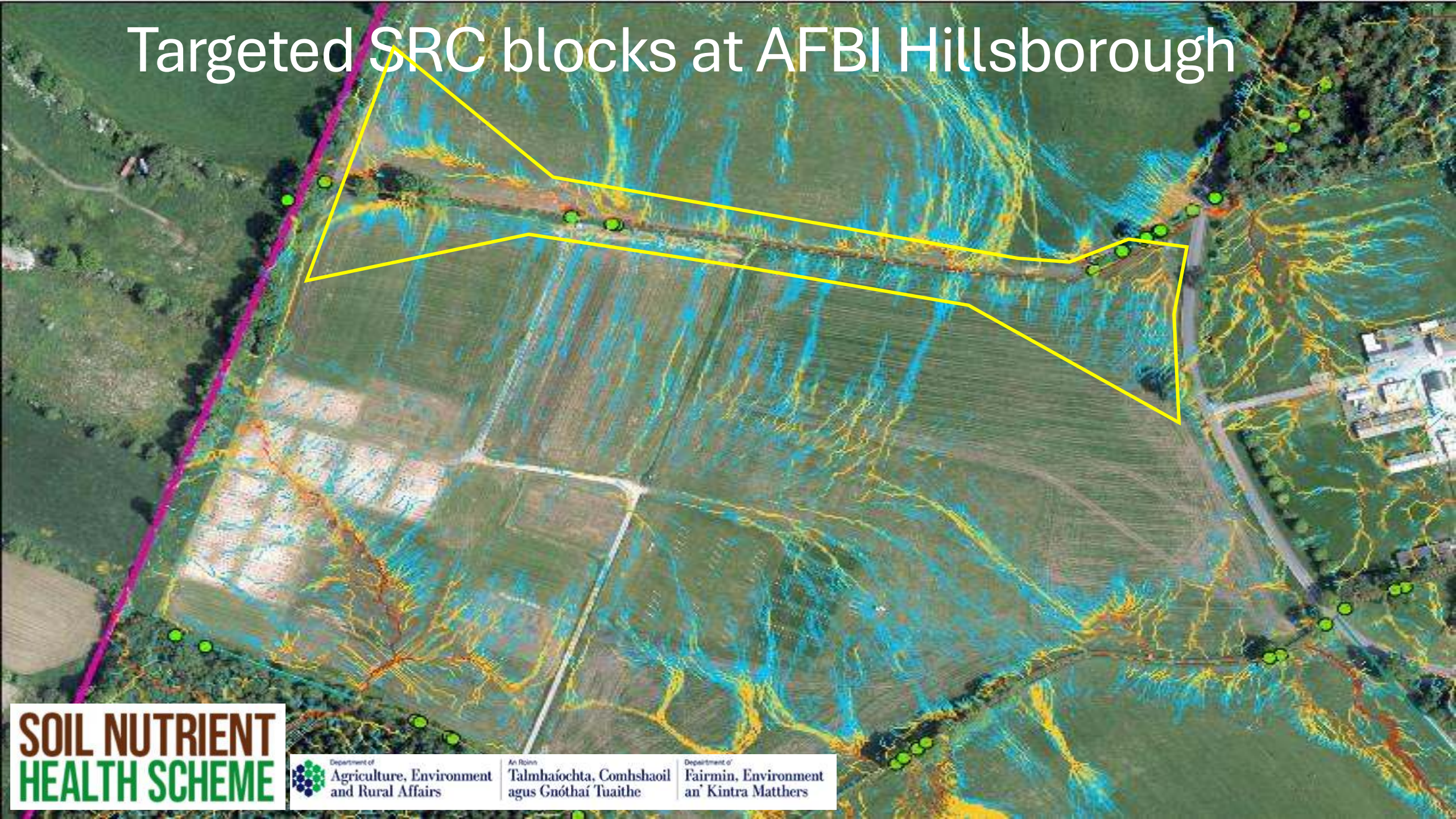
Interreg
Northern Ireland - Ireland - Scotland

CatchmentCARE
Community Actions for Resilient Ecosystems

Run-off - Accumulative Total SRP



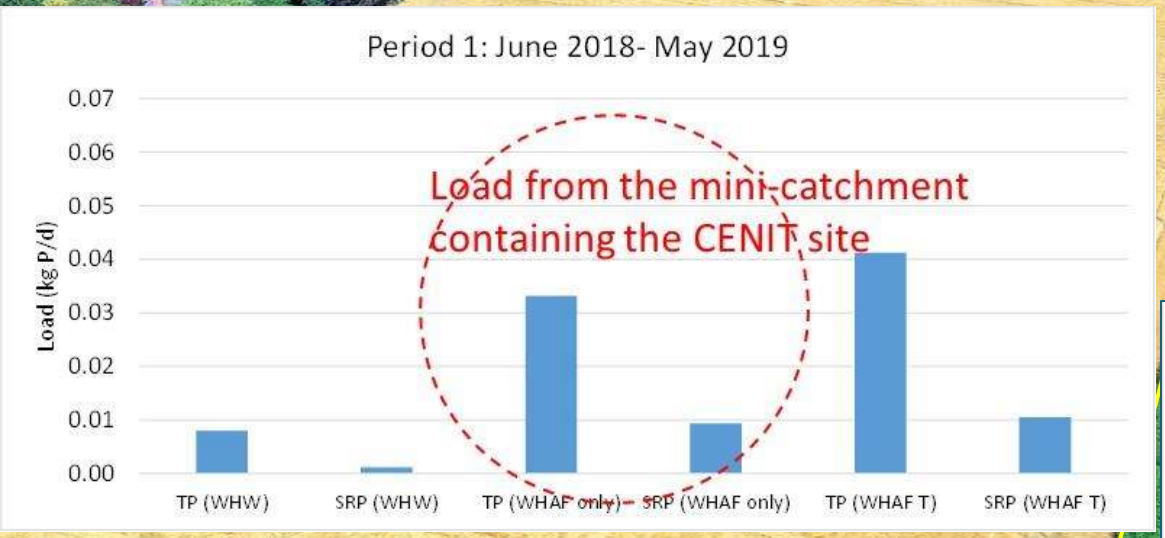
Targeted SRC blocks at AFBI Hillsborough

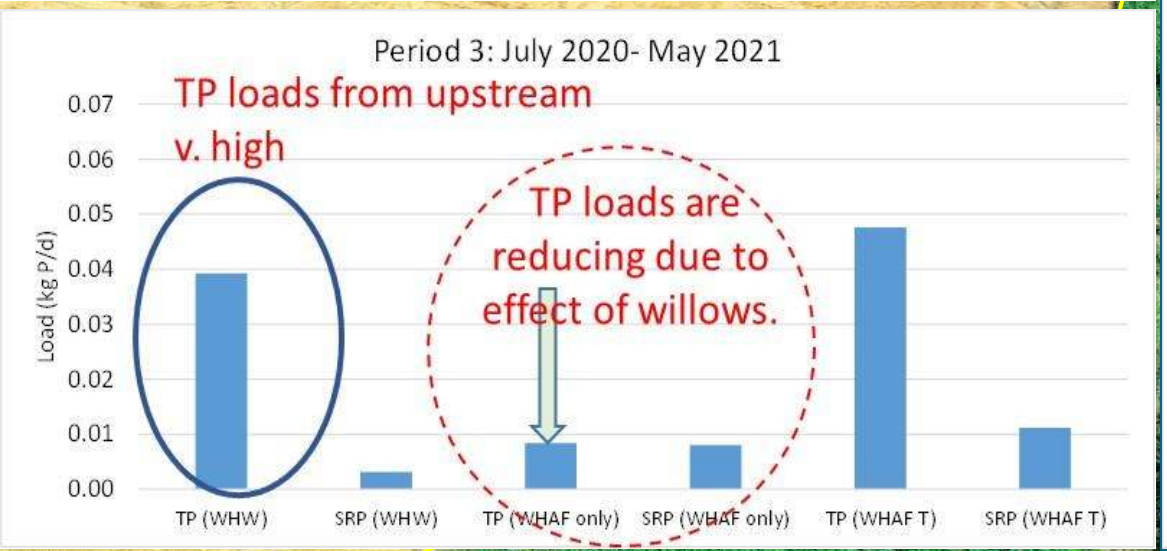


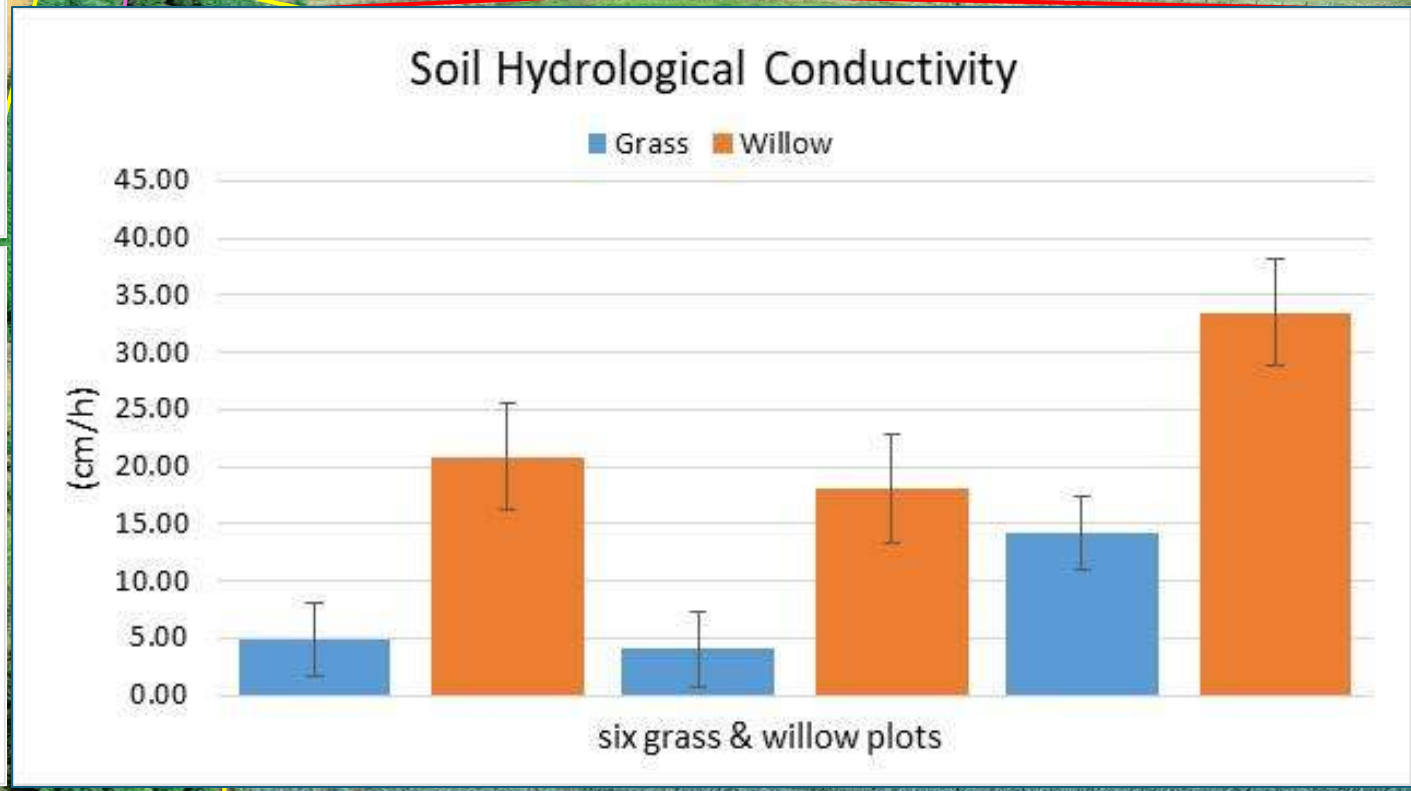
SOIL NUTRIENT HEALTH SCHEME

Department of Agriculture, Environment and Rural Affairs | An Roinn Talmhaíochta, Comhshaoil agus Gnóthaí Tuaithe | Depairtment o' Fairmin, Environment an' Kintra Matthers

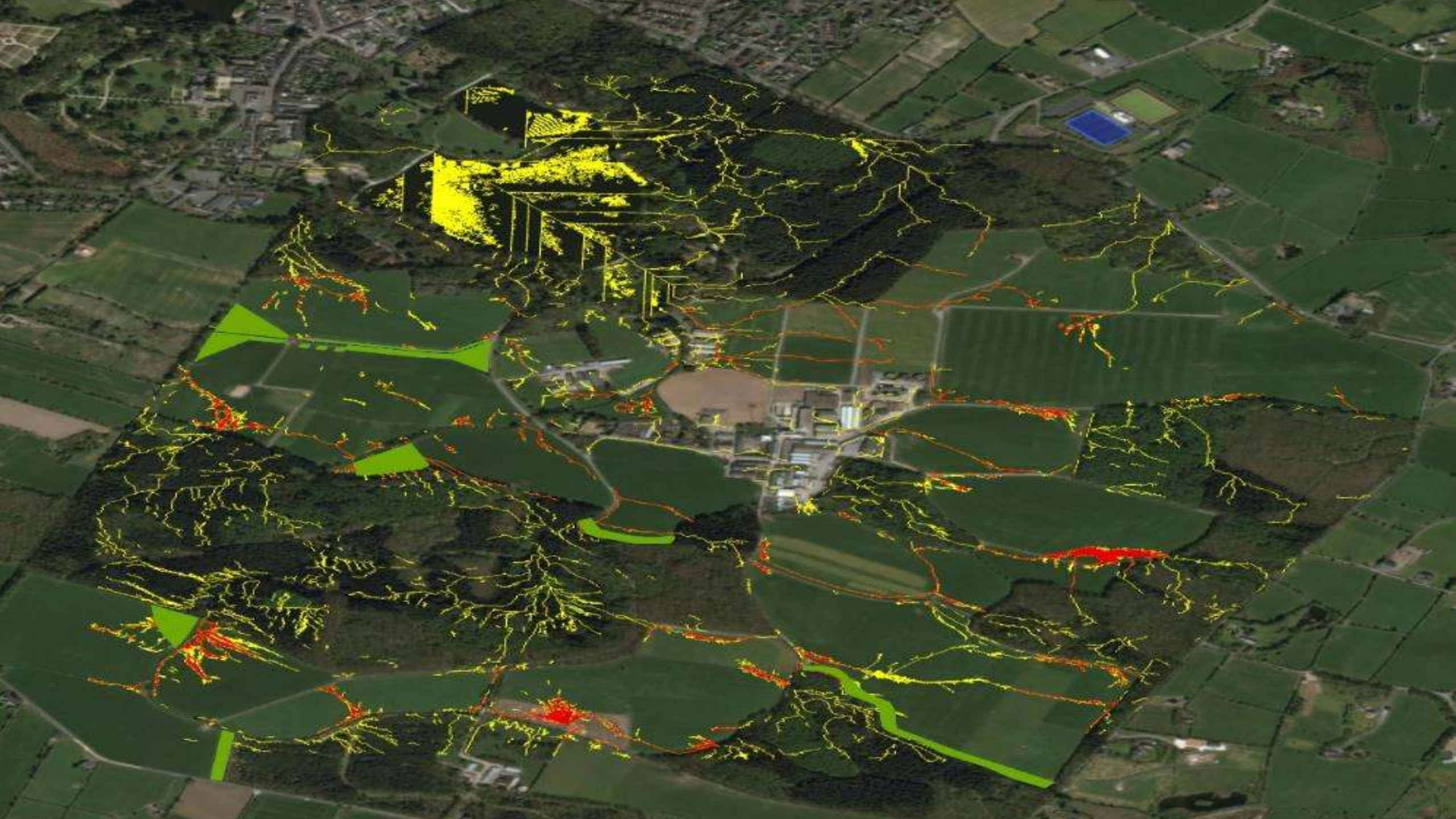
Continuous Outflow sampling



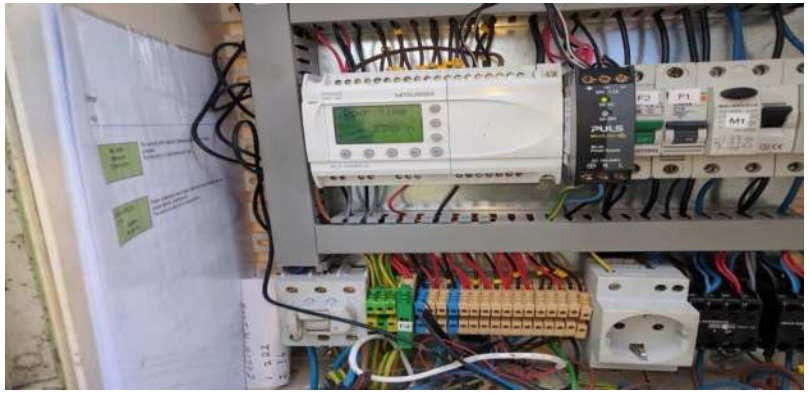




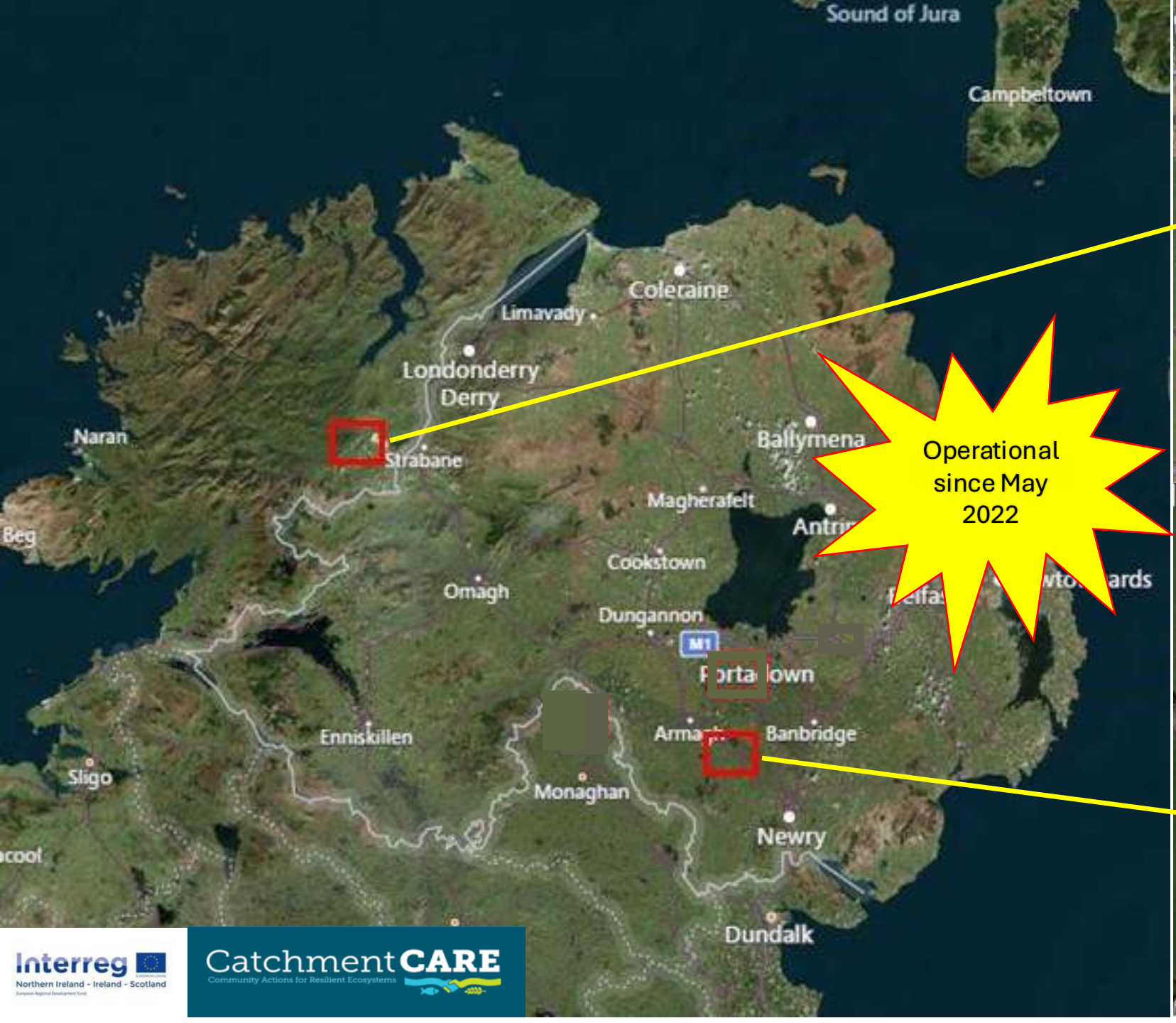
Continuous Inflow Sampling

