Demonstration Test Catchments

THE UNIVERSITY OF NORTHAMPTON

Testing the efficacy of on-farm pollution mitigation measures in agricultural catchments of the Hampshire Avon DTC.

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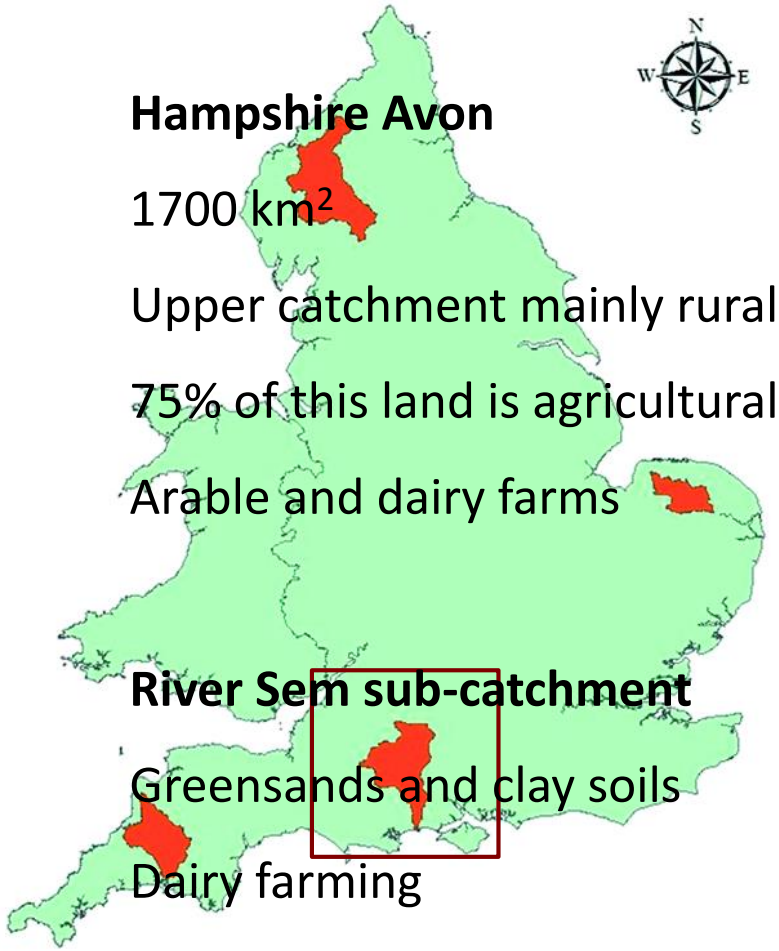
Supervisors: Professor Adrian Collins, Professor Ian Foster and Dr Naomi Holmes

