

River Wye Farmscoper Report – Key Messages

The Report

The Farmscoper model was used to predict the potential reductions in nutrient loading in the River Wye (England and Wales) which could be achieved under various management scenarios.

The findings will form part of the evidence base underpinning updates to the River Wye Nutrient Management Action Plan and the development of the Diffuse Water Pollution Plan (DWPP), as well as informing the delivery of farm advice within the catchment.

Farmscoper: The model and data inputs

- Farmscoper is a decision support tool which models nutrients at a catchment scale by modelling ‘typical’ farms evenly across the catchment – it is not intended to accurately model individual farms.
- APHA livestock data and soils data from the RePhoKUs report were used to ensure the model was up to date and relevant for the Wye catchment (rather than using the default, nationally applicable values in Farmscoper).
 - The livestock data obtained from APHA indicated there are almost 30 million poultry in the catchment.
- Farmscoper is a model and as such requires various assumptions and it does have limitations which may have impacted these findings:
 - Assumptions were made on soil types, soil condition, drainage, regulatory compliance, current implementation rates of measures, fertiliser application rates, etc.
 - Farming Rules for Water were applied across the whole catchment (this legislation doesn’t apply in Wales).
 - Limited information is available on manure movement and exports from the catchment, so were not considered (e.g. including the Avara pledge).

Key Findings:

- >50% of phosphorus losses from agricultural land into the River Wye are associated with soil movement. Measures which reduce soil movement are needed.

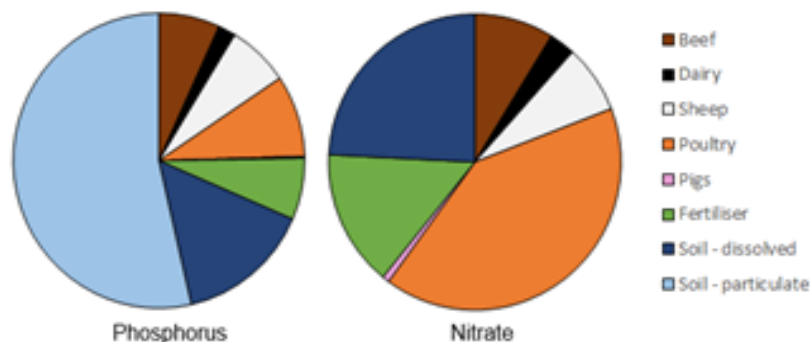


Figure 5 Apportionment of the annual average agricultural phosphorus and nitrogen loss in the Wye catchment, by source.

- Poultry manure accounts for 63% of phosphorus and 49% of nitrate produced by livestock in the catchment.

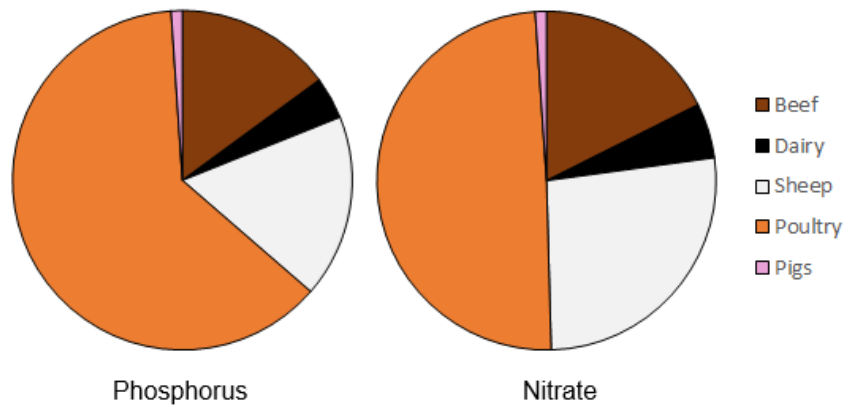


Figure 4 Apportionment of the total annual phosphorus and nitrogen excreta in the Wye catchment, by livestock type

Compared to current regulatory compliance and implementation of measures:

- Full regulatory compliance would reduce P losses by **6%**
 - If current compliance was 0% then full compliance could achieve a maximum of 15% reduction in P losses
- Adoption of the CSF recommended measures could reduce P losses by **14%**
- Adoption of the top 5 recommended measures within Farmscoper (see table below) across the catchment could reduce P losses by **22%**. This is higher than CSF measures because the CSF measures did not include cover crops.
- Implementation of all measures in the Farmscoper library achieved a maximum reduction of **>35%**. This is likely an unfeasible, theoretical limit though.
- If large scale land use change (30% of the catchment) was implemented, P losses could be reduced by:
 - **>40%** (if land use change was targeted at the most polluting farms)
 - **<20%** (if non-targeted approach, so land use just split evenly across farm types)
- If targeted land use change was combined with the top recommended measures on the remaining farmland, Farmscoper gave a maximum possible P reduction value of almost **60%**.
- **The targeted approach is key because Farmscoper predicts that >50% of P losses come from 15% of farms.**

Table 7 Scenario 5 – Top 5 most effective measures for reducing agricultural phosphorus loss, by farm type. Measures differ for dairy, extensive grazing and all other farm types.

Name	Other	Dairy	Extensive Grazing
Establish cover crops in the autumn	1	1	2
Establish riparian buffer strips	2	4	
Plant areas of farm with bird seed / nectar flower mixtures	3	5	
Establish in-field grass buffer strips	4		
Cultivate compacted tillage soils	5		
Use slurry injection application techniques		2	
Early harvesting and establishment of crops in the autumn		3	
Loosen compacted soil layers in grassland fields			3
Fence off rivers and streams from livestock			4
Reduce the length of the grazing day/grazing season			1
Construct troughs with concrete base			5