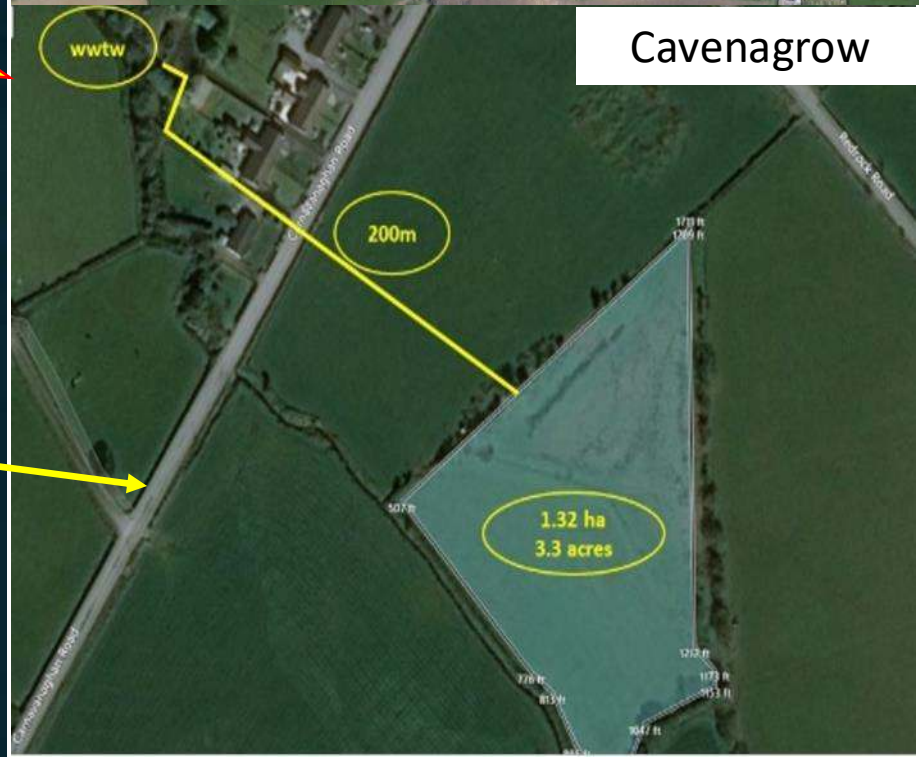


Point Source Wastewater Management



Point source discharge !