NORTH WYKE ROTHAMSTED RESEARCH

Department for Environment Food & Rural Affairs

Hampshire Avon
Demonstration Test Catchment

The Location



Hampshire Avon

1700 km^2

Upper catchment mainly rural

75% of this land is agricultural

Arable and dairy farms

River Sem sub-catchment

Greensands and clay soils

Dairy farming

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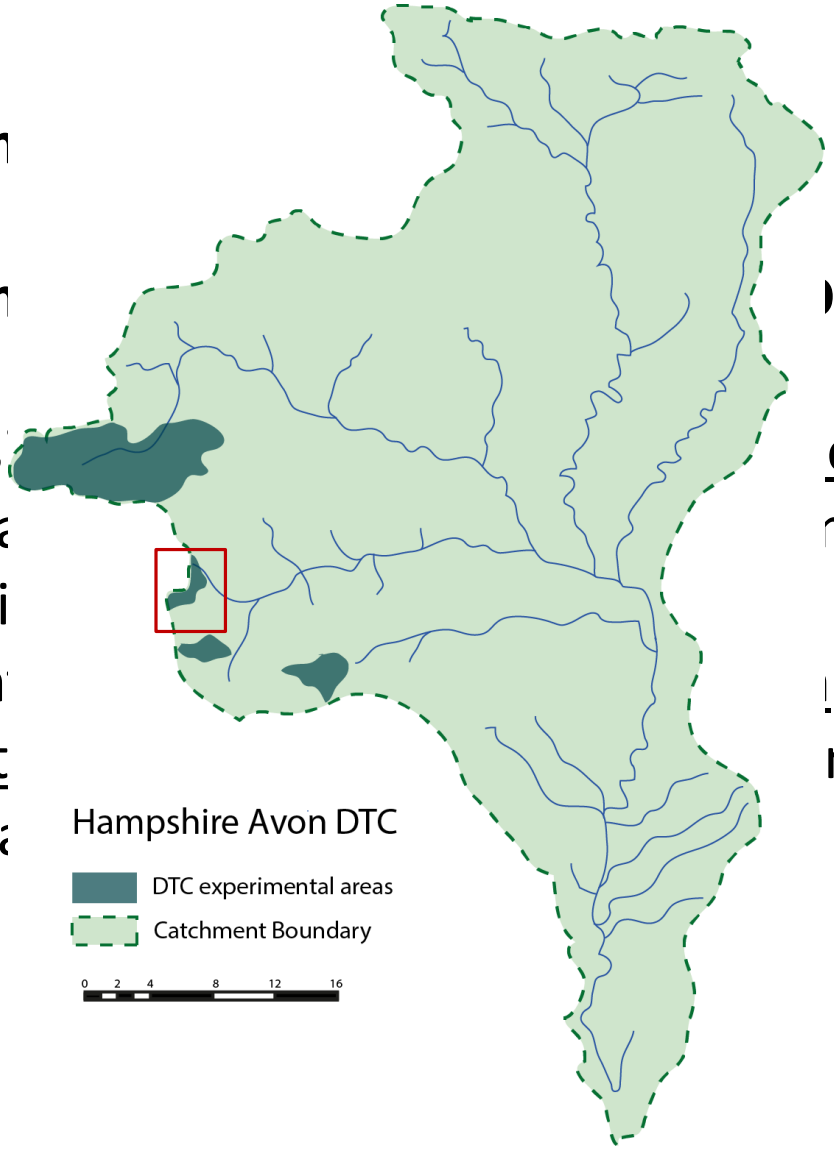
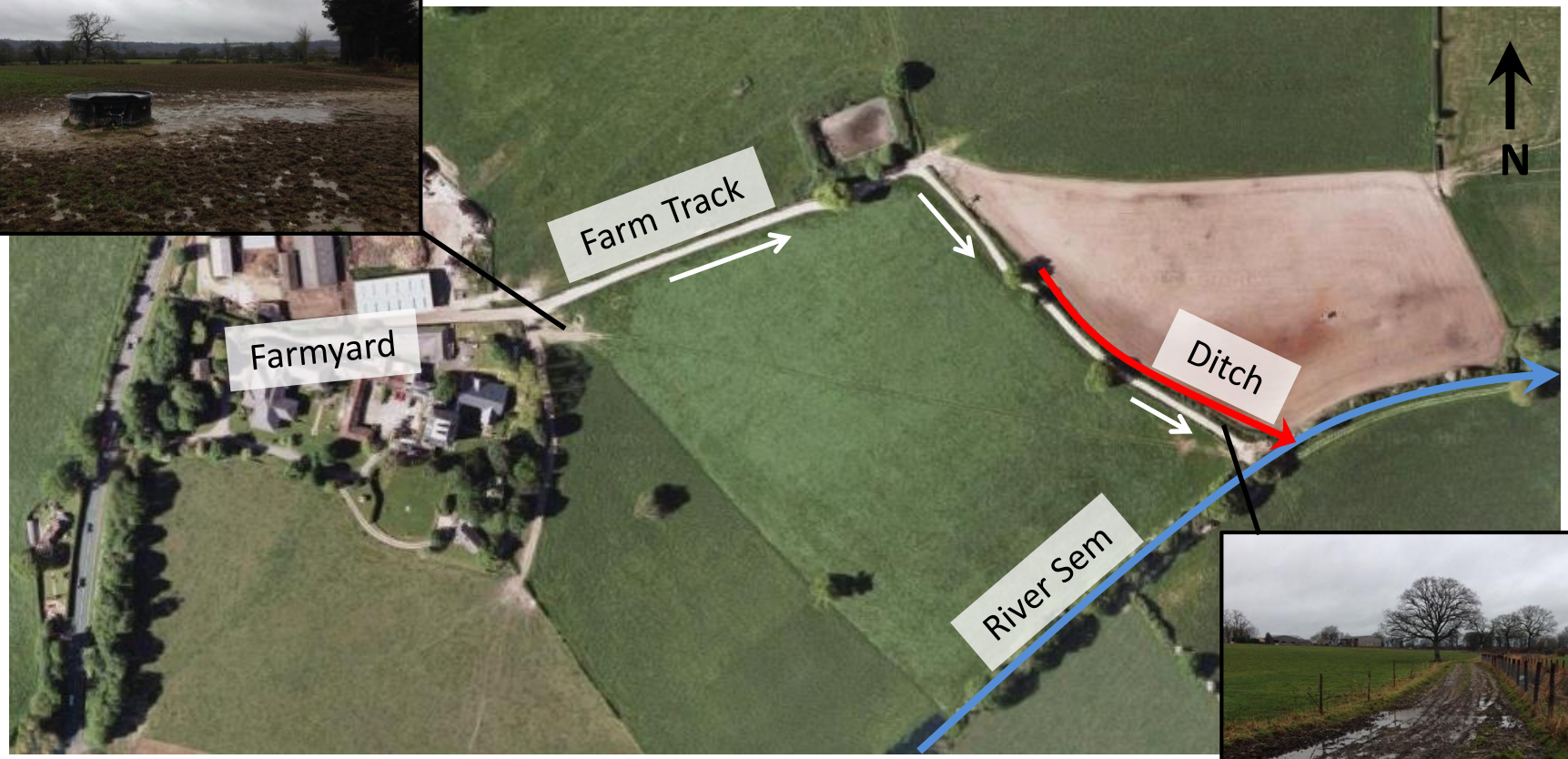


The Problem: Agriculture

Agricultural Activity	Effect	Consequence
Increased stocking density	Soil compaction	Enhanced water runoff
Heavy machinery	Soil compaction	Enhanced water runoff
Ye	d ve	il loss to rivers
Yea	ce of	sportation of nutrients to rivers
fertiliser and slurry	vulnerable weather	
Degraded infrastructure	Impervious surfaces with badly maintained storage.	Direct transportation of sediment and nutrients to rivers.

Mitigation: Farm Infrastructure Repair



High volumes of sediment and nutrients **transported** along track to river

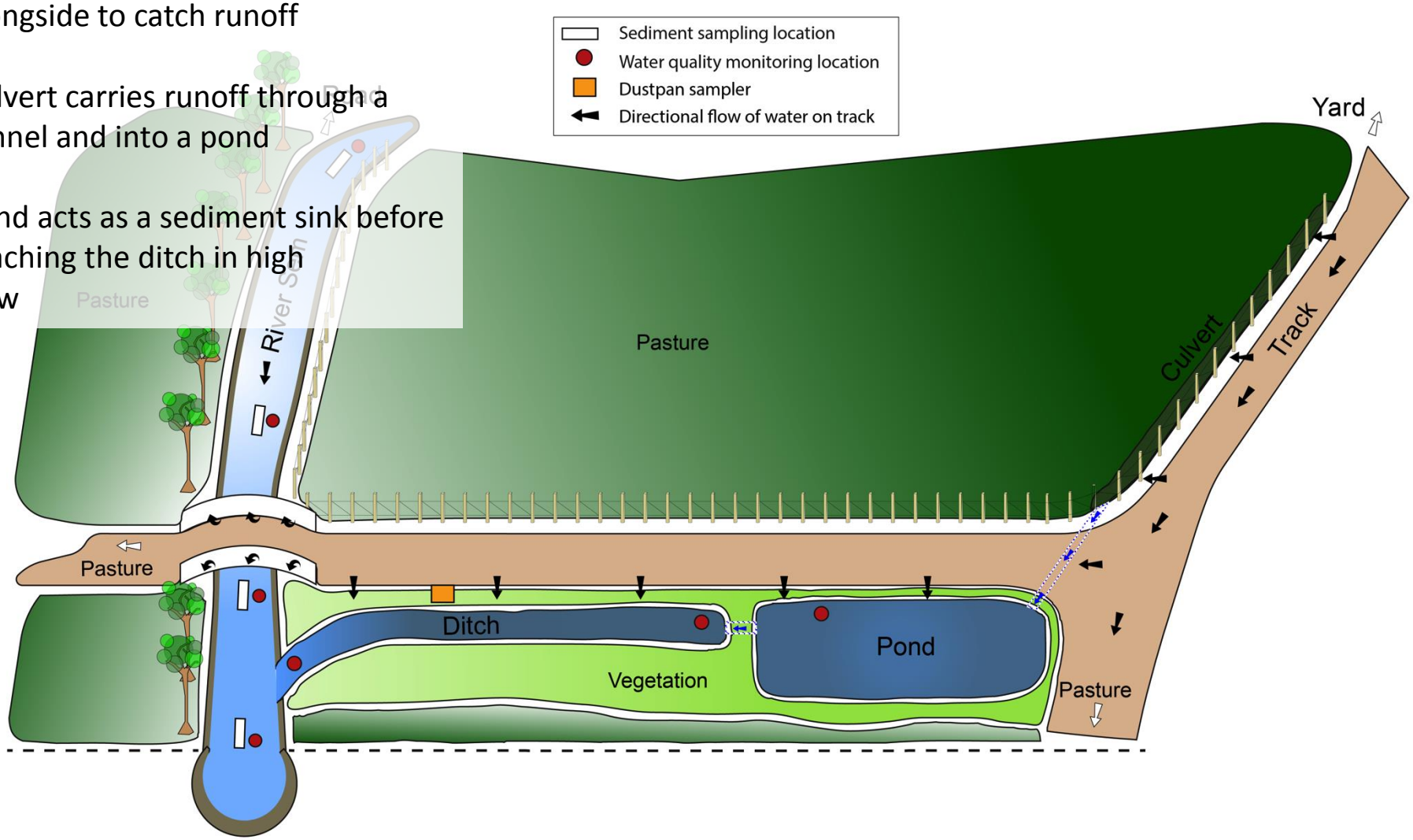
Sourced from *fields* and the *farmyard* as well as the **eroding** the *track* itself

Mitigation: Farm Infrastructure Repair

Resurfaced the track with a culvert alongside to catch runoff

Culvert carries runoff through a tunnel and into a pond

Pond acts as a sediment sink before reaching the ditch in high flow



Mitigation: Farm Infrastructure Repair

Testing Effectiveness: Sampling Methods

Bed Disturbance Experiments: Stored Bed Sediment

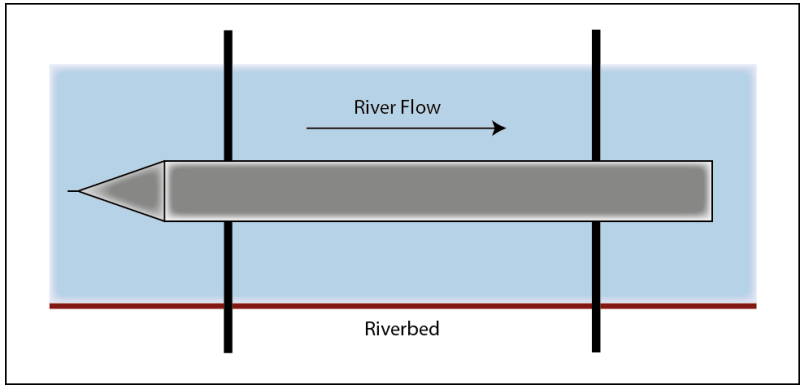
Method by Lambert & Walling (1988)

Both methods are affordable, replicable and sustainable.

"Farmer Self-Monitoring"

Time-integrated Sediment Traps: Suspended Sediment

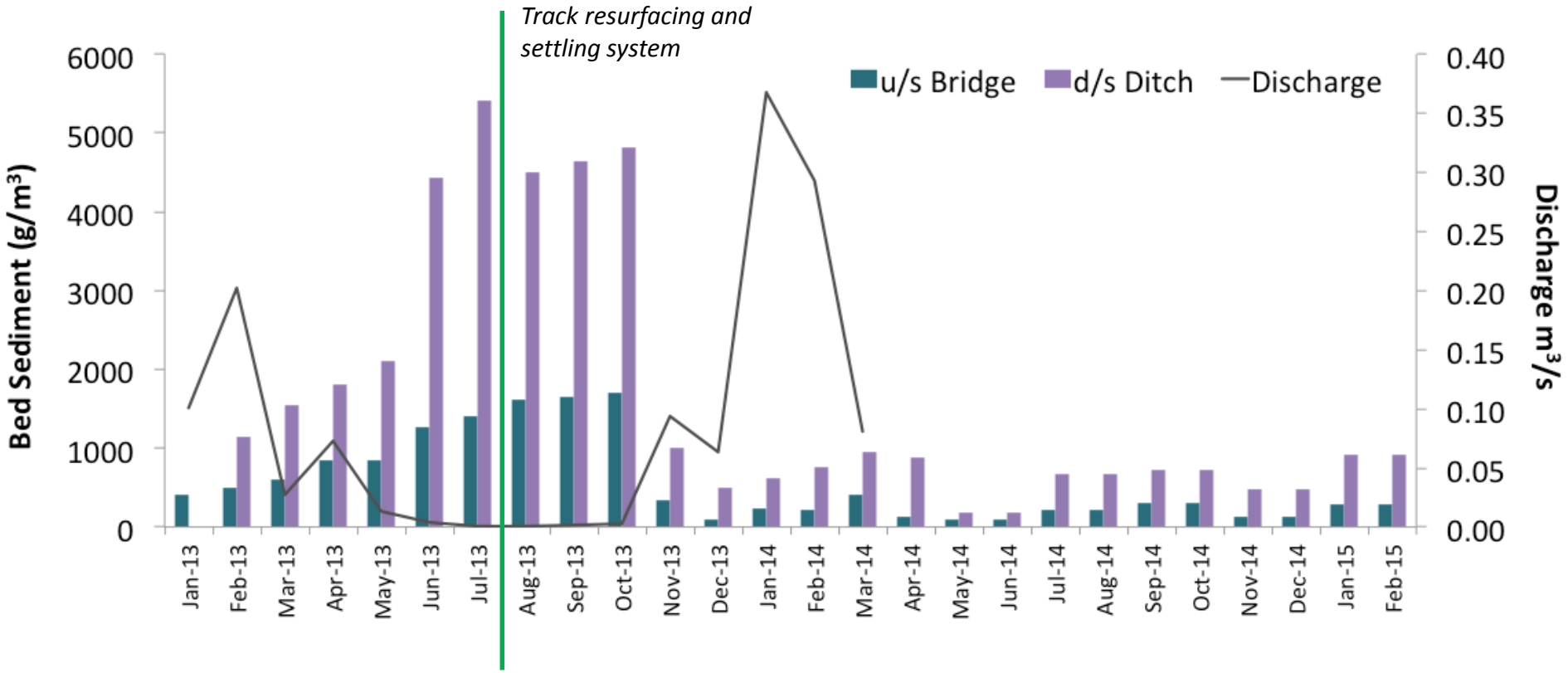
Method by Phillips *et al*. (2000)



Gives a representative sample of all the sediment in suspension for the time period it is left in situ.

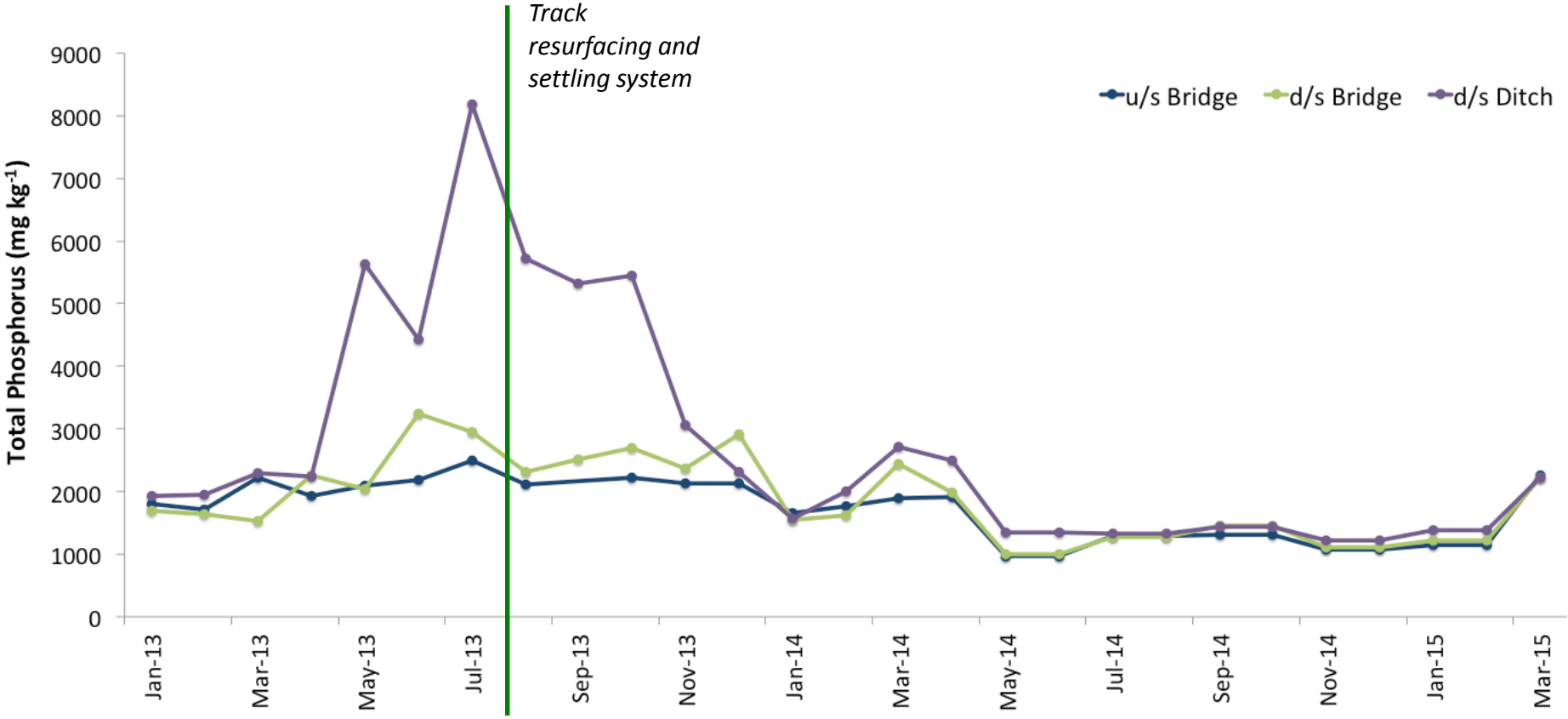
Incorporates storm events and does not require constant attention

Bed Storage Sediment



Total Phosphorus

Total Phosphorus concentration in trapped suspended sediment of the River Sem.



Testing Effectiveness: Sampling Methods

Dustpan Sampler: Collecting Farmtrack Runoff

Testing Effectiveness: Sampling Methods

Water Quality: Colorimeter

Affordable, simple and quick

Shows changes in water quality with distance from the farm track

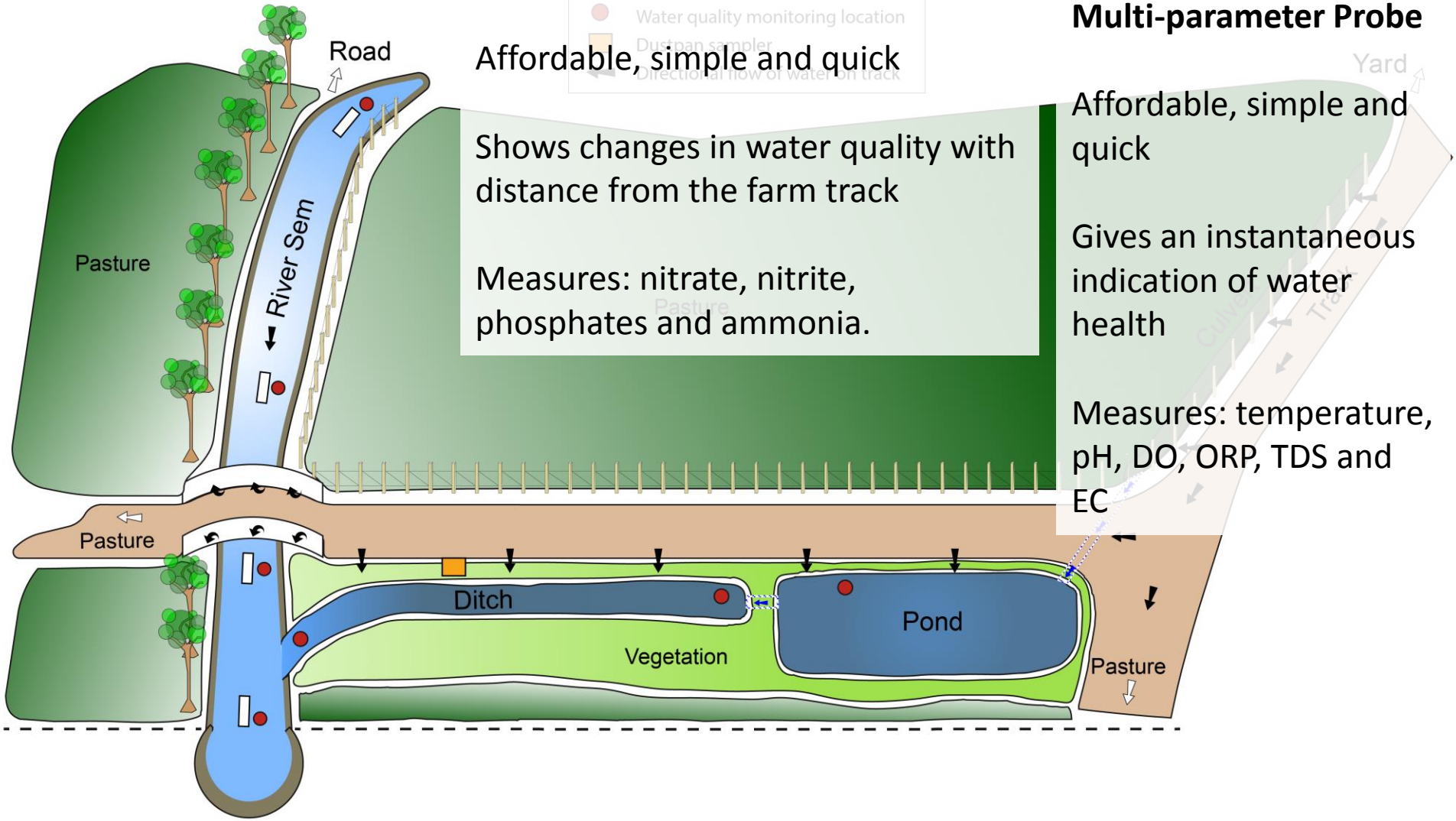
Measures: nitrate, nitrite, phosphates and ammonia.

Water Quality: Multi-parameter Probe

Affordable, simple and quick

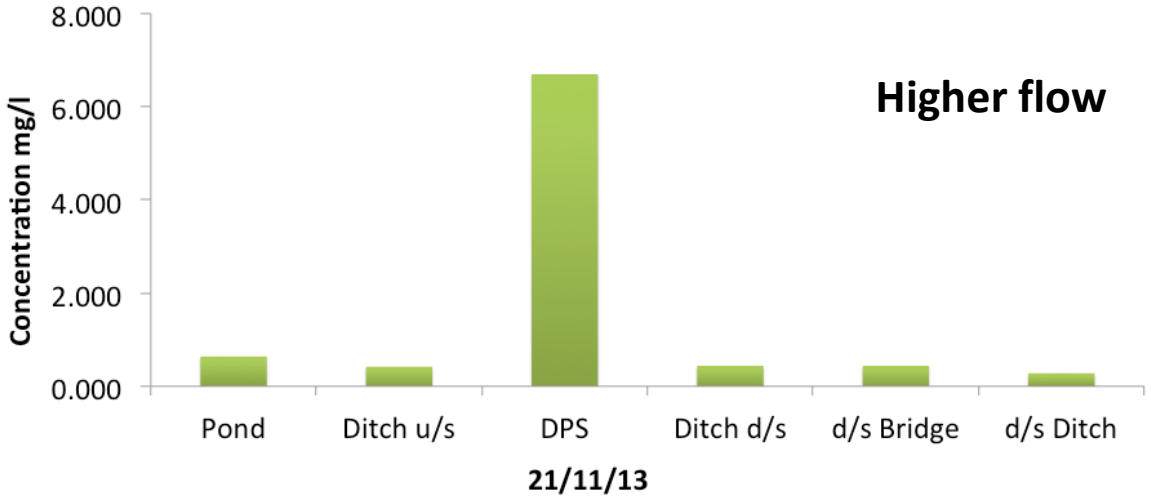
Gives an instantaneous indication of water health

Measures: temperature, pH, DO, ORP, TDS and EC

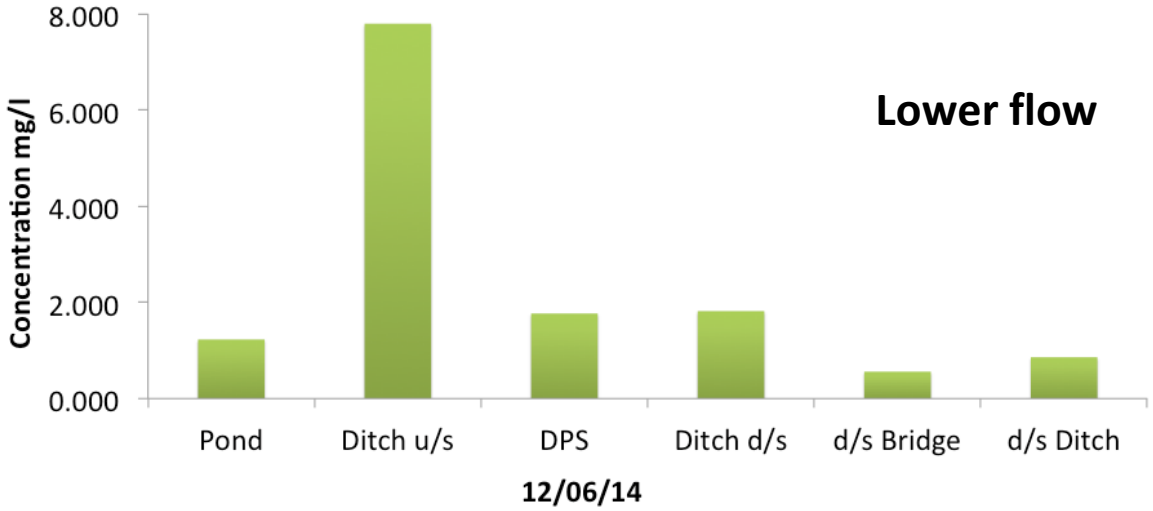


Water Quality of Settling System

Phosphate concentrations during low flow and high flow

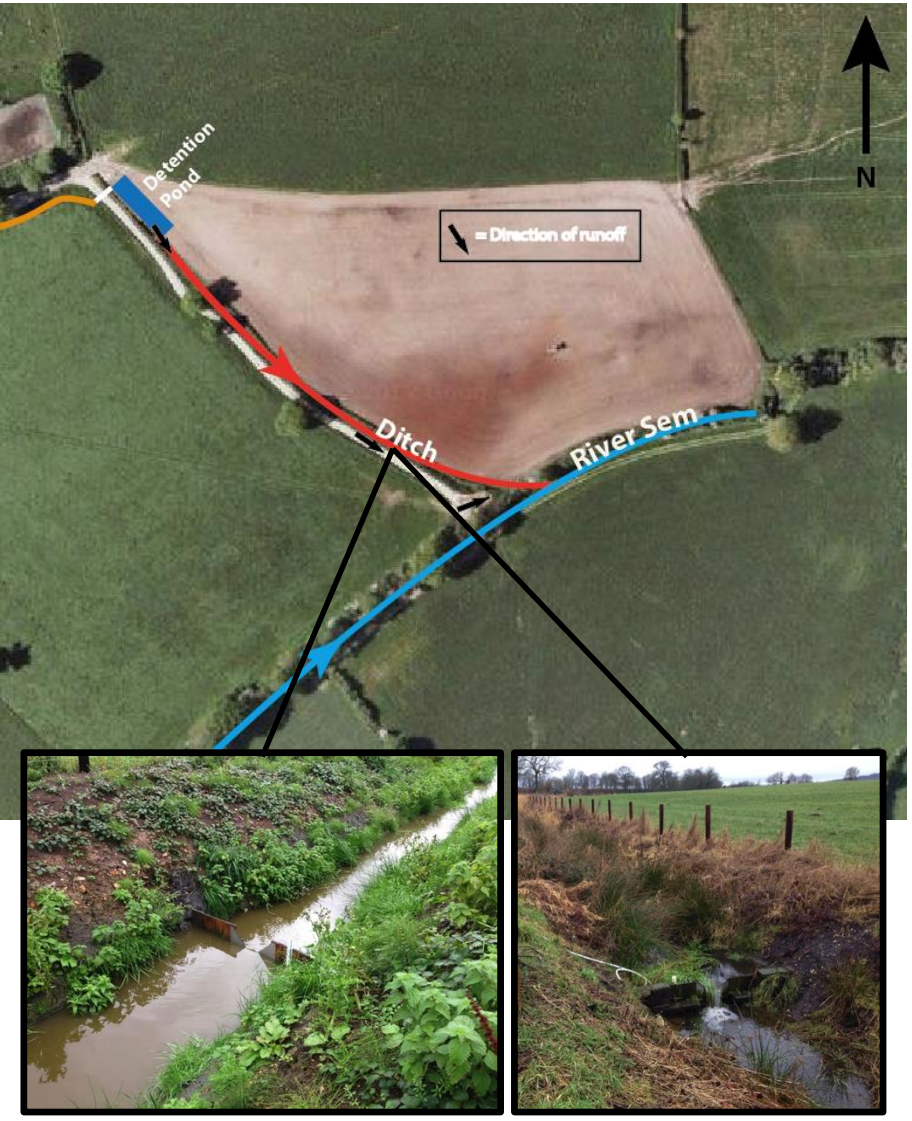


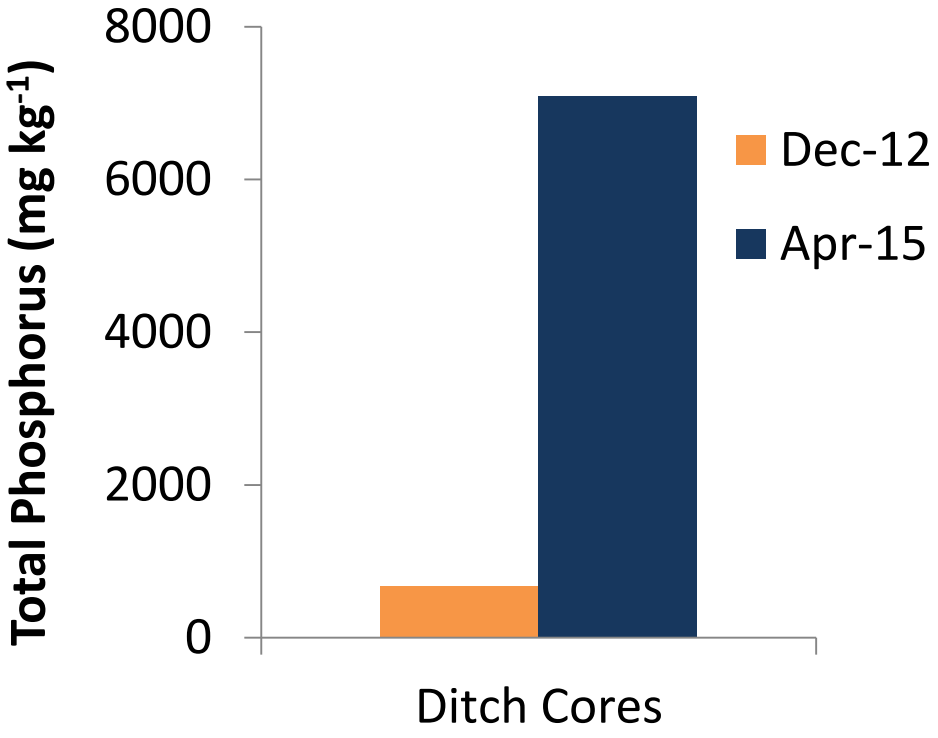
Higher flow



Lower flow

Water Quality of Settling System





Summary

Results are based on a particular site, with a particular land use, geology, topography and climate.

Focus here is on monitoring methods for mitigation measures.

It is important to know that the mitigation measures are effective at reducing agricultural pollution.

Evident changes to the river since mitigation, but further analysis may show that other factors have contributed to these improvements.

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Thank you

Hampshire Avon Demonstration Test Catchment

ROTHAMSTED RESEARCH

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