



- SloWaters: EPA- & OPW-funded collaborative programme to address flooding & water quality issues
- Multiple benefits of NbCMS
- Flood peak attenuation through storage and slowing the flow
- Effects of offline Runoff Attenuation Feature (RAF) on storm-delivered water quality pressures



Darragh Murphy –  
UCC 4th year PhD  
Student

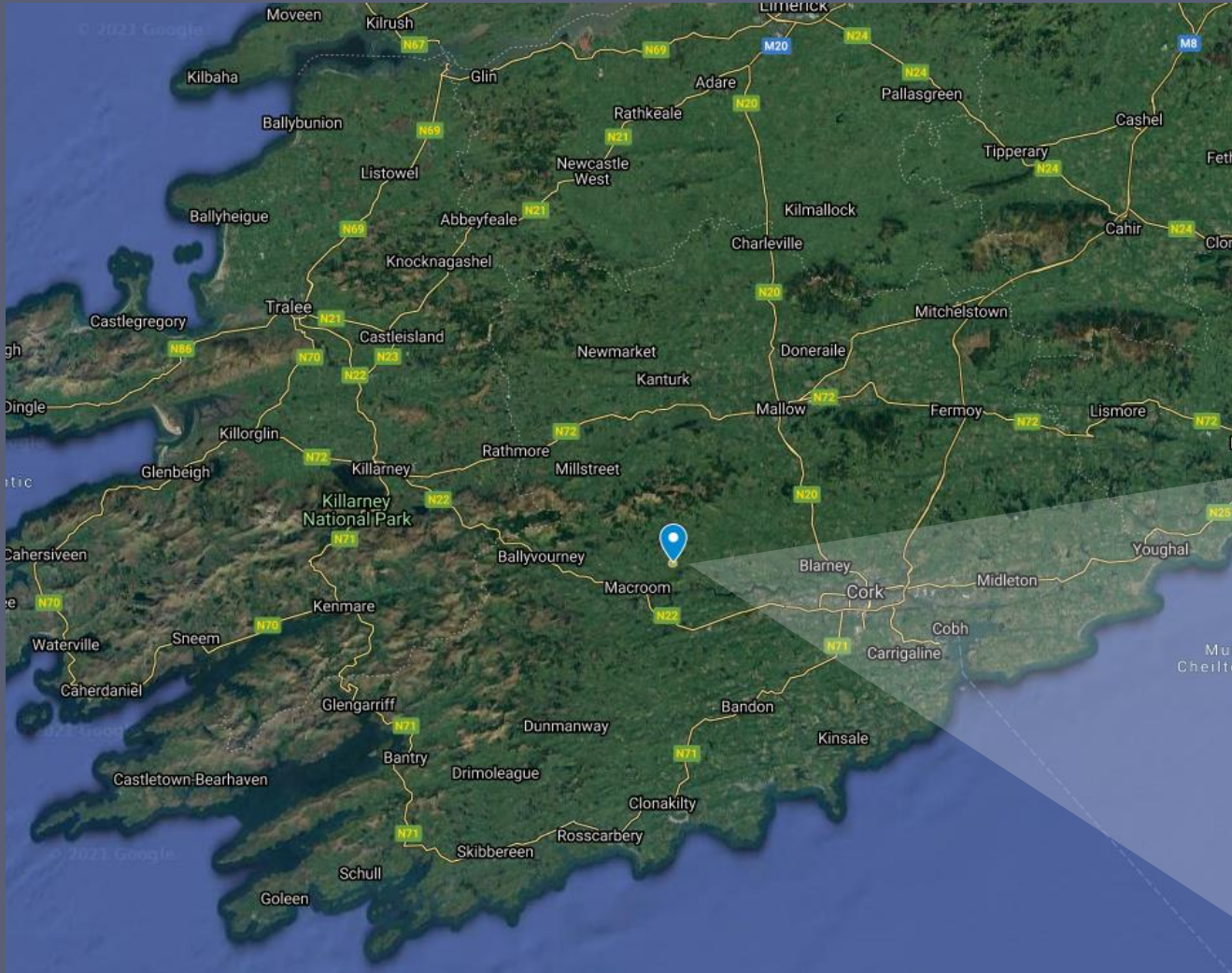
Simon Harrison –  
PhD Supervisor

John Weatherill –  
Co-supervisor



# Leades farm, Co. Cork

- Downstream of Boggeragh Mountains
- 2nd/3rd order stream running Southward through Leades Farm
- Catchment dominated by peat and coniferous forestry to the north, beef and dairy surrounding Leades Farm



# NbCMS at Leades farm, Co. Cork



Field Runoff Attenuation Feature (RAF)



Cellular RAF



Leaky Dams

# NbCMS at Leades farm, Co. Cork



Field Runoff Attenuation Feature (RAF)

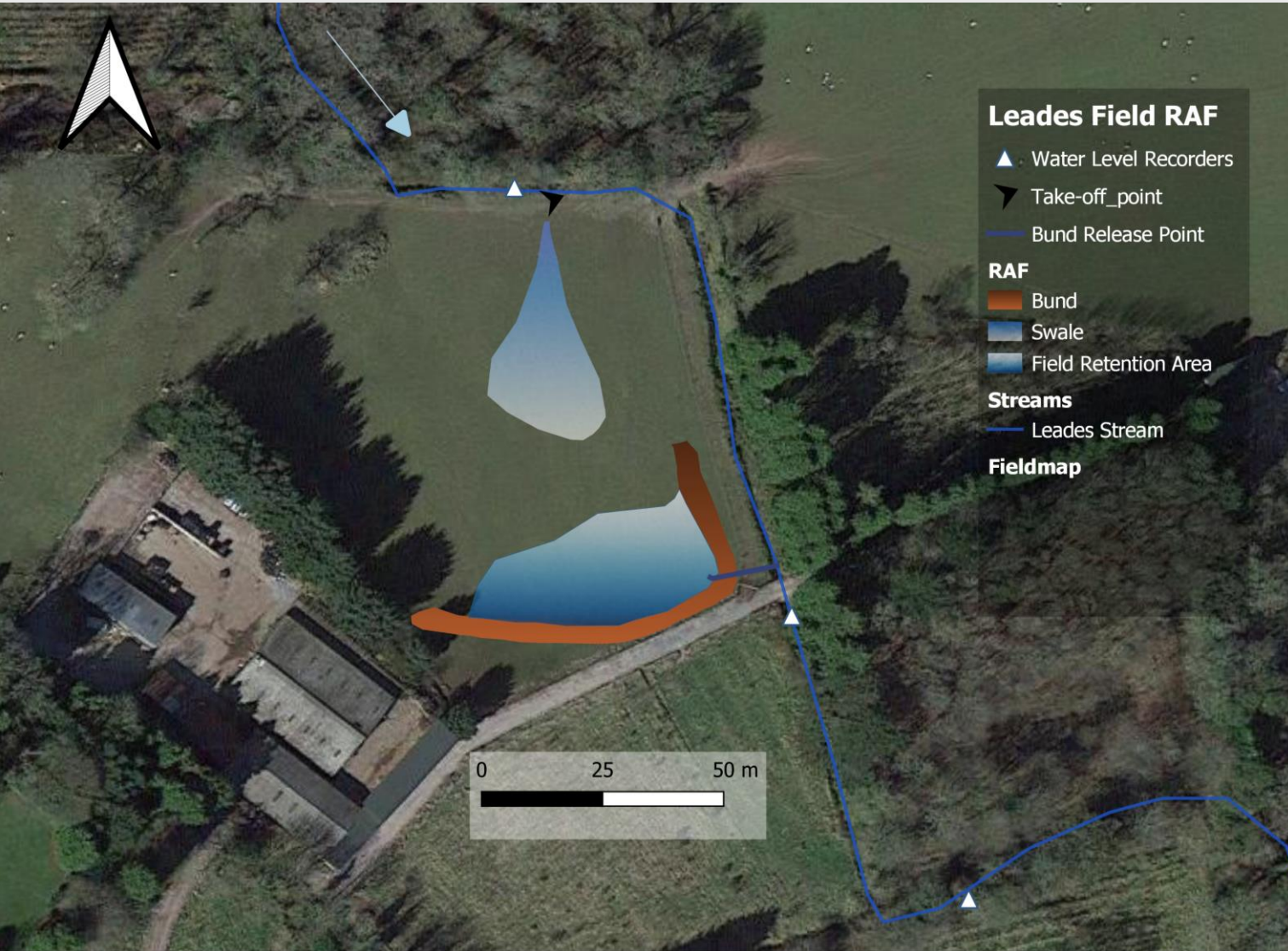


Cellular RAF



Leaky Dams

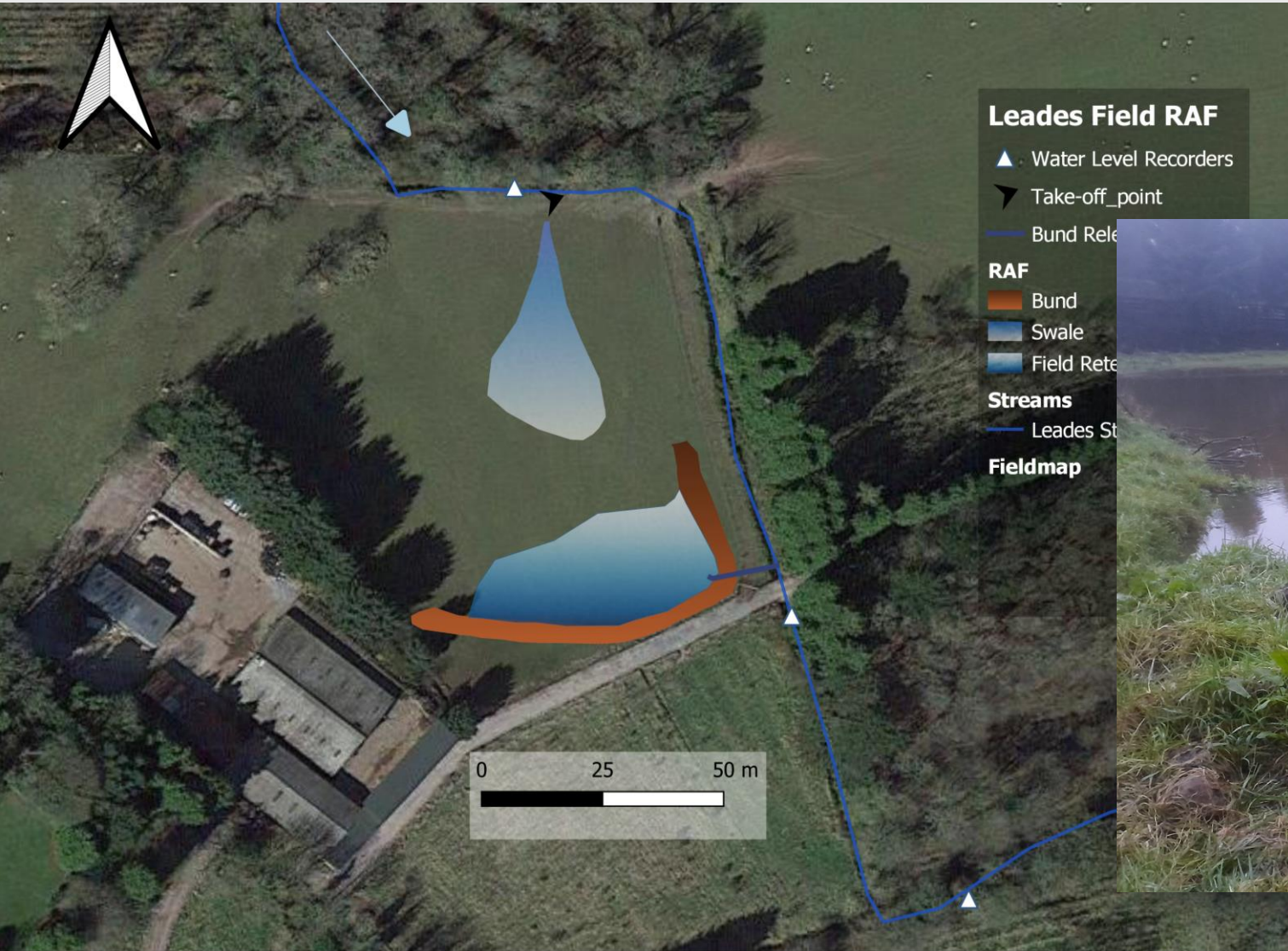
# Leades Field Runoff Attenuation Feature (RAF)



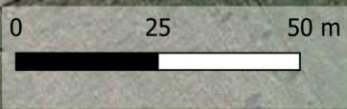
## Field RAF

- Reduction of flood peaks
- Sediment capture
- Nutrient attenuation through enhanced aerobic activity on swale; & increased residence time in storage area

# Leades Field Runoff Attenuation Feature (RAF)



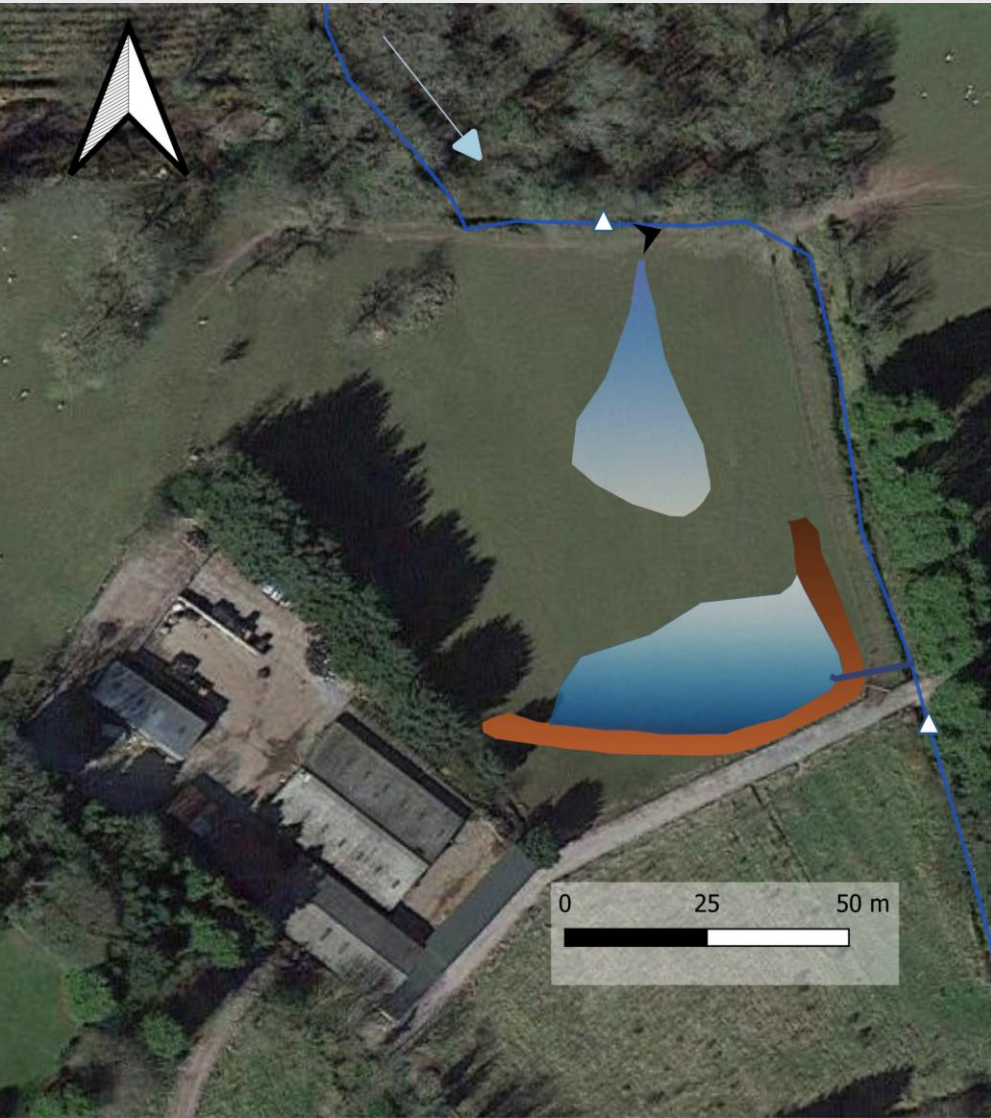
- Leades Field RAF**
- ▲ Water Level Recorders
  - ▼ Take-off\_point
  - Bund Release
- RAF**
- Bund
  - Swale
  - Field Retention
- Streams**
- Leads Stream
- Fieldmap**



## Field RAF

- Reduction of flood peaks
- Sediment capture
- Nutrient attenuation through enhanced aerobic activity on swale; & increased residence time in storage area

# Leades Field Runoff Attenuation Feature (RAF)



**Leades Field RAF**

- ▲ Water Level Recorders
- ▼ Take-off\_point
- Bund Release

**RAF**

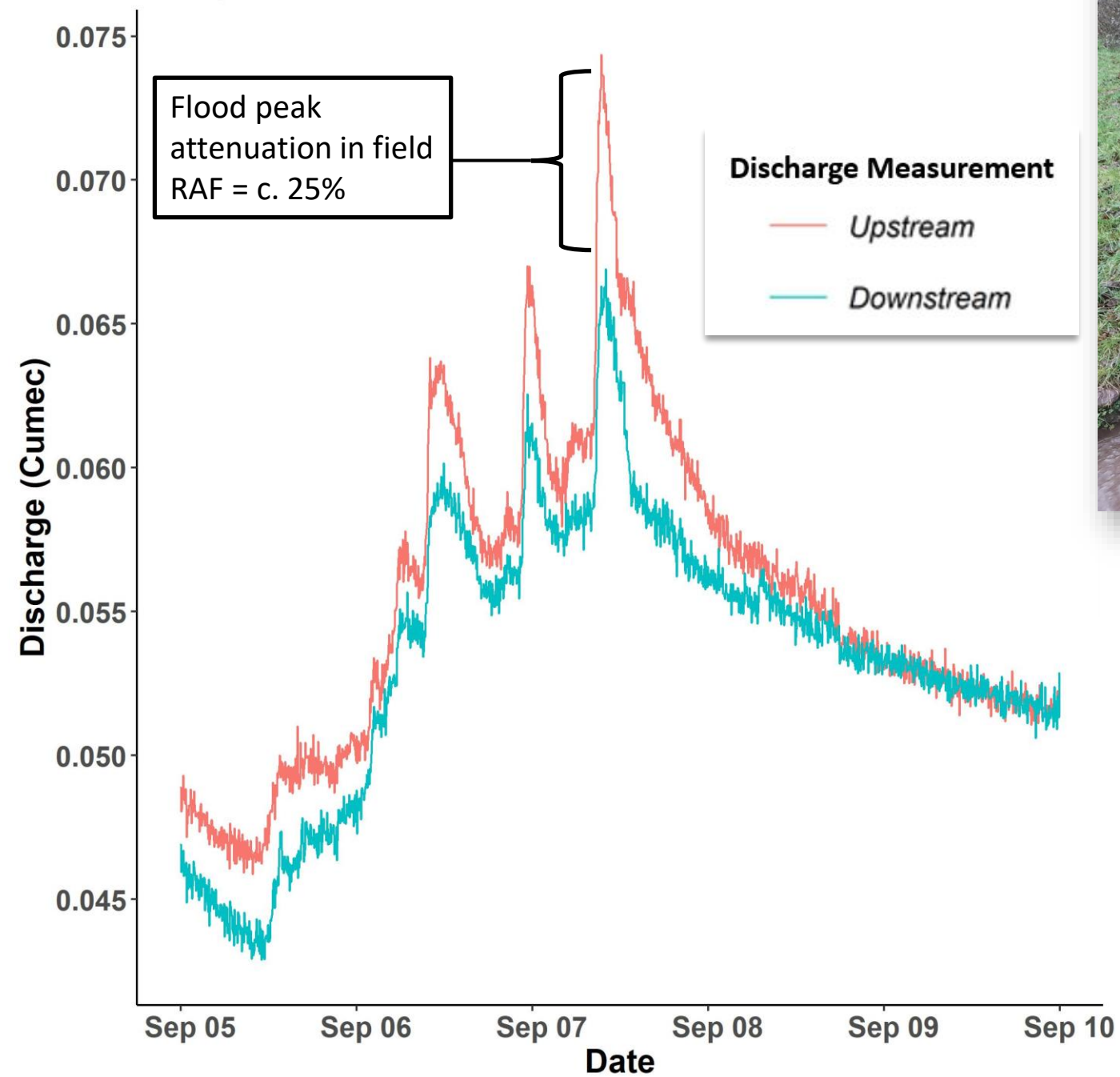
- Bund



- Field RAF
- Reduction of flood peaks
  - Sediment capture
  - Nutrient attenuation through enhanced aerobic activity

