# Nature-based Solutions for Catchment Management in practice on an Irish Farm

SloWaters: EPA- & OPW-funded collaborative programme to address flooding & water quality issues

Multiple benefits of NbS-W

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flow

Effects of offline Offline Storage Area on storm-delivered water quality pressures

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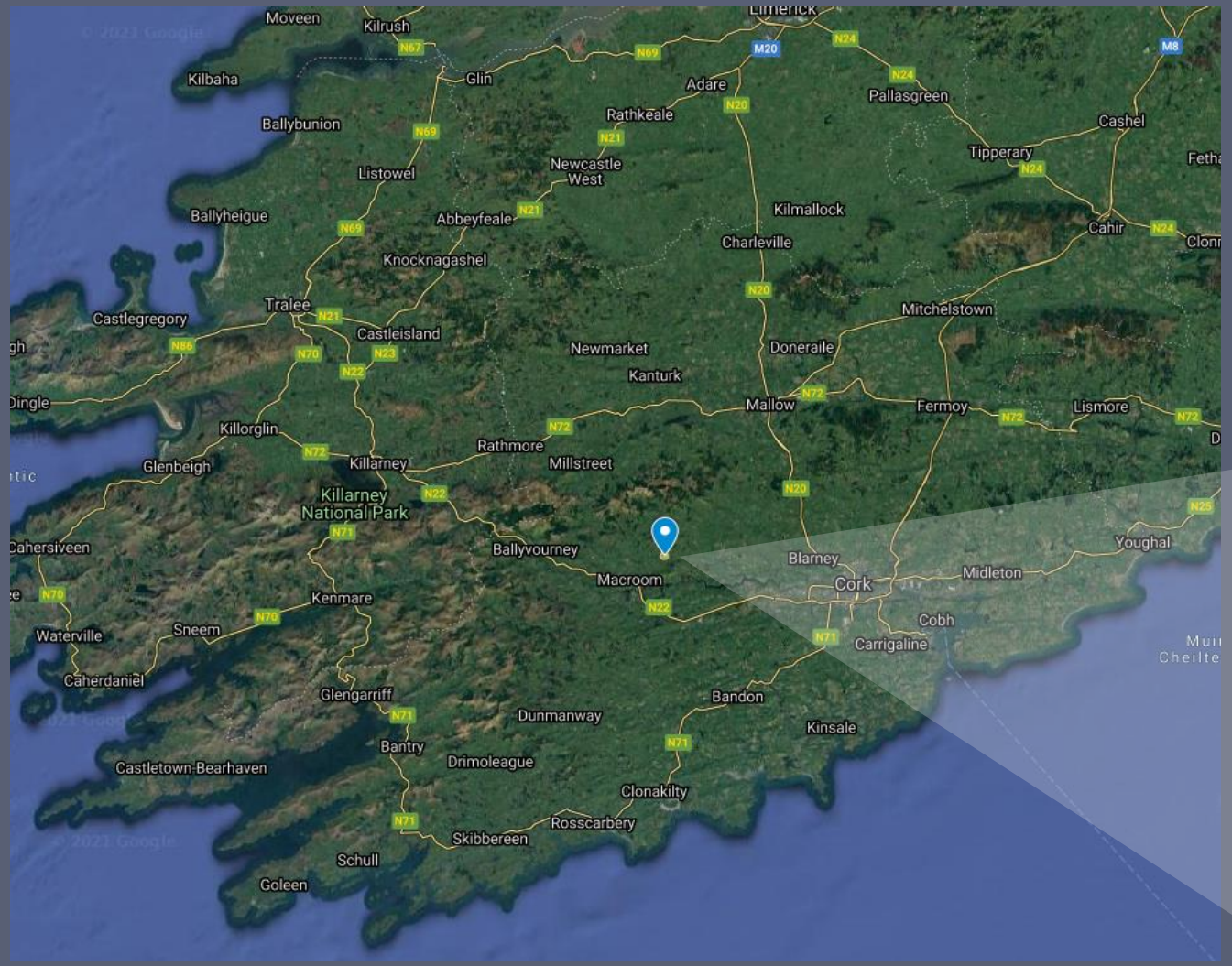
SloWaters

# 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

# NbS-CM at Leades farm, Co. Cork

Field Offline Storage Area (OSA)

Cellular Runoff Attenuation Feature

Leaky Dams

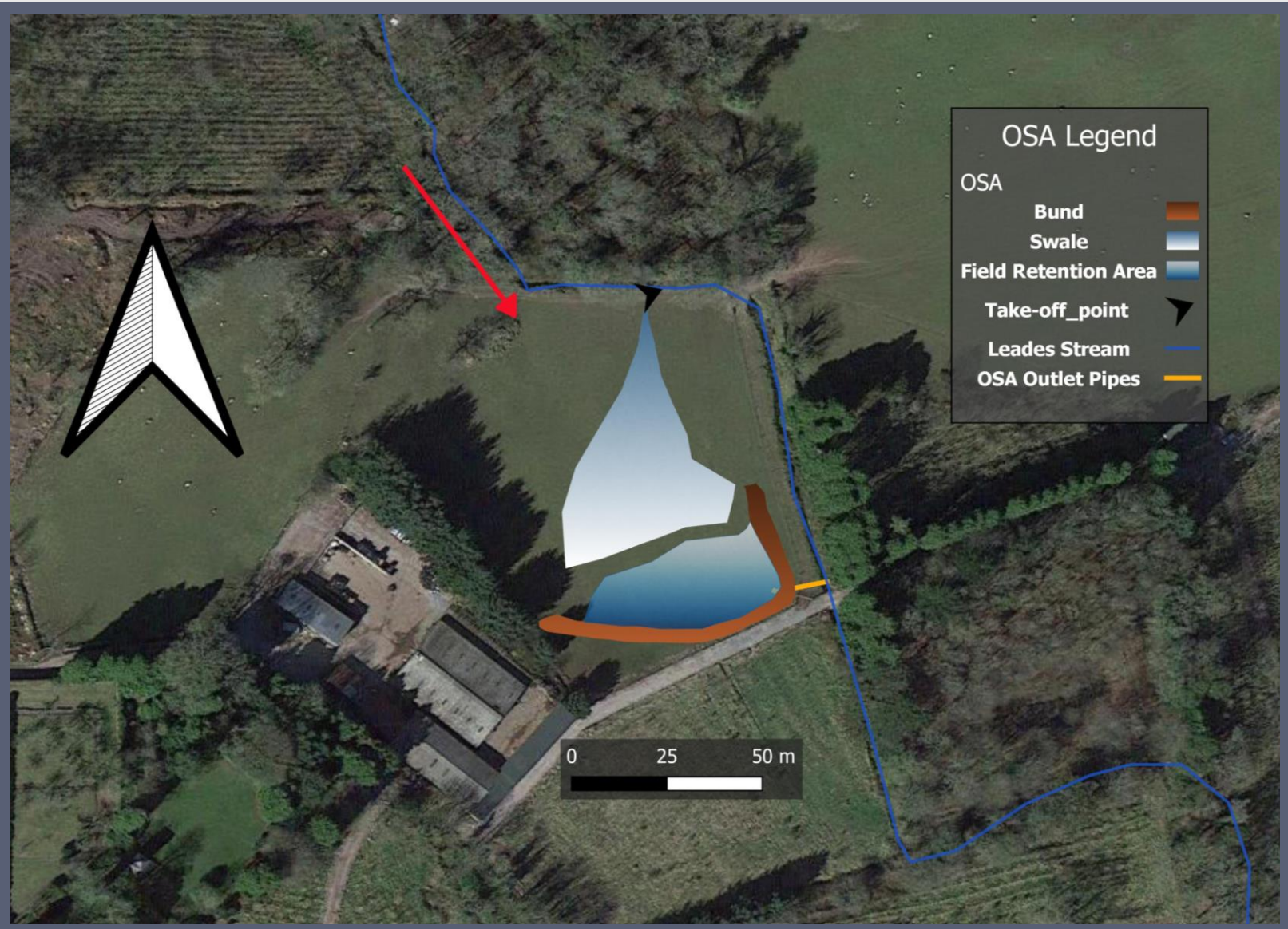
# NbS-CM at Leades farm, Co. Cork

Field Offline Storage Area (OSA)

Cellular RAF

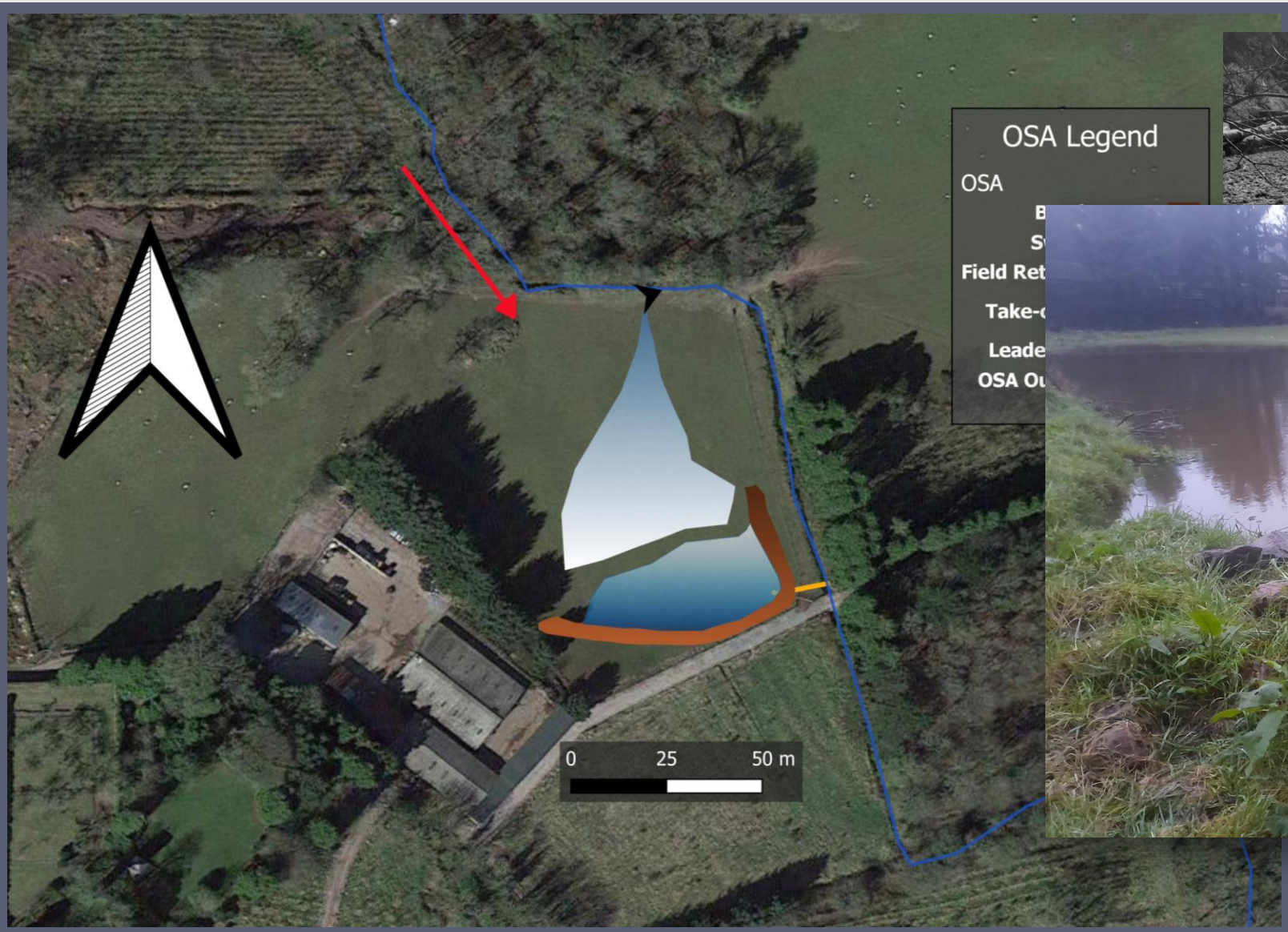
Leaky Dams

# Leades Field Offline Storage Area (OSA)




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

# Leades Field Offline Storage Area (OSA)



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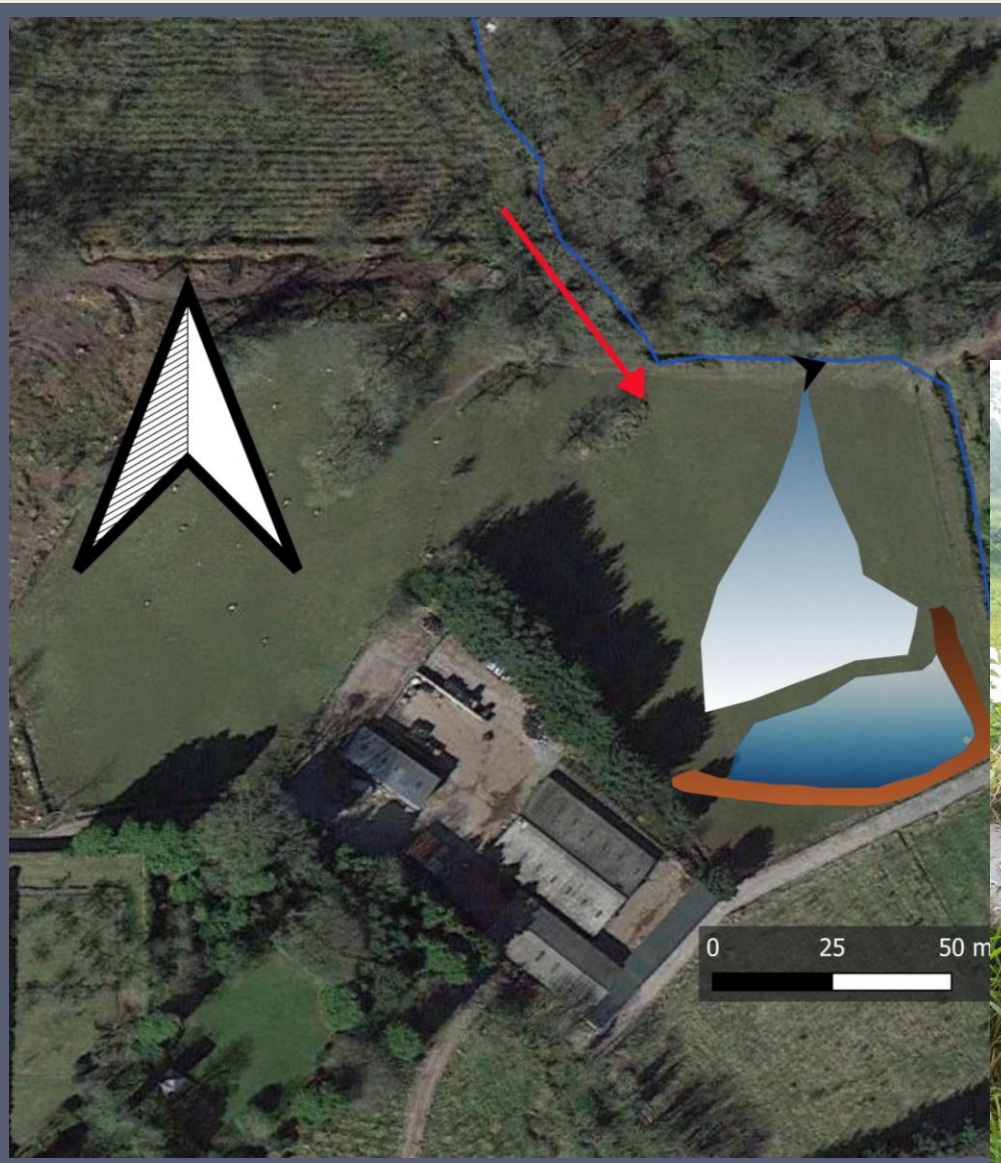
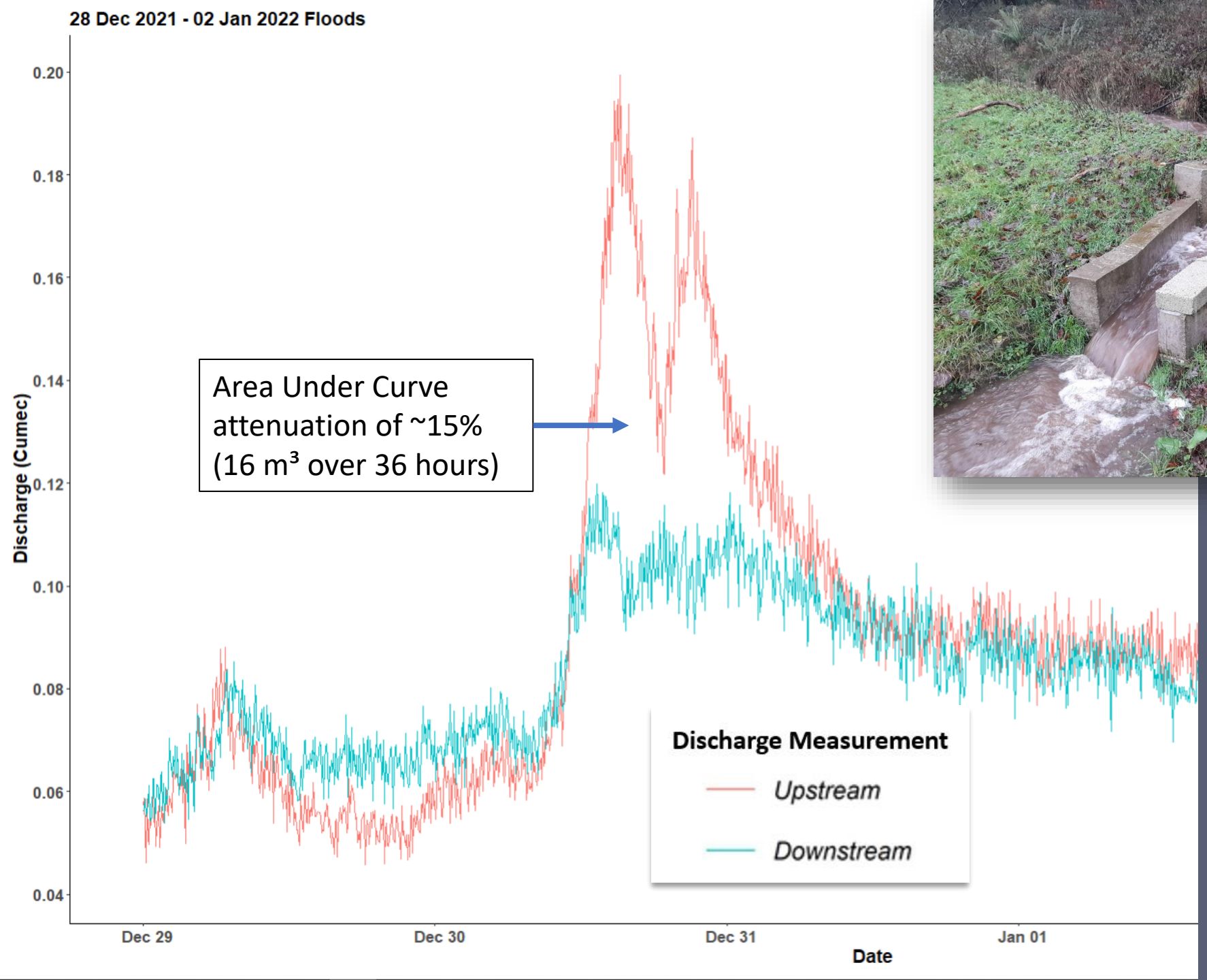