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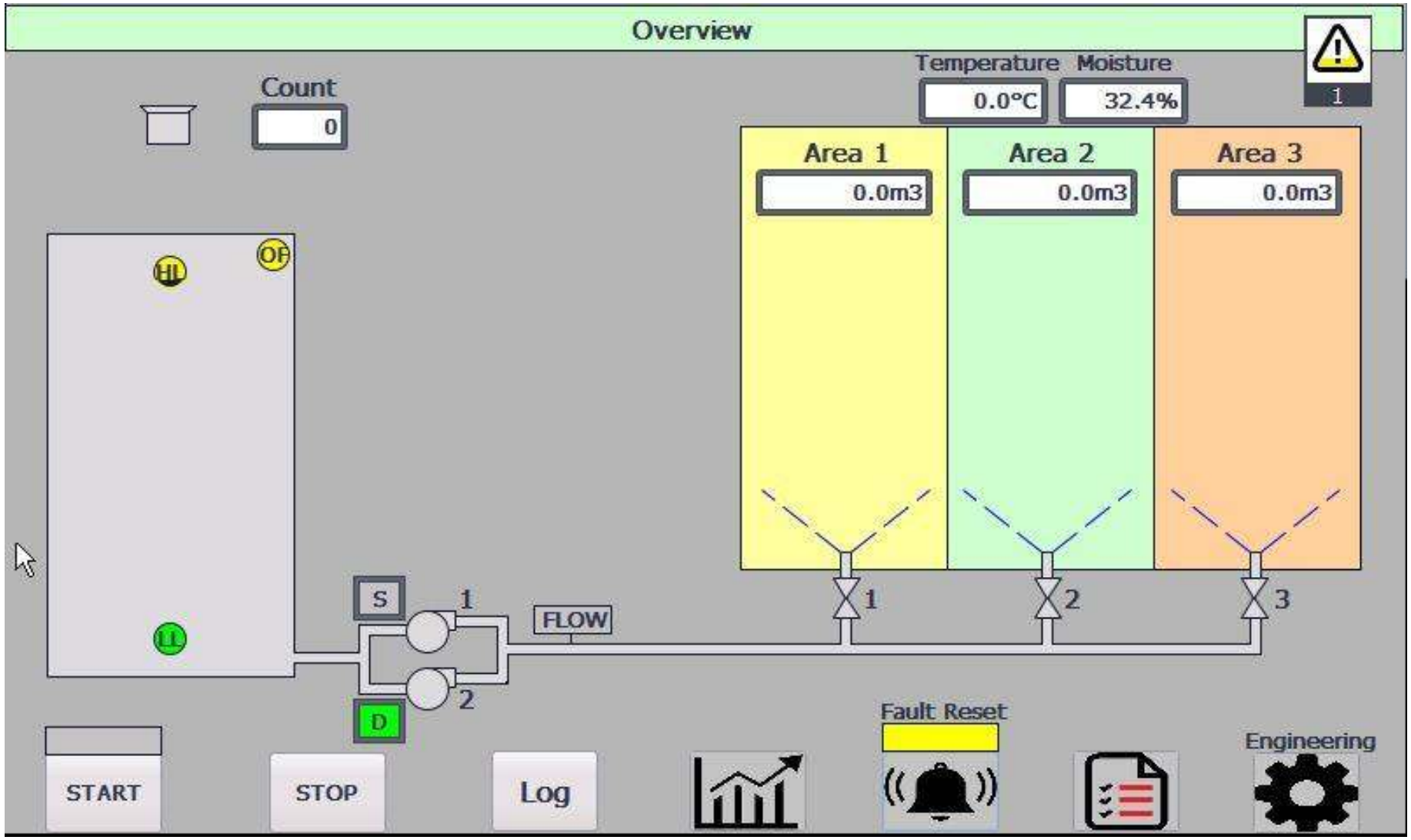
SCADA – control & Operation



Rainfall

Temperature and Moisture

Daily Irrigation Values

Pumps on / off

Valve on / off

Sump Level low / high

Control on/off

Alarm & List

Project Legacy – Soil / Plant management of N & P

Cavenagrow - PE 38

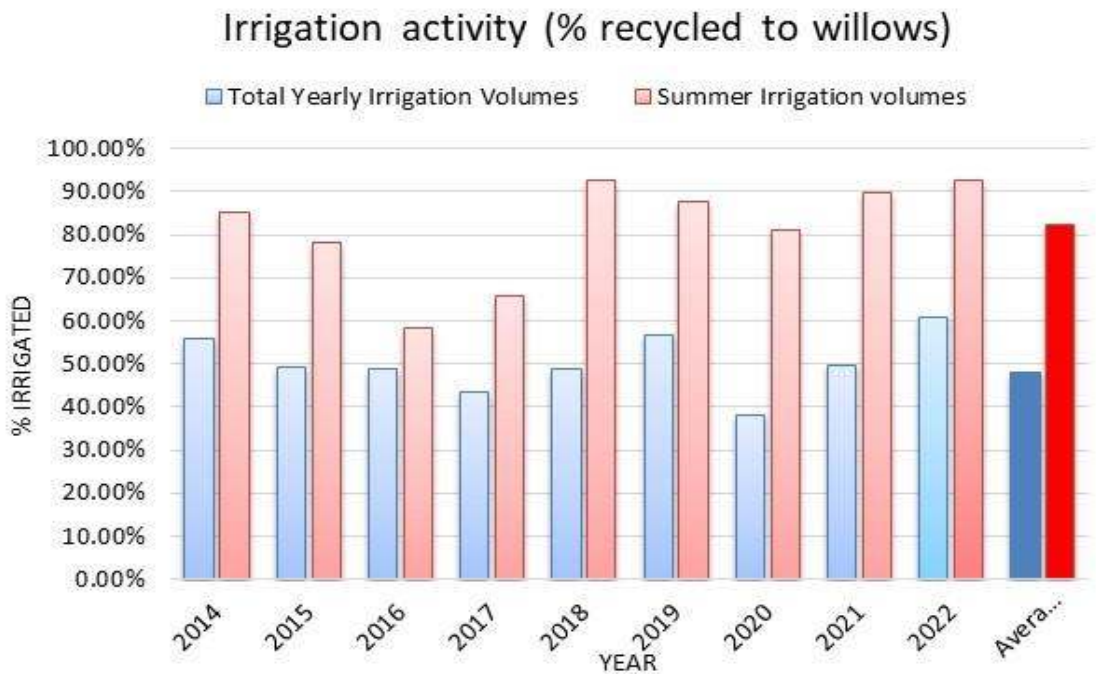
Current estimated improvement of yearly discharge to the Blackwater Catchment …

1,800 m^3	540 m^3
80 kg Nitrogen (N)	24 kg Nitrogen (N)
11 kg Phosphorus(P)	3 kg Phosphorus(P)
240 kg BOD	70 kg BOD

Liscooley - PE 60

Current estimated improvement of yearly discharge to the to the Finn Catchment

3,000 m^3	900 m^3
87 kg Nitrogen (N)	26 kg Nitrogen (N)
15 kg Phosphorus(P)	5 kg Phosphorus(P)
420 kg BOD	130 kg BOD



- Approx 50% of yearly discharge irrigated
- Over 80% of Summer discharge irrigated
- Crop offtake (50kg N and 8 kg P) per ha year
- Within the recommendations of Nutrient requirement
- Combined 30 tonnes (DM) Biomass/year = 150 MWh or 55 tonnes CO_{2e} off set.

Some obstacles ....

Diversified Farming opportunities are very hard sell …

- Cannot compete with current farming (Dairy / Milk)
- Wary of land use Change
- Immaturity of the biomass sector
- Limited markets
- Distant and lack of contractors
- Stigma of renewable energy incentives and policy errors
- Unknowns (GHG, carbon, water quality, polluter responsibility)
- Over 50 land-owners approached (ultimately only 2 takers)
    - Liscooley (4 landowners).
    - Cavenagrow (3 landowners)

Further information

Case Study: Biofiltration blocks of Short Rotation Coppice willow for protection of ***diffuse nutrient*** run-off into the water environment.

Case Study: Biofiltration blocks of Short Rotation Coppice willow used for management of ***Point Source*** wastewater discharges

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