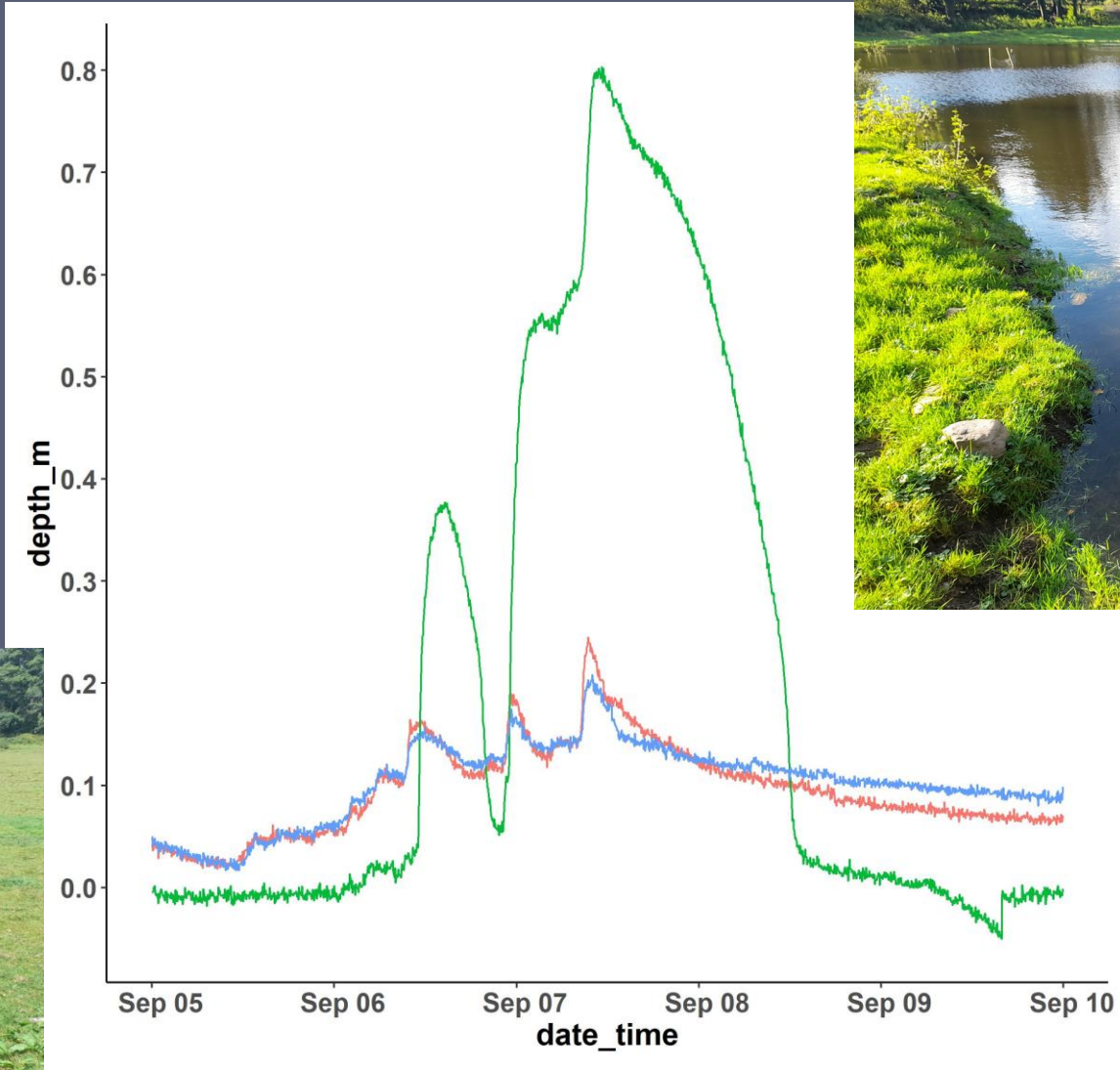
storage area

6-8 Sept 2022 Floods

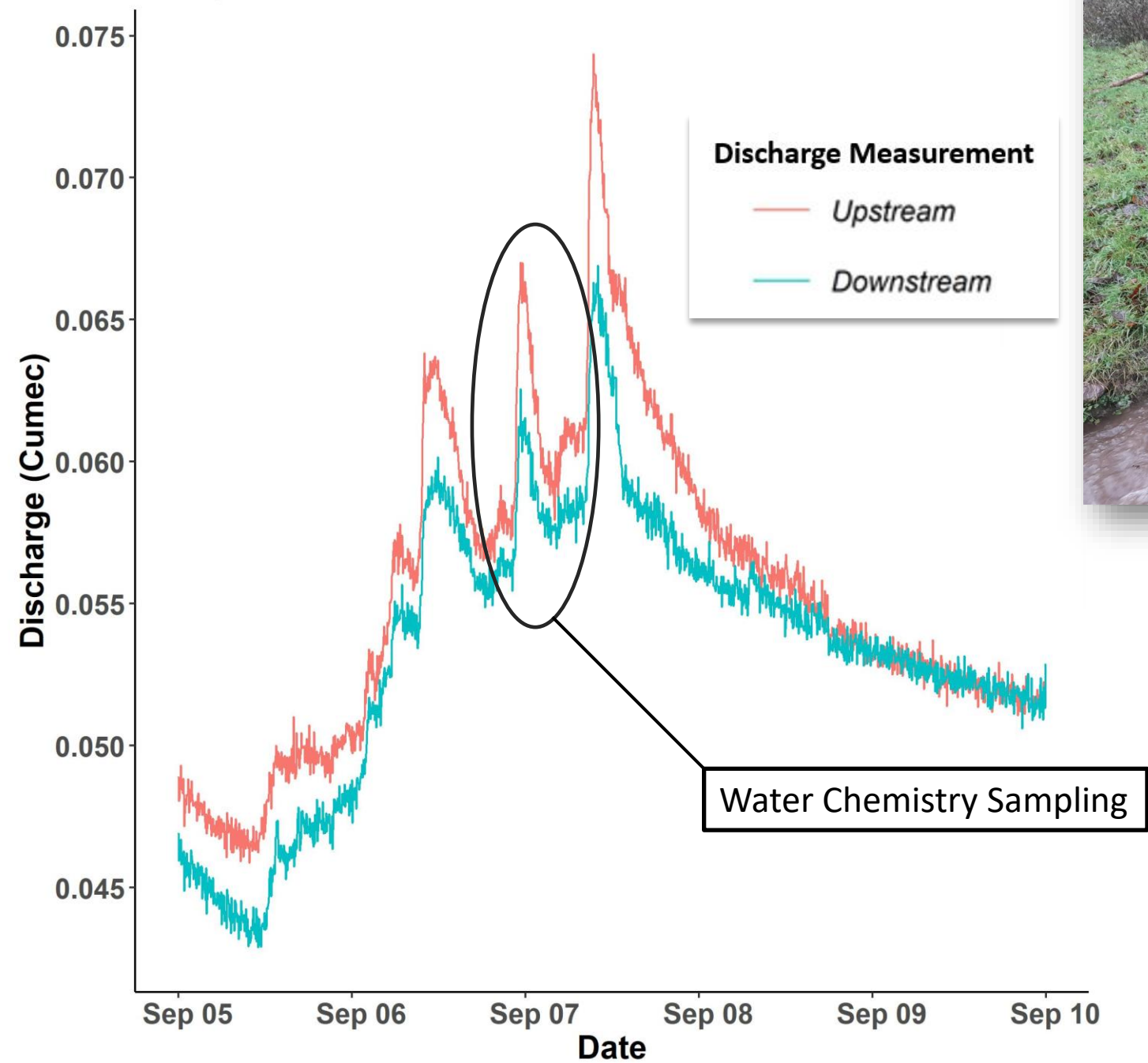




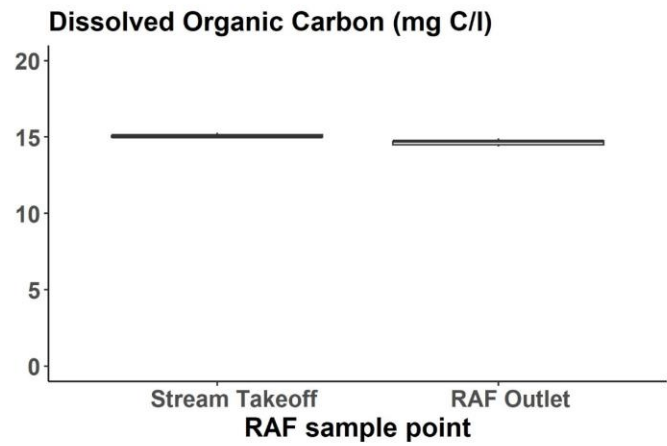
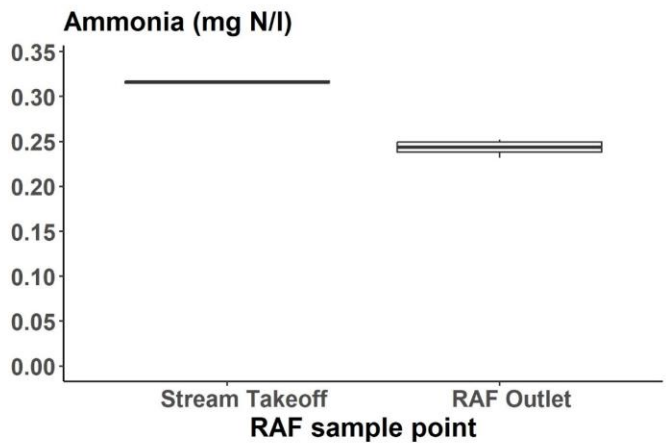
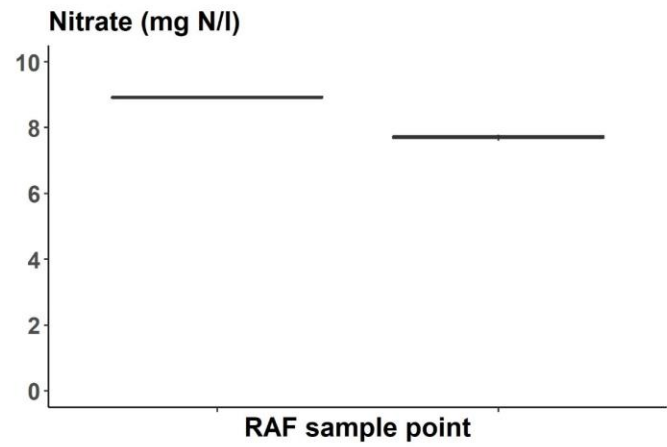
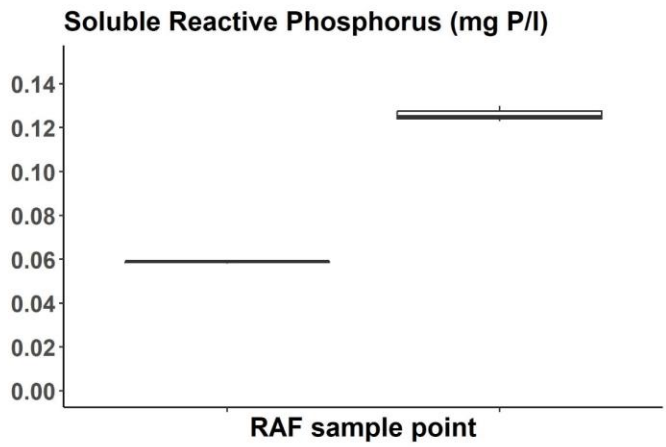
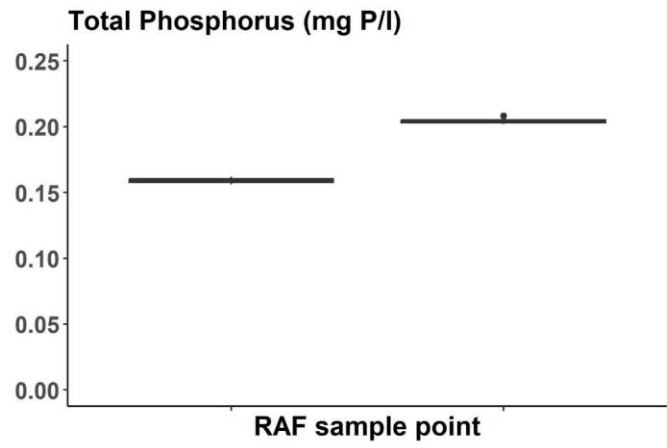
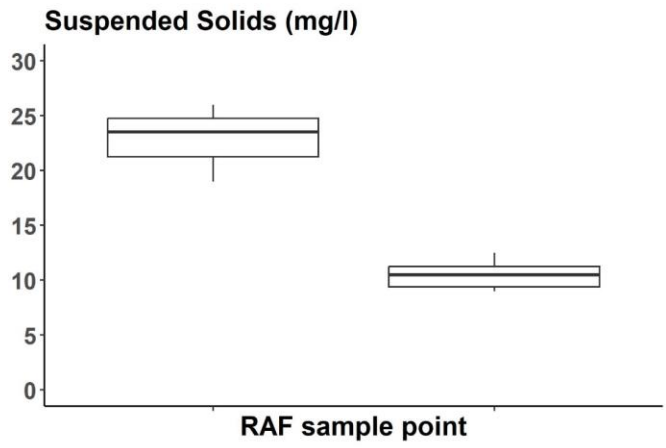
# Field RAF filling during flood event



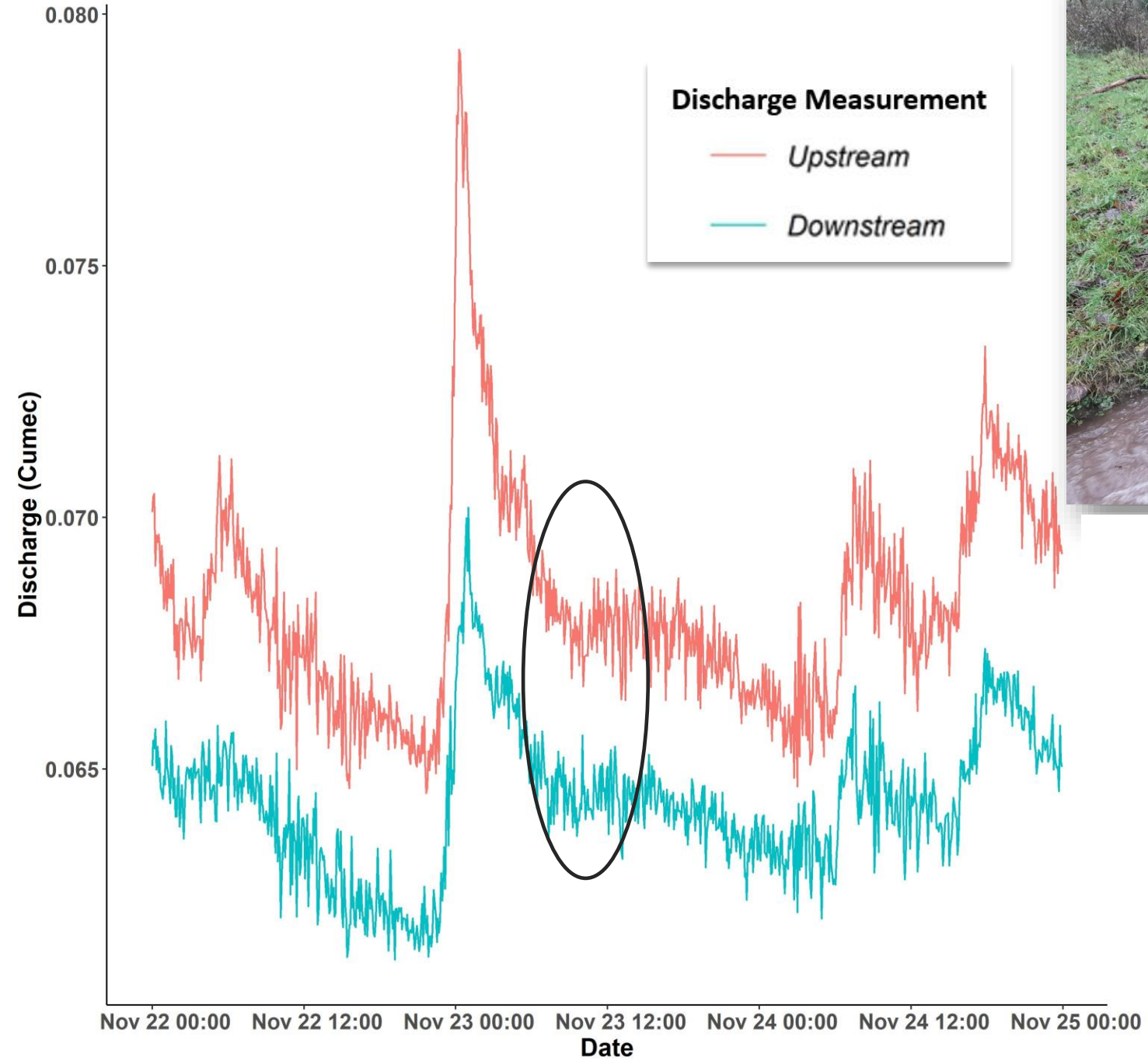
6-8 Sept 2022 Floods



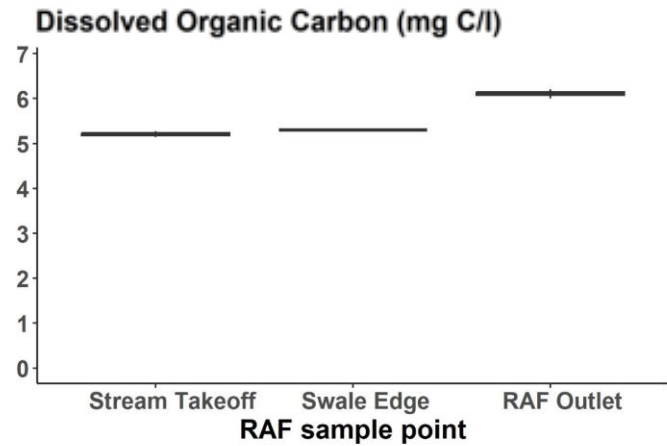
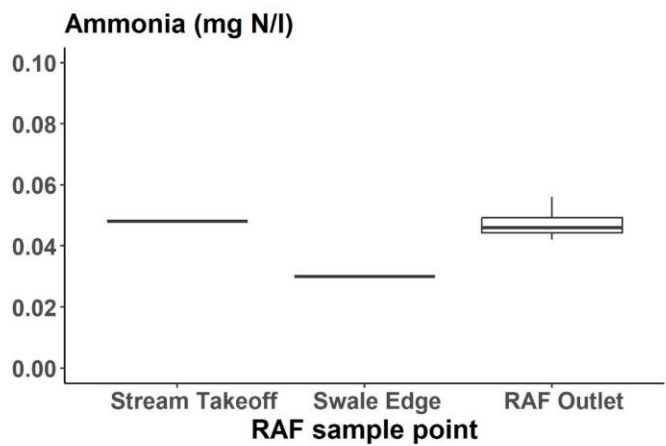
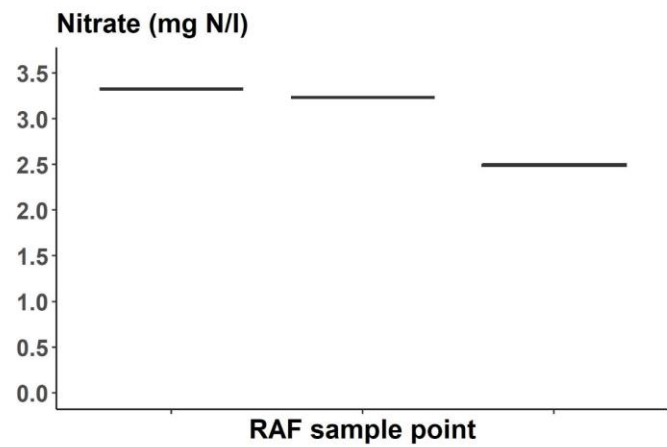
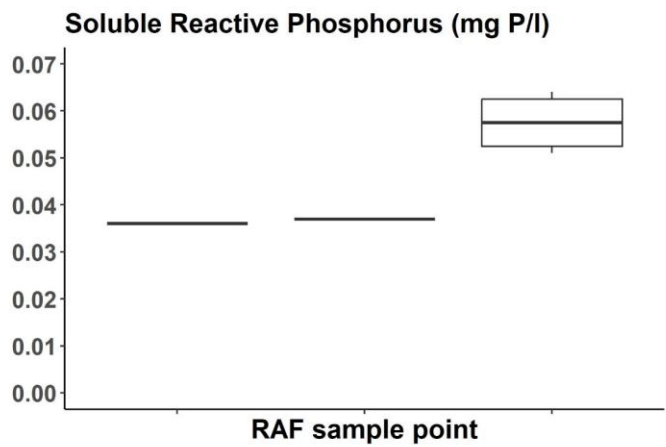
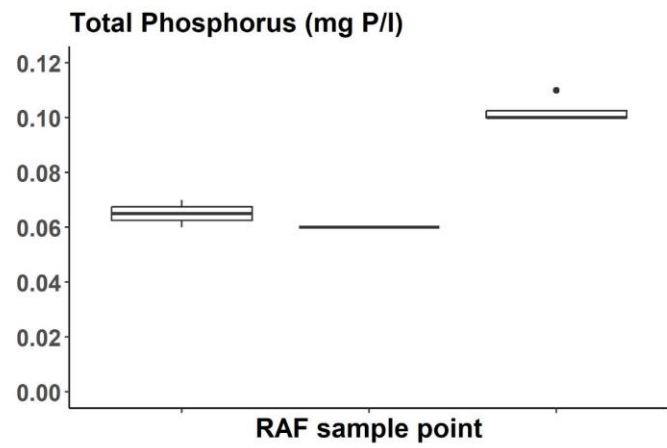
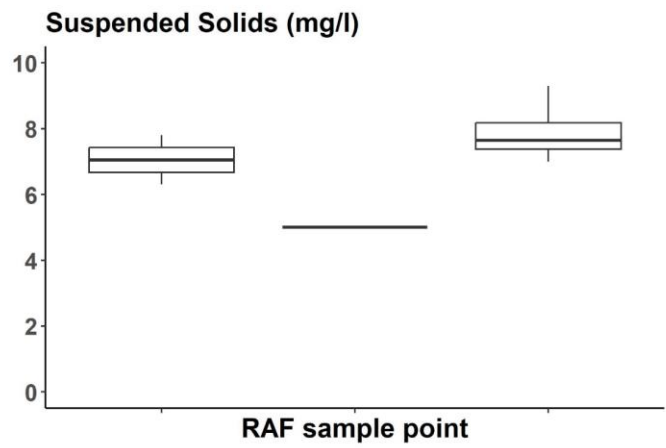
RAF 14:30 07 Sept 22 Samples



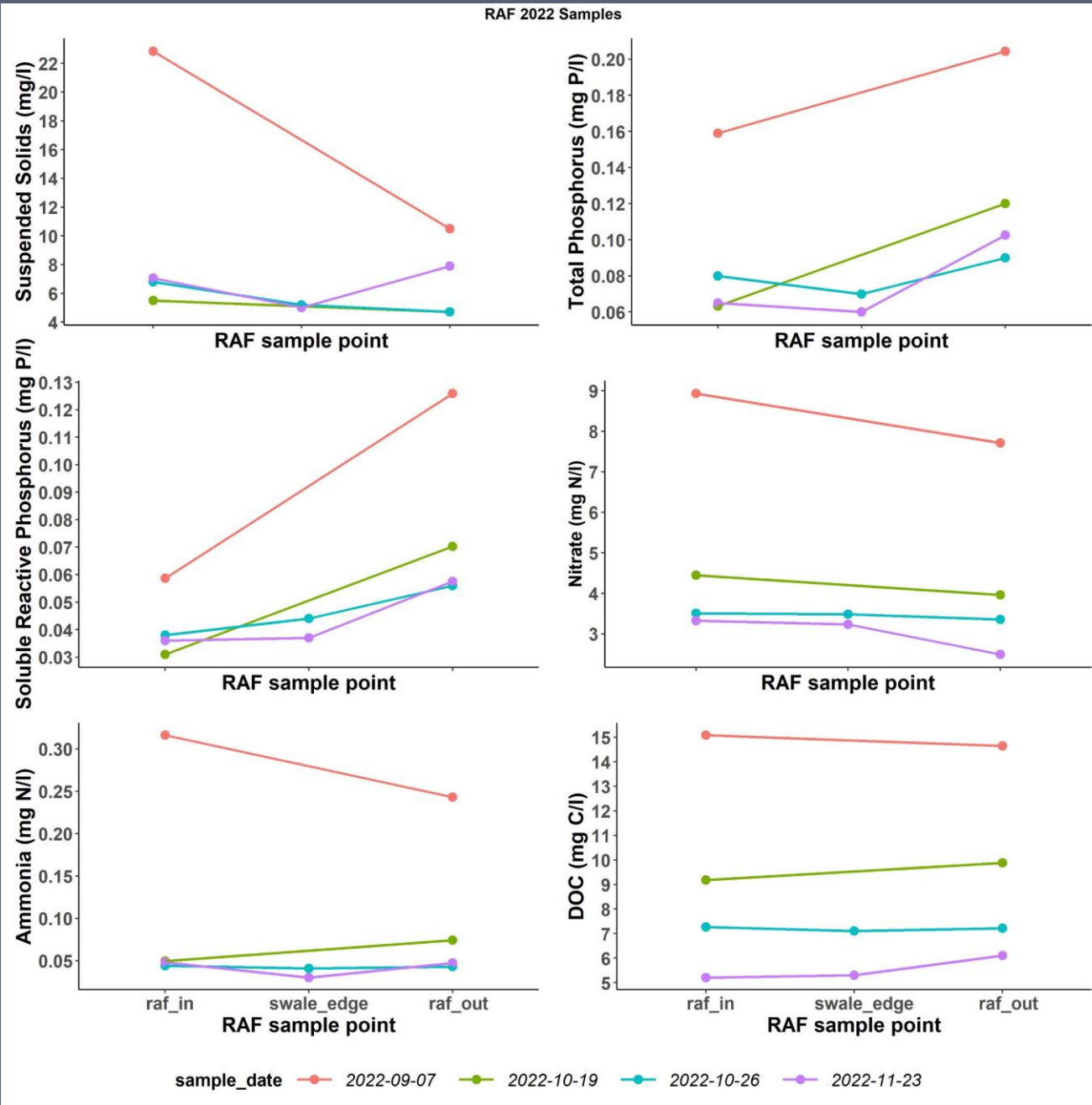
22-24 Nov 2022



RAF 23 Nov 22 11:00 Samples



# Chemistry of early to late floods



## Trends through September to November 2022 Floods

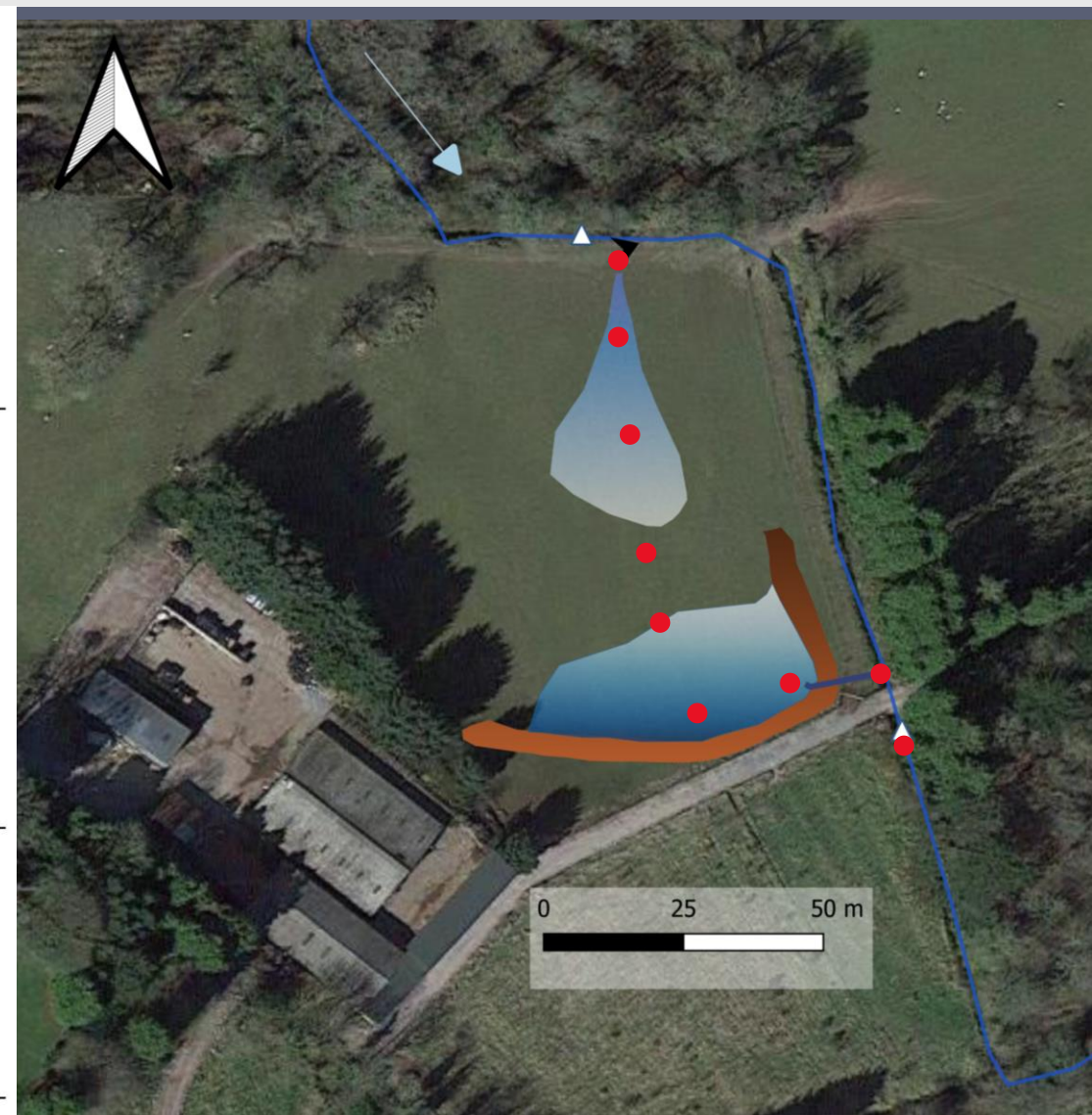
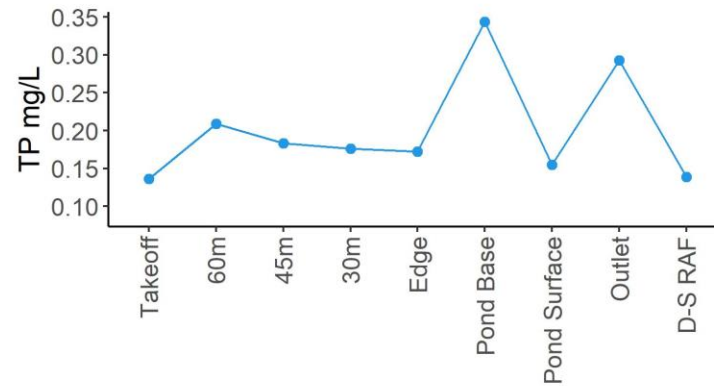
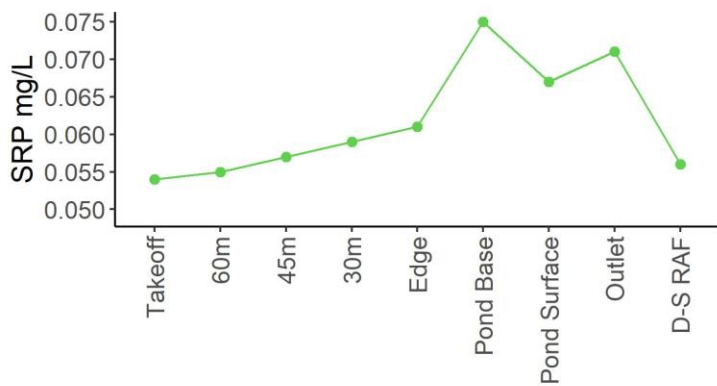
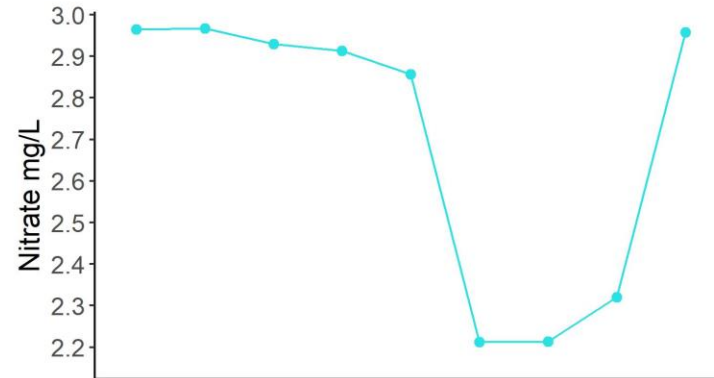
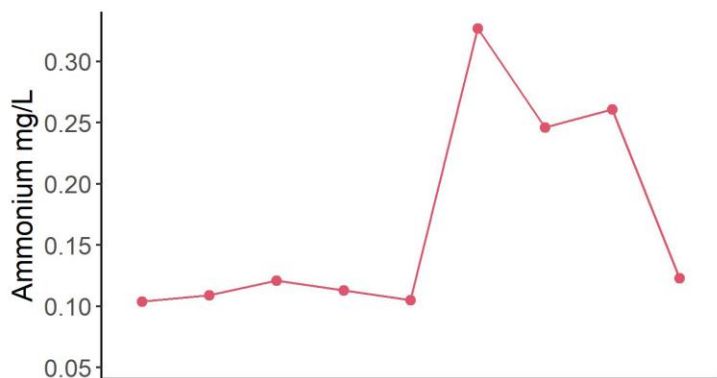
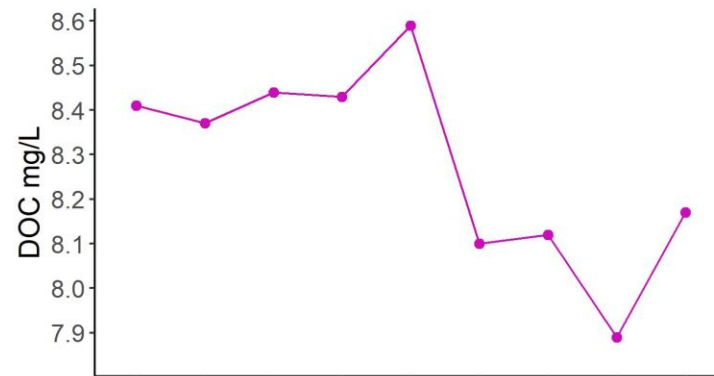
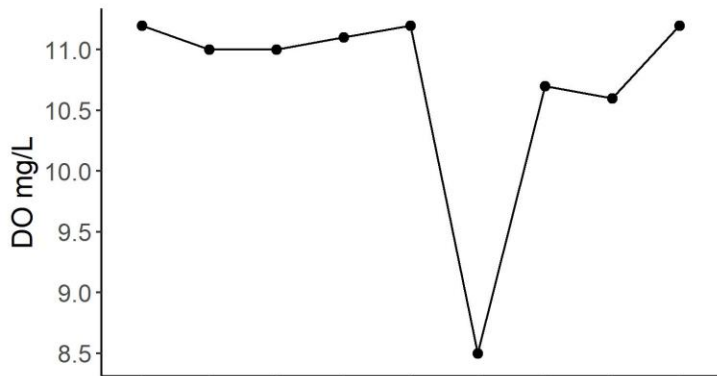
- Mean peak discharge of sampled floods = 0.067 cumecs (range = 0.066 to 0.069 cumecs)
- First flood event (**07-September-2022**) has highest concentrations
- Conc's diminish in succeeding events



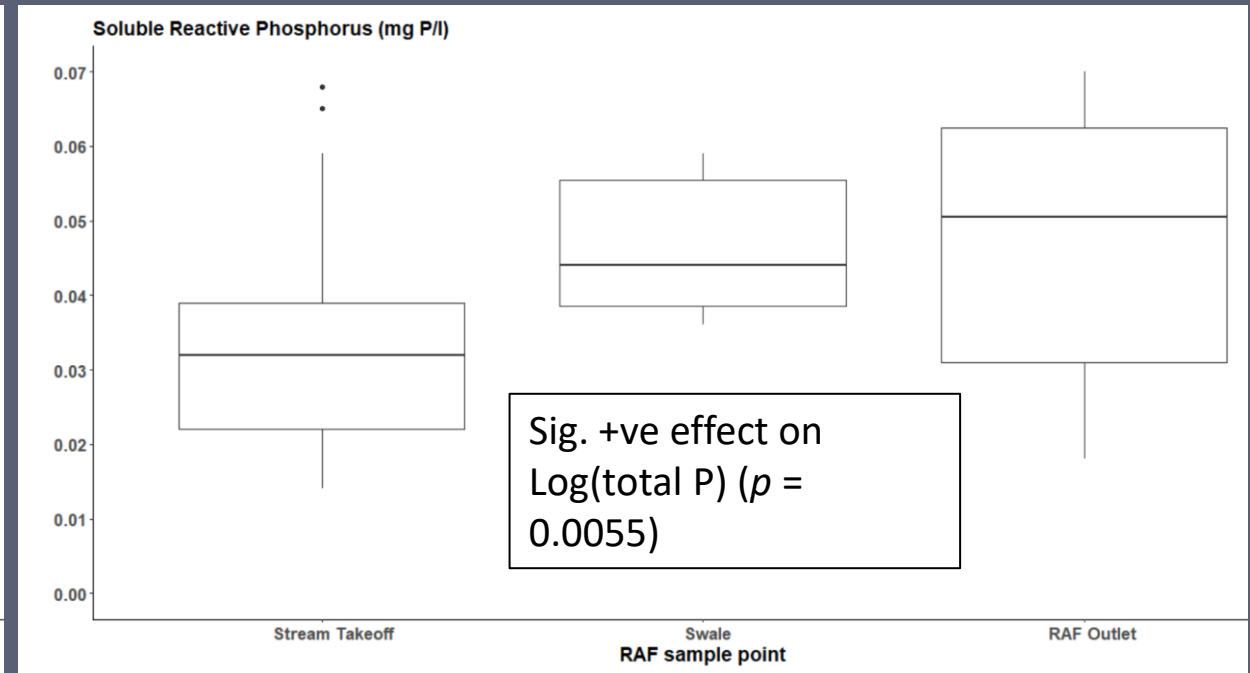
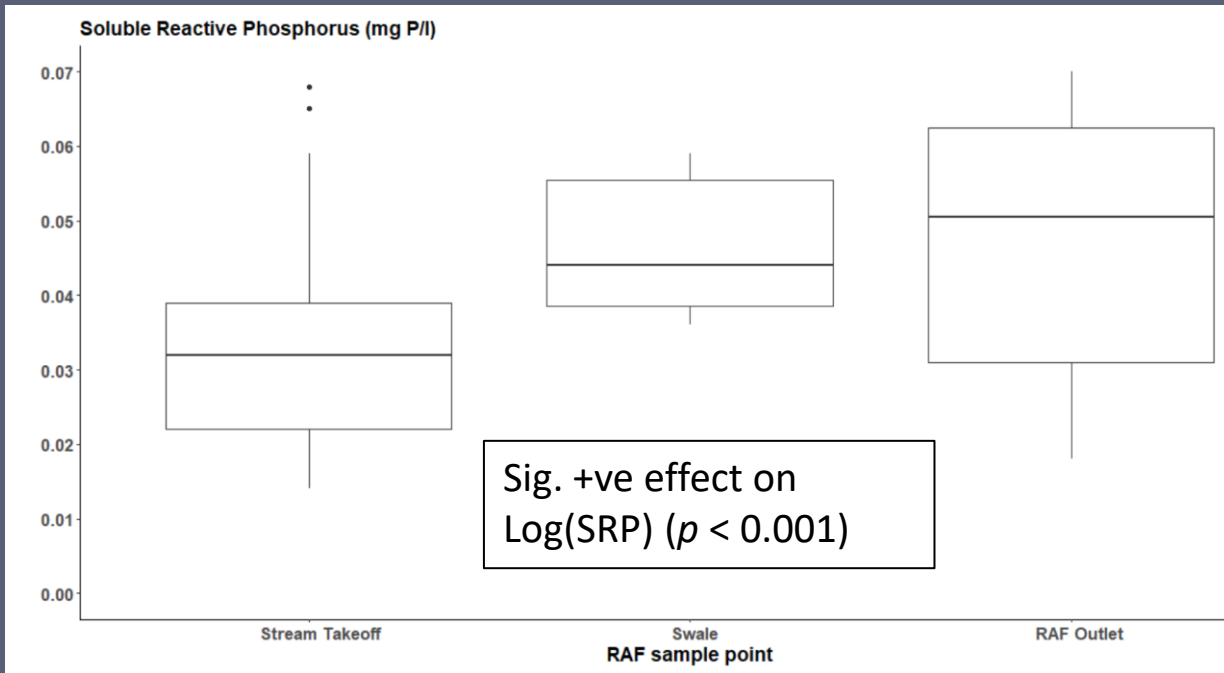
Water flowing into Field RAF 7 Sept 2022

# Sampling along the Field RAF

RAF Sampling 09 Mar 22



# Overall Chemistry



Surface Water Chemistry from  $n = 15$  flood events (March 2021 – November 2022)

- Only significant effect of Field RAF found for log(SRP) and log(Total P)
- Indication of Suspended Solids attenuation in large events.
- Potential correlation with order of flood in season; scale of flood event.



## Monitoring grass growth in flood zone and unflooded zone



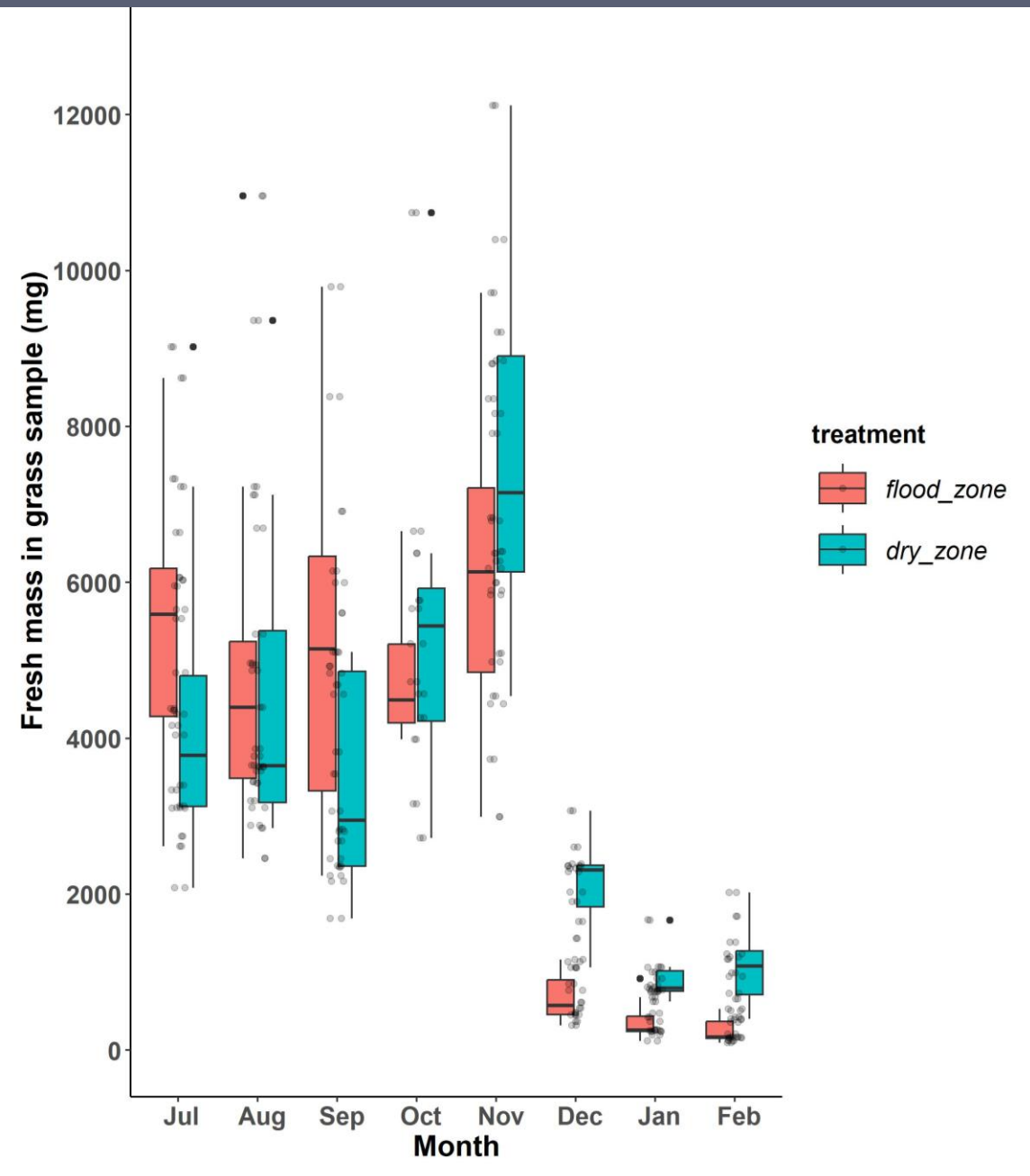
# Monitoring grass growth in flood zone and unflooded zone



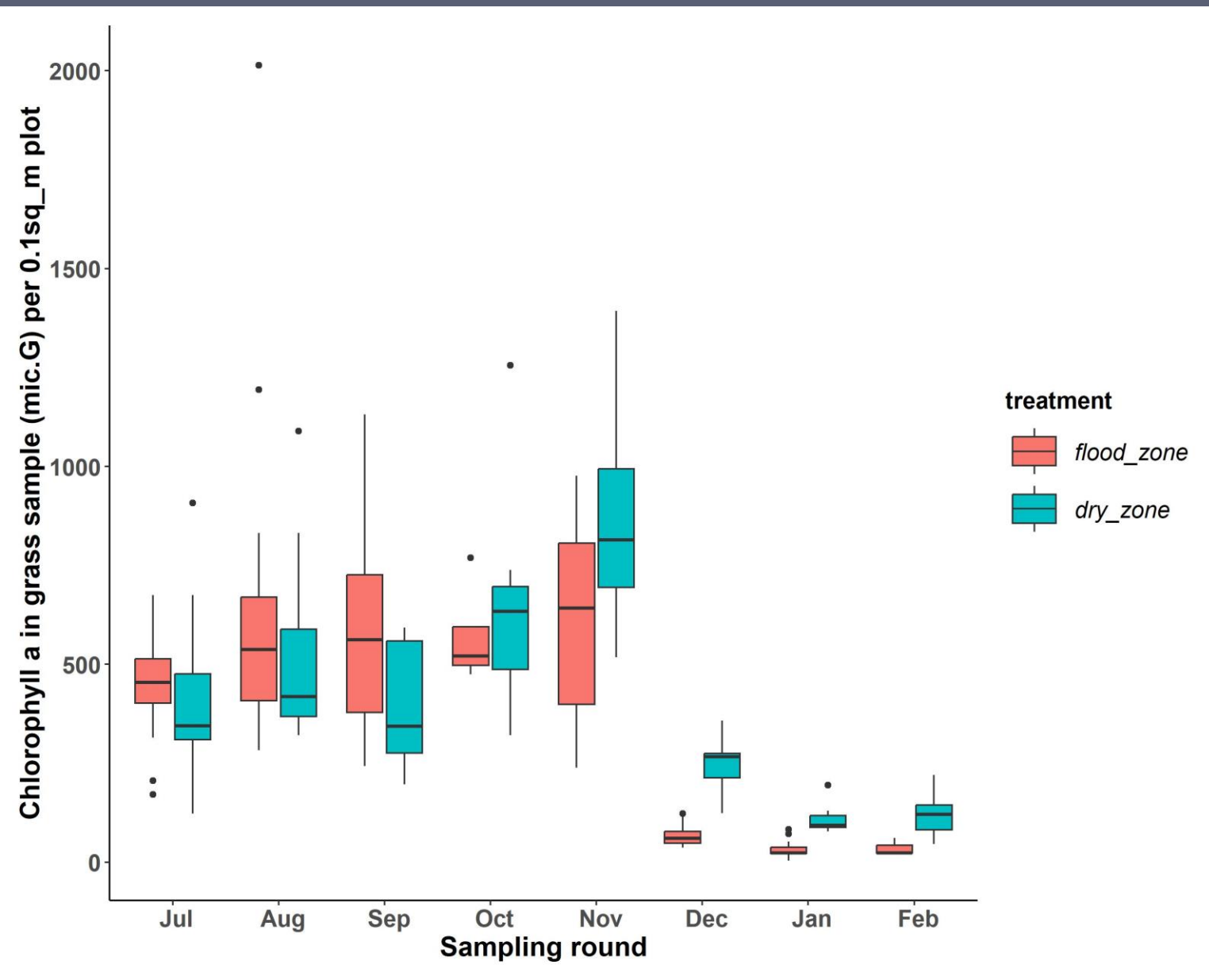
# Monitoring grass growth in flood zone and unflooded zone



# Fresh mass of grass in RAF zones



# Chlorophyll in RAF zones



Thanks for your attention


Questions?



[darragh.murphy@ucc.ie](mailto:darragh.murphy@ucc.ie)

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 [YouTube](#) <sup>IE</sup> SloWaters Videos

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