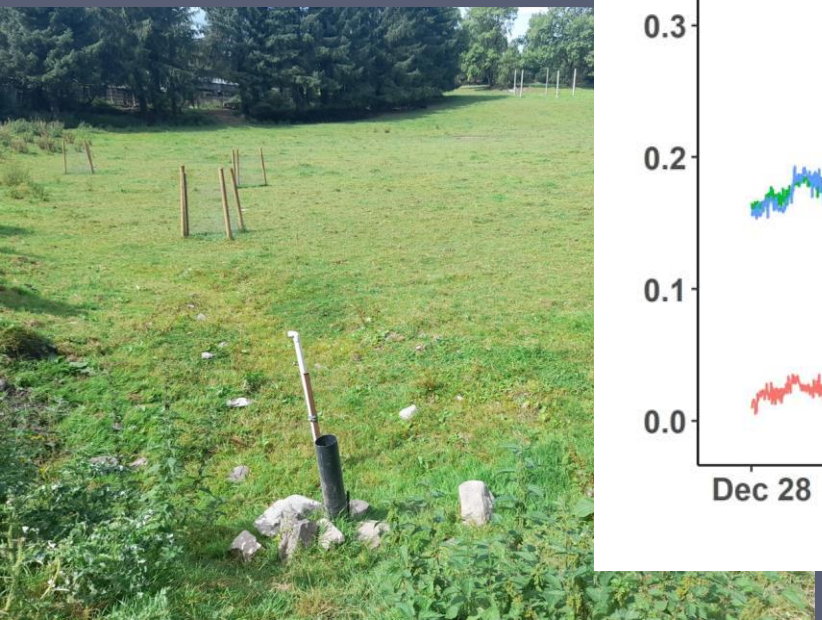

- Reduction of flood peaks
- Sediment capture
- Nutrient attenuation through enhanced aerobic activity, [illegible], & increased residence time in storage area

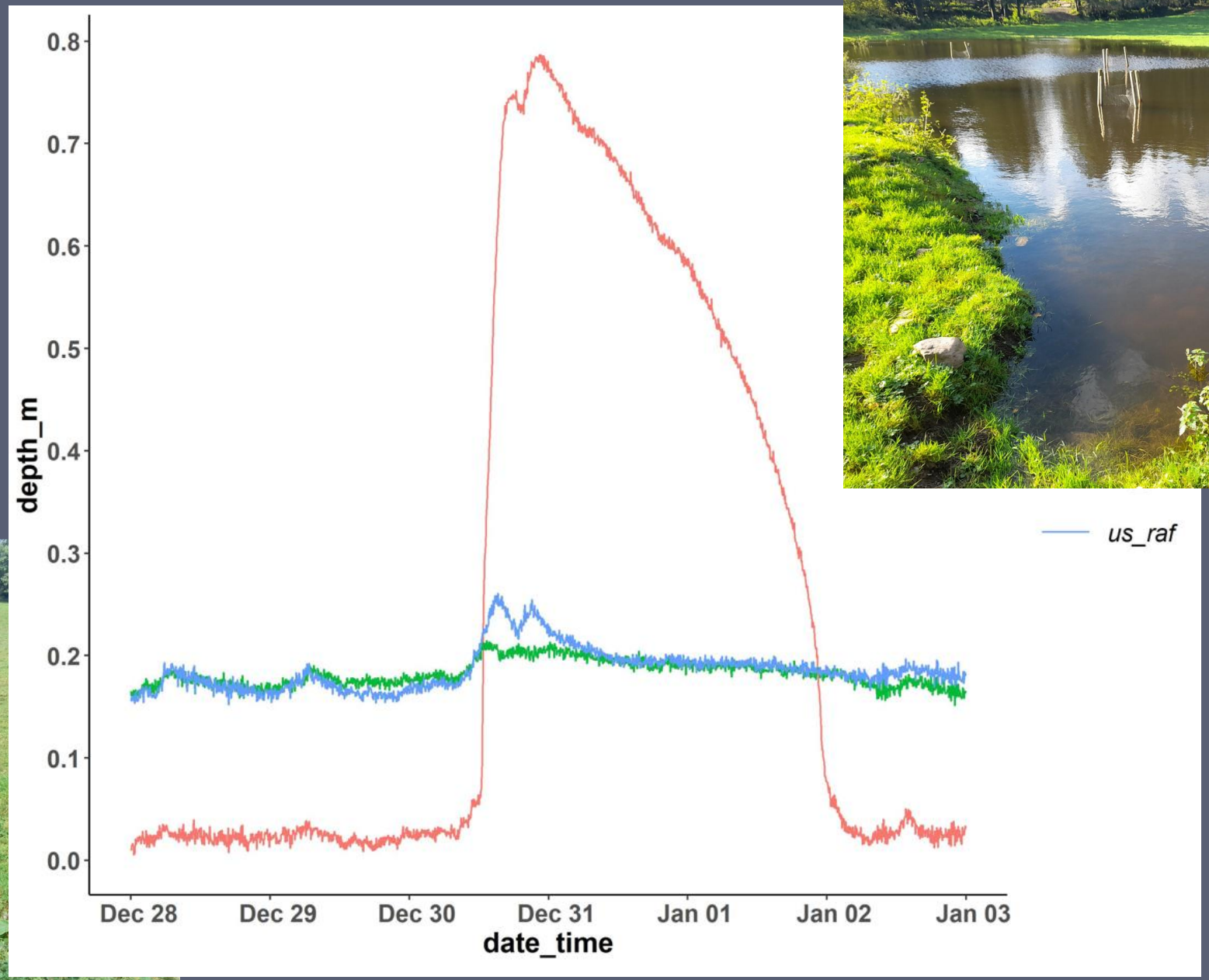
28 Dec 2021 - 02 Jan 2022 Floods

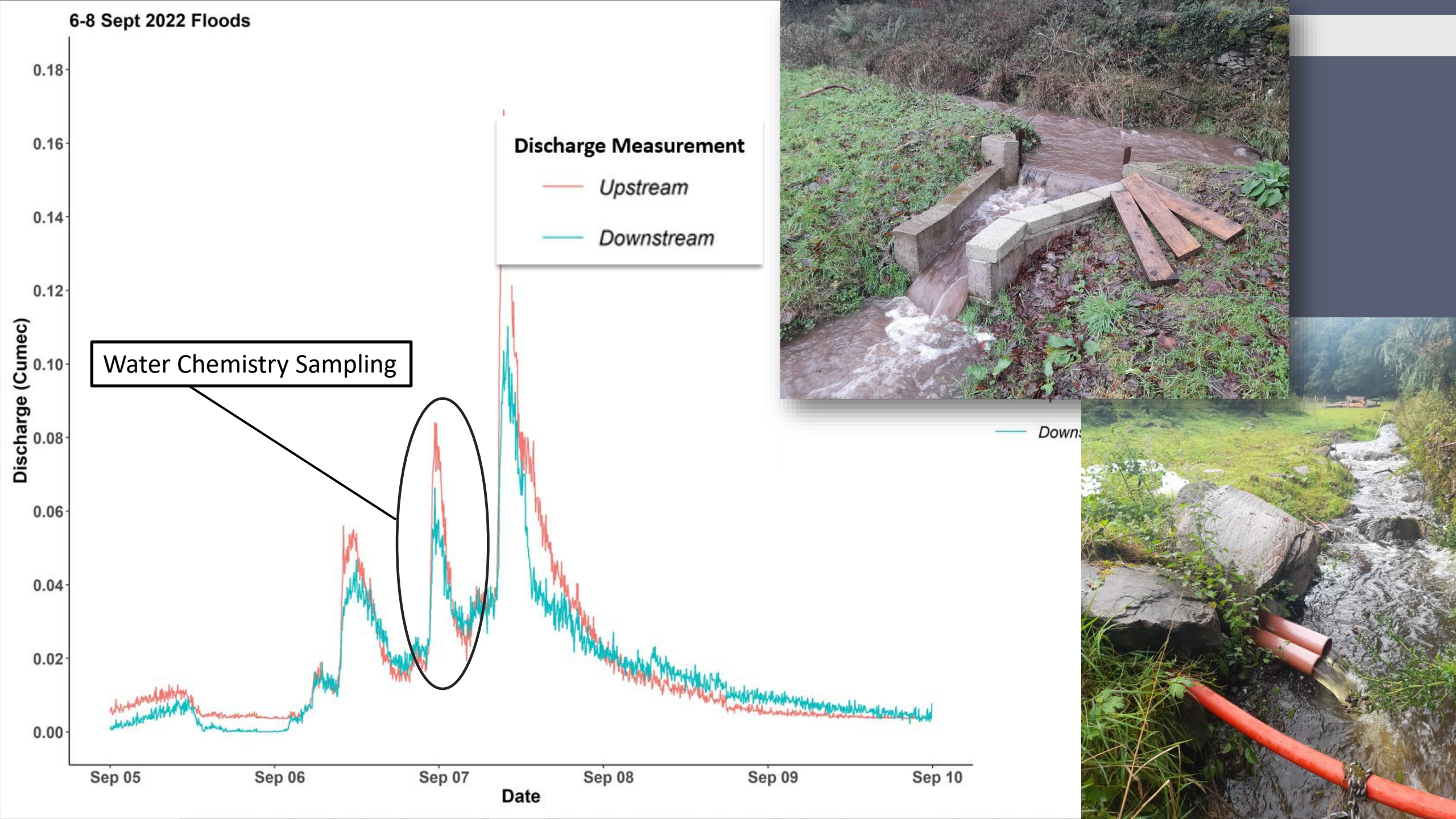
Area Under Curve attenuation of ~15% (16 m³ over 36 hours)



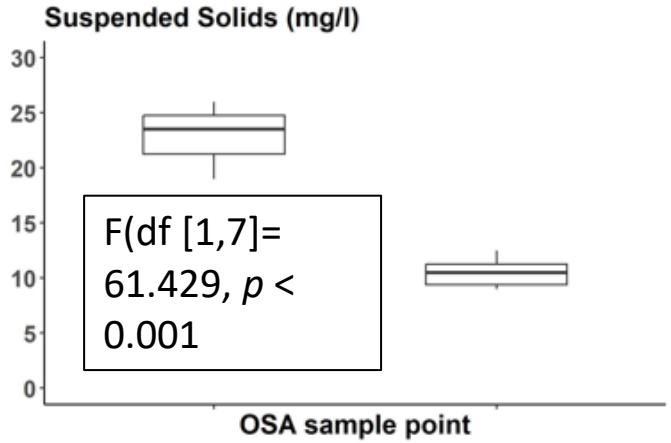
# Field OSA filling during flood event

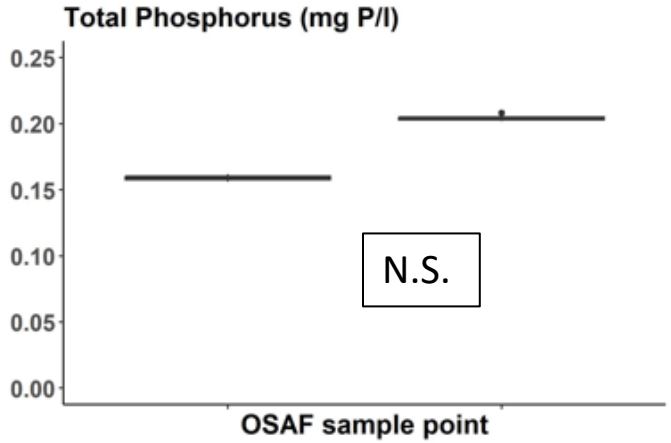


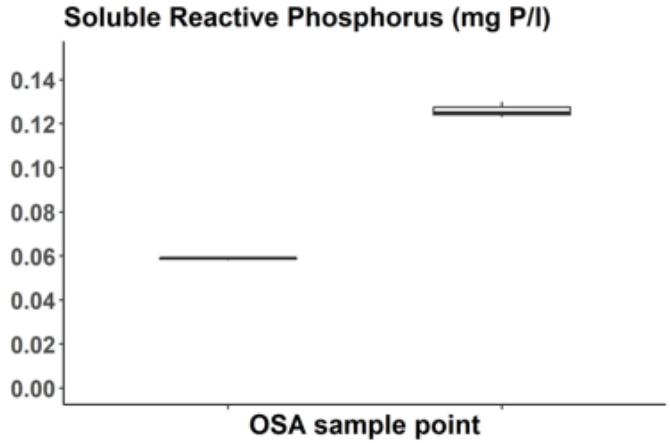


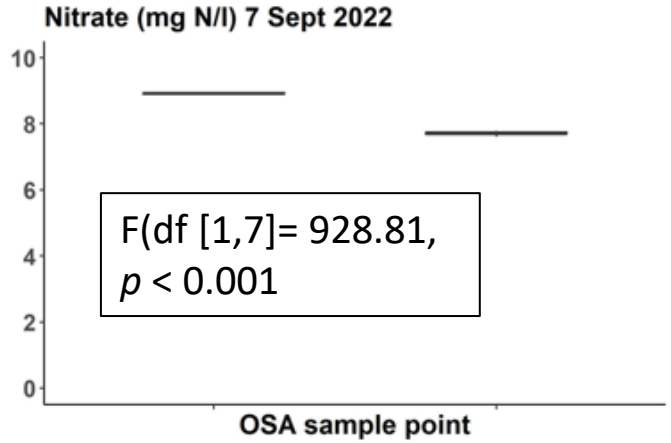


6-8 Sept 2022 Floods
Discharge Measurement
Upstream
Downstream
Water Chemistry Sampling
Discharge (Cumec)
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Sep 05
Sep 06
Sep 07
Sep 08
Sep 09
Sep 10
Date

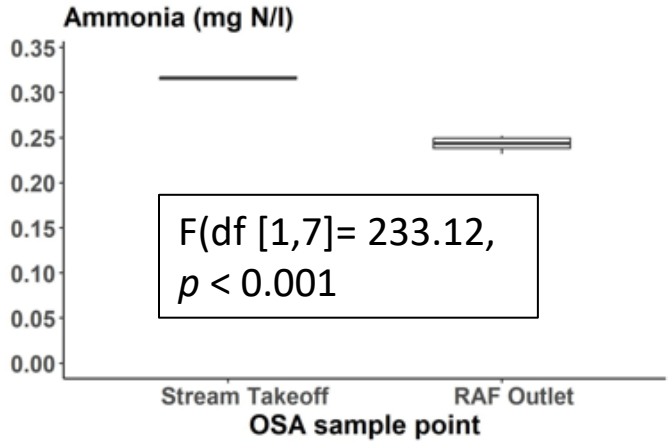
OSA 14:30 07 Sept 22 Samples

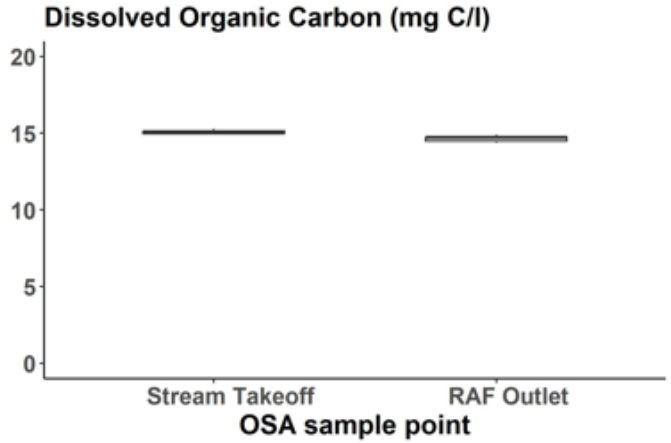


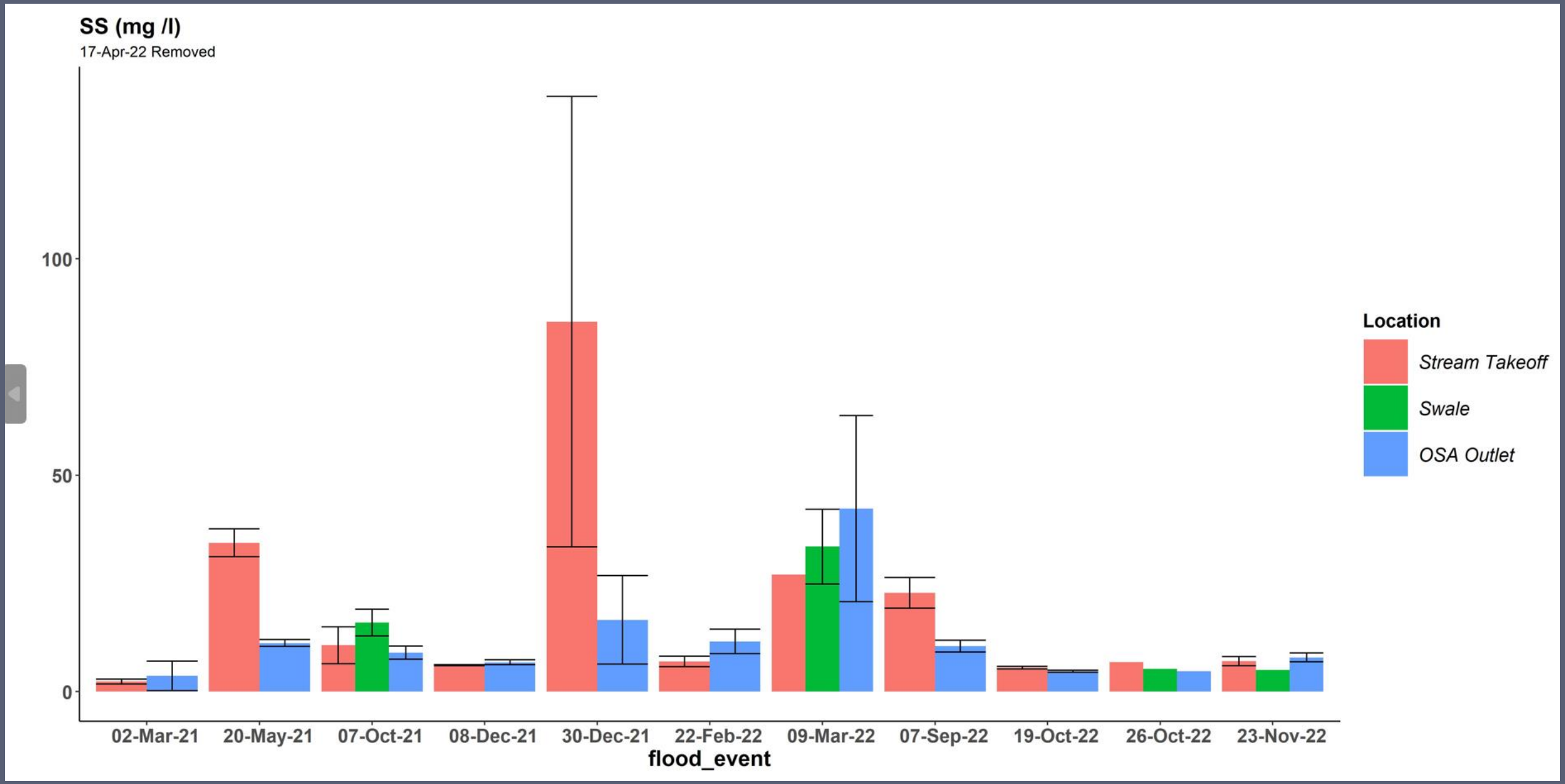




# Water Chemistry Mar 2021 Nov 2022



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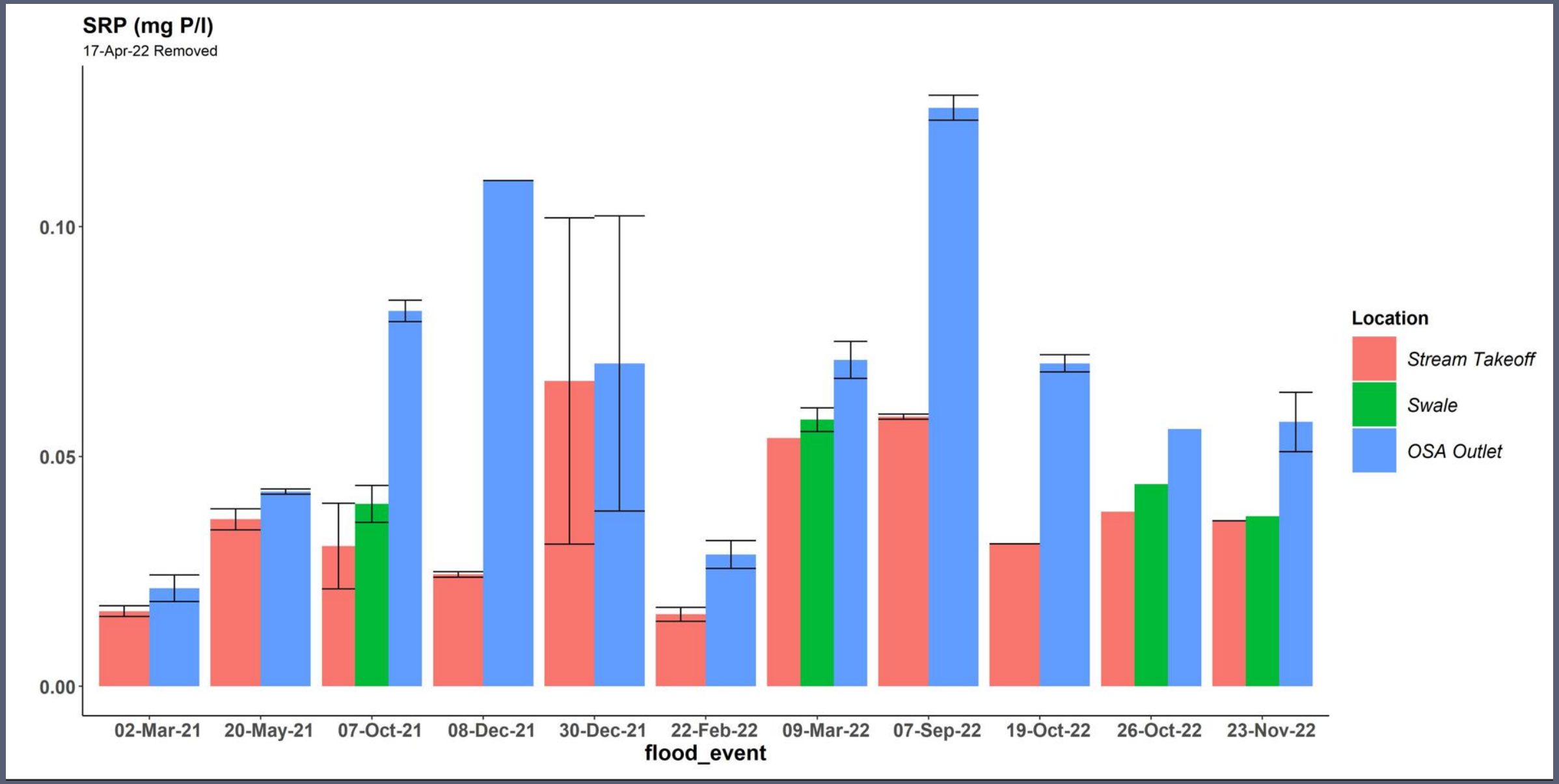
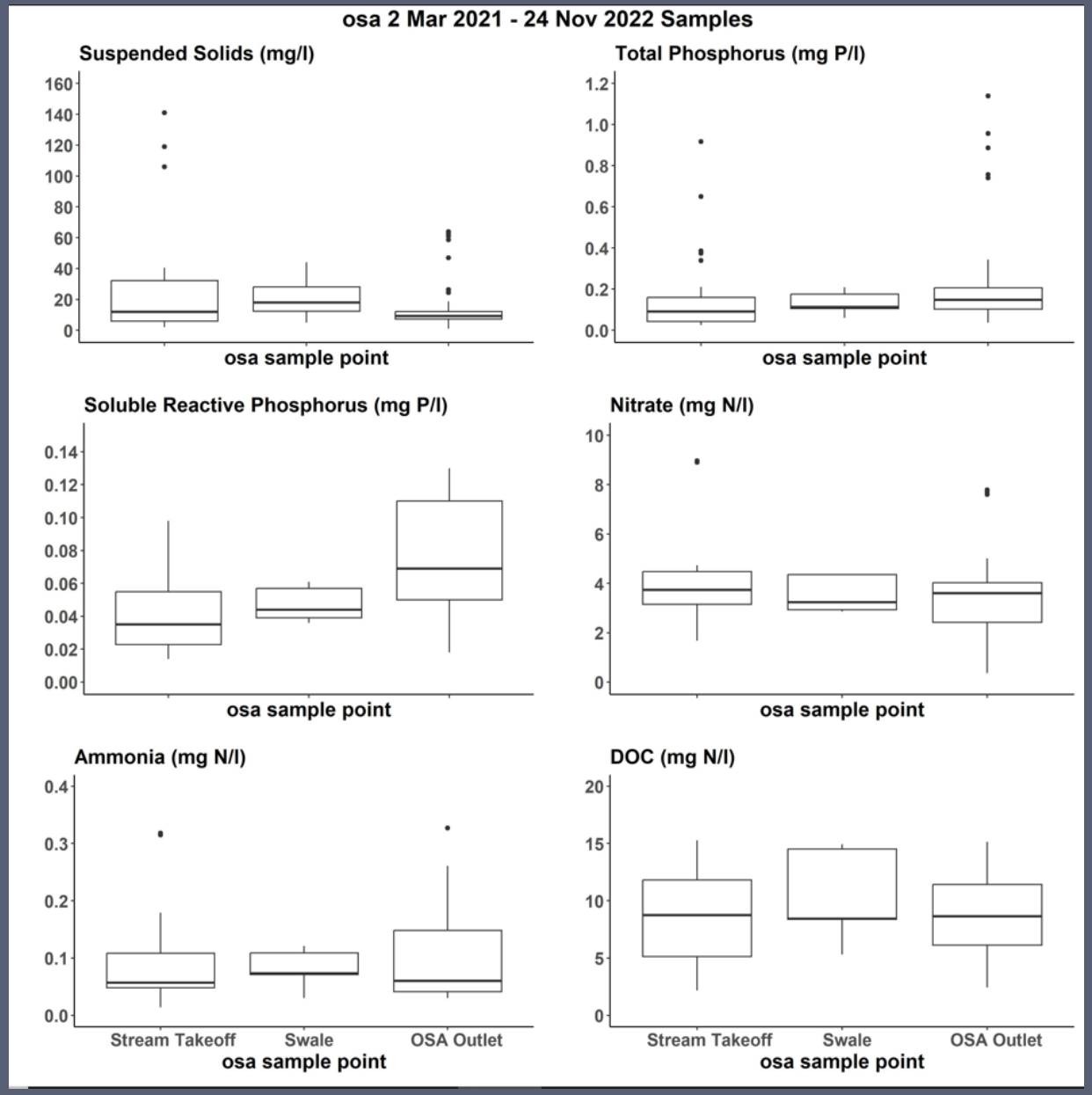


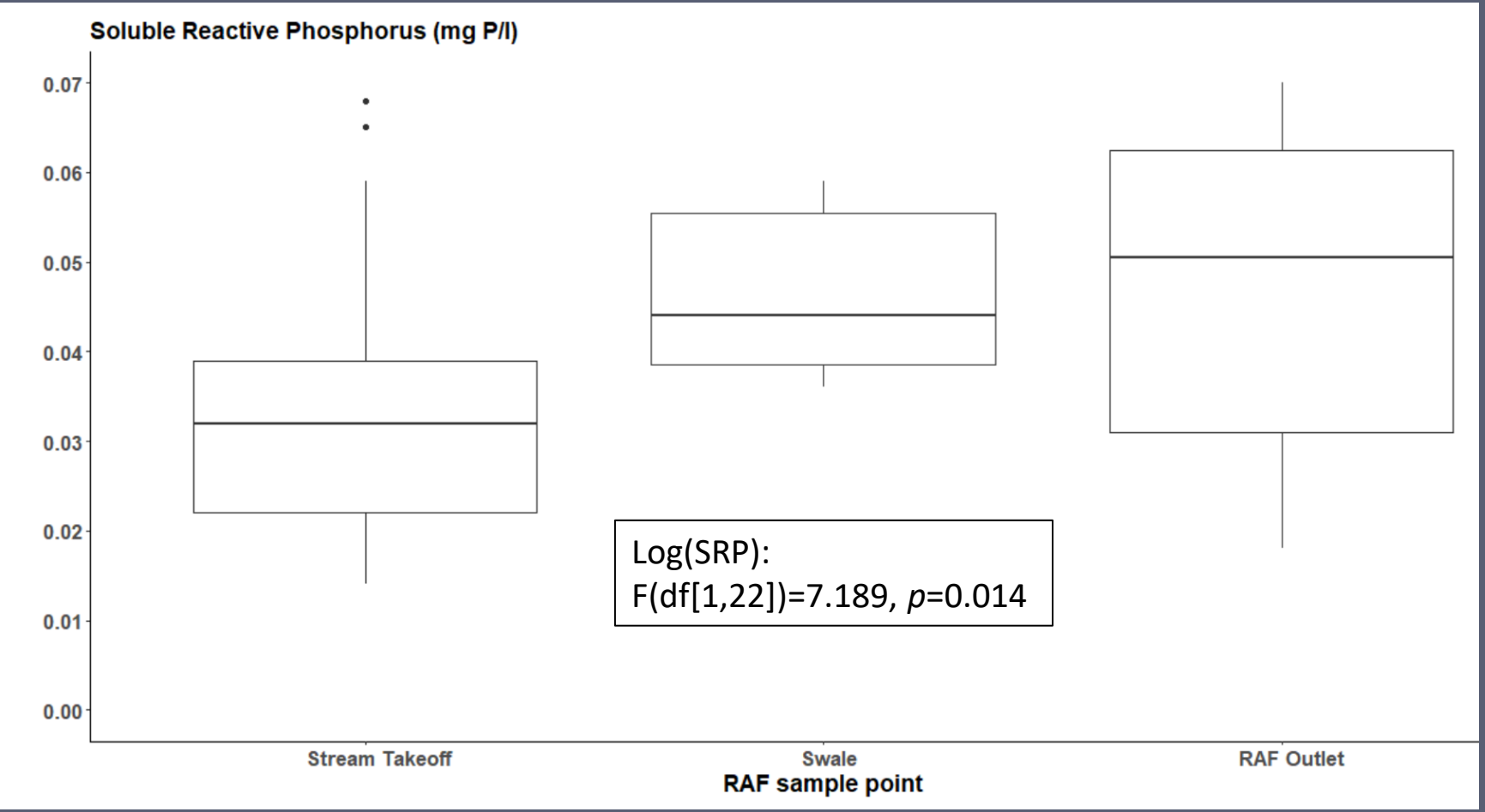
# Overall Chemistry




Surface Water Chemistry from n = 12 flood events (March 2021 –November 2022)

- Events are variable –hydrology, water quality
- Roles of season, antecedent conditions, time of sampling along flood peak
- Studies indicate that OSAs can retain suspended sediment, but may act as sources for SRP [1,2,3]

# Overall Chemistry




Surface Water Chemistry from n = 12 flood events (March 2021 –November 2022)

- Only significant effect of Field OSA found for log(SRP): Production of SRP
- Indication of Suspended Solids attenuation in large events.
- Potential correlation with order of flood in season; scale of flood event; time of sampling.

# Final thoughts

- Working directly with landowners to design and install nature-based solutions
- Maintaining farming activities through knitting mitigation into the landscape
- Process-lead & illustrated by data

Thanks for your attention

Questions?

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YouTube IE SloWaters Videos

nwrmireland.wordpress.com

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The University of Dublin

The James Hutton Institute

epa
Environmental Protection Agency

OPW

eagasc
Agriculture and Food Development Authority

# References


Clarke, D. (2013) *The performance of Detainment Bunds (DBs ) for attenuating phosphorus and sediment loss from pastoral farmland*. University of Waiato.

Levine, B. *et al.* (2021) 'The ability of detainment bunds to decrease s approach to agricultu *Agricultural Water Management*, 243 (June 2020), p. 106423. doi: 10.1016/j.agwat.2020.106423.

Robotham, J. *et al.* (2022) 'Nature-based solutions enhance sediment and nu *Earth Surface Processes and Landforms*, (September 2022), pp. 243–258. doi: 10.1002/esp.5483.