Soils and Water Quality

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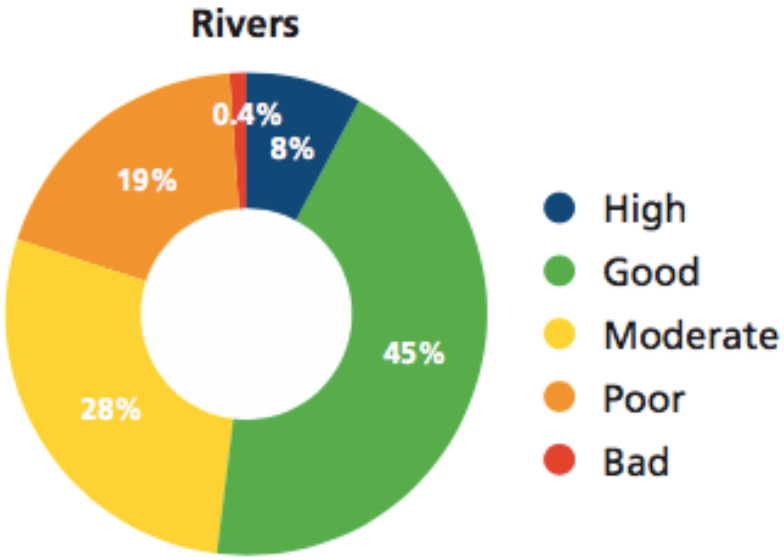
Soils and Water Quality

Water Quality in Ireland

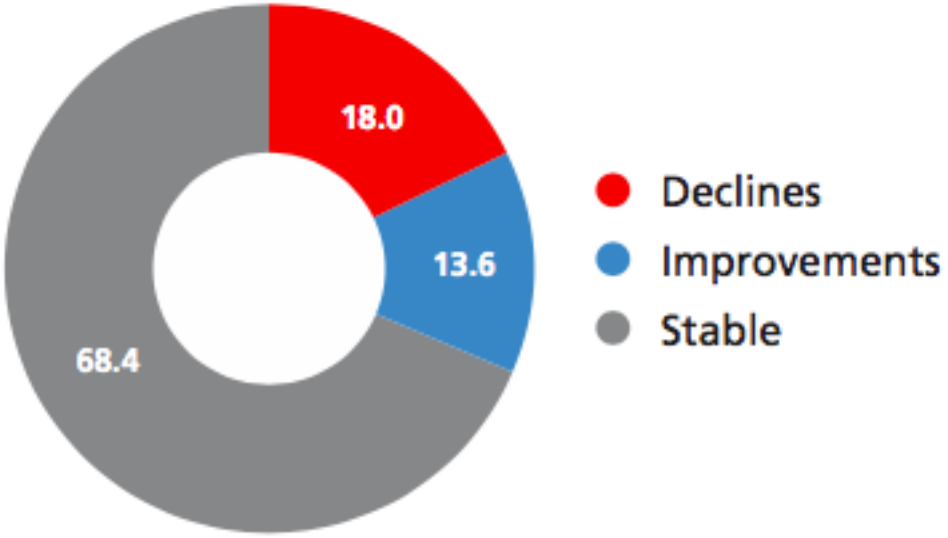
Figure 7.2 Surface water ecological status by water category, 2013-2018 (Source: EPA)



EPA 2020

Water Quality - Trends

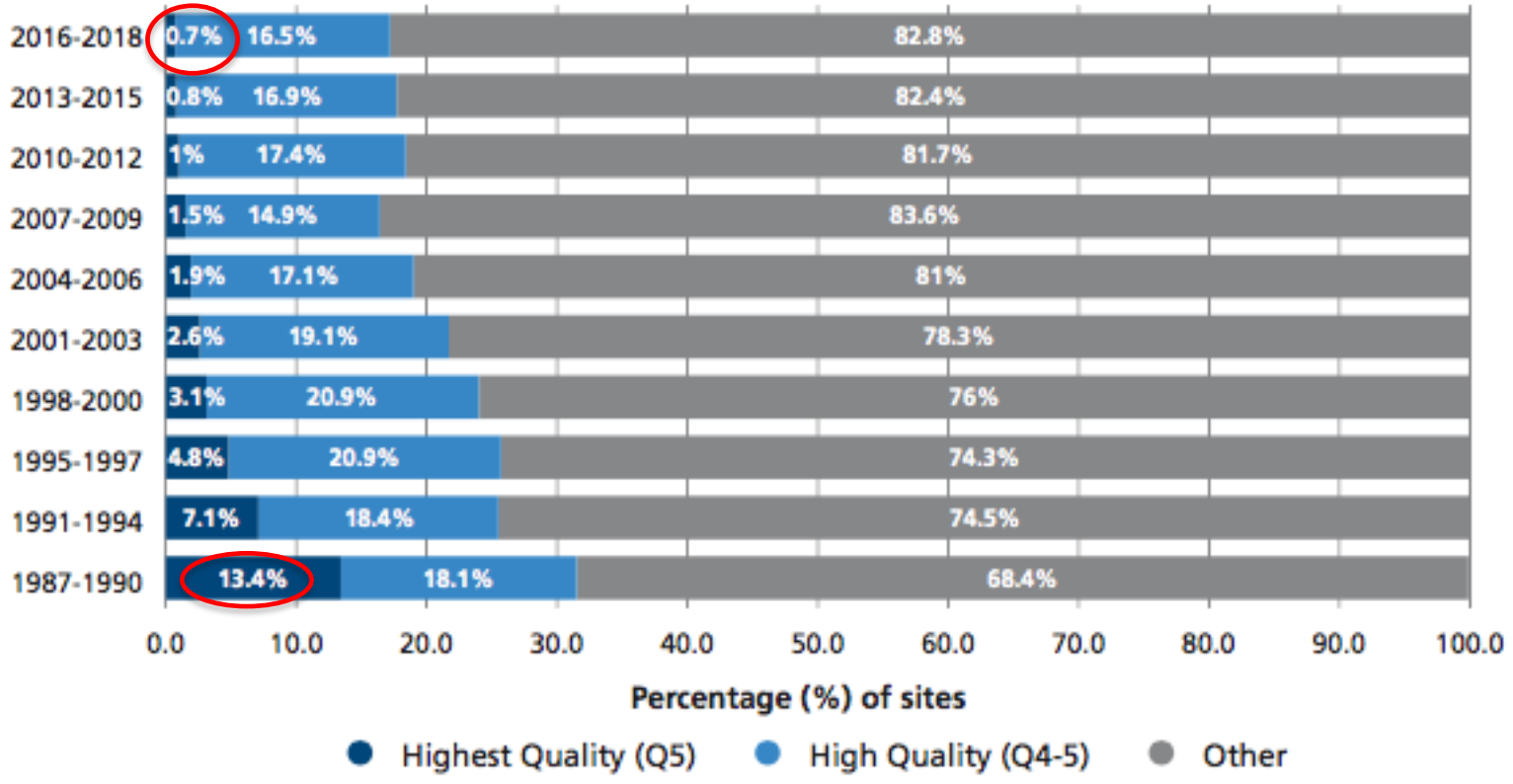
Figure 7.4 Percentage change in ecological status of surface waters between the assessment periods 2010-2015 and 2013-2018 (Source: EPA)



EPA 2020

Water Quality - Trends

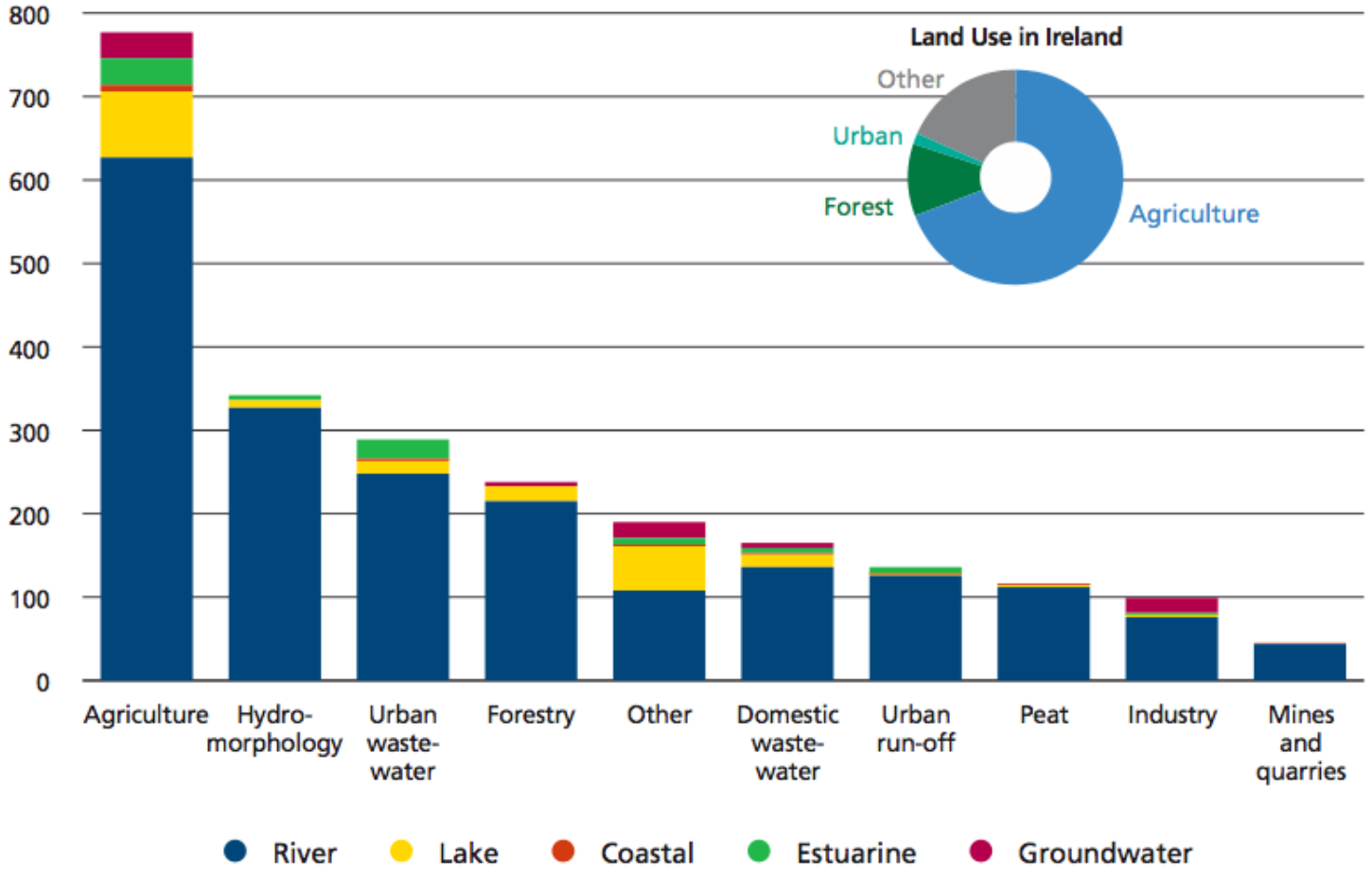
Figure 7.6 Change in the percentage of high ecological quality (macroinvertebrate) river sites in each survey period between 1987 and 2018 (Source: EPA)



EPA 2020

Agriculture and Water Quality

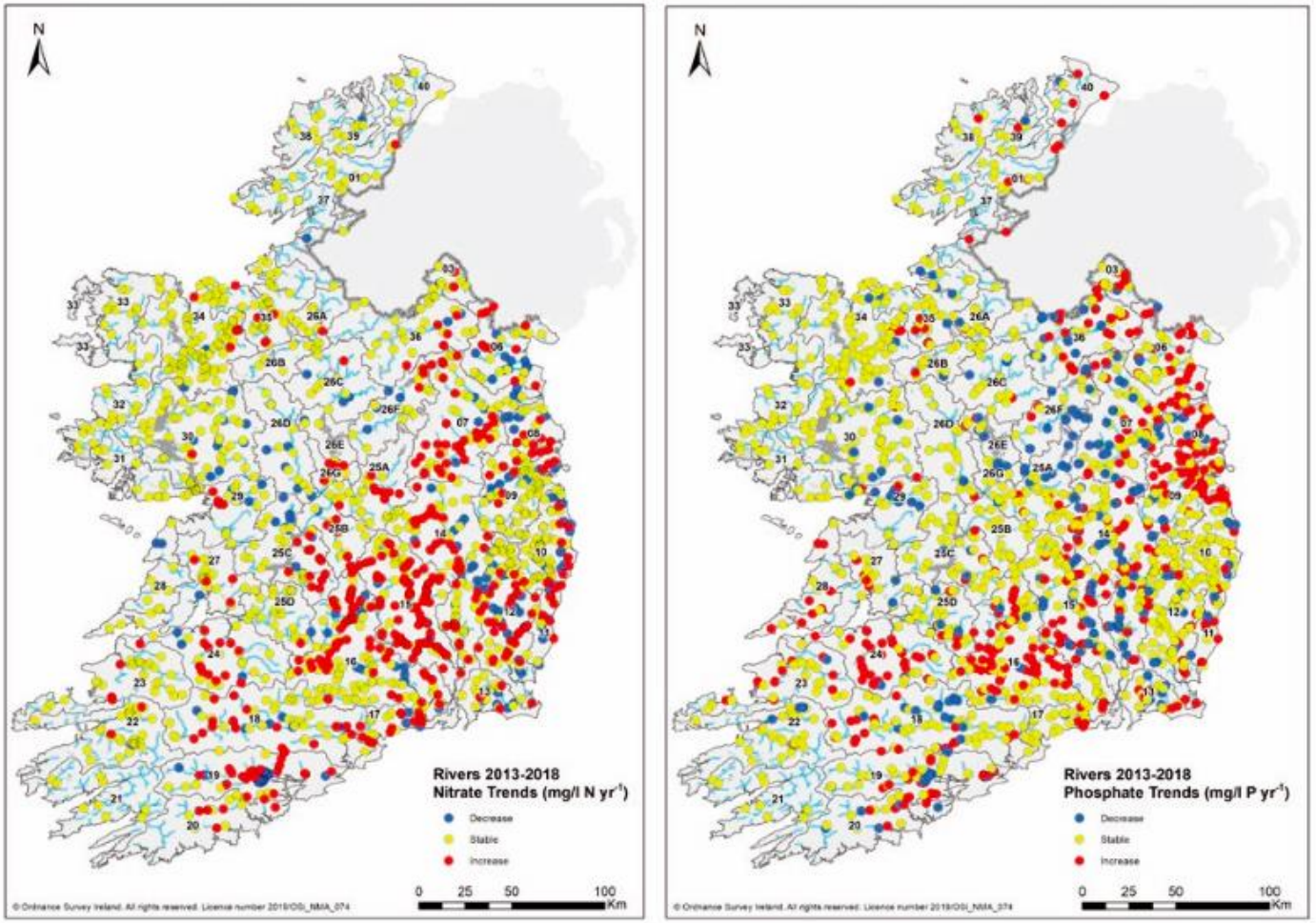
Figure 7.9 Significant pressures on Ireland's aquatic environment (Source: EPA)



EPA 2020

Water Quality - Trends

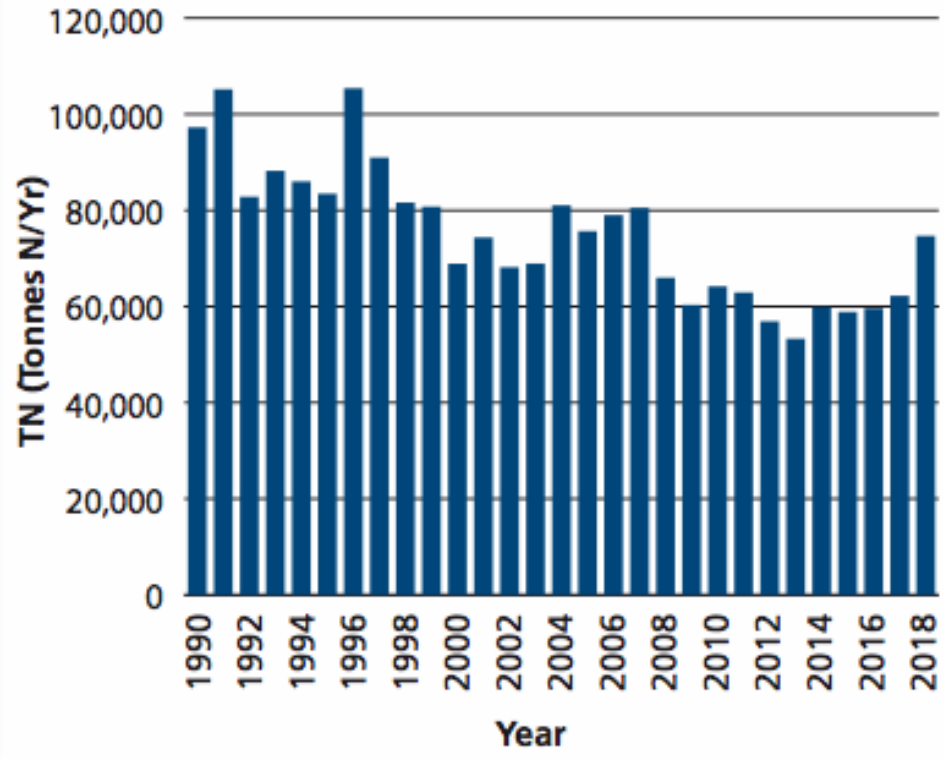
Figure 7.10a Nitrate (left) and phosphorus (right) concentrations in rivers, 2013-2018, showing trends increasing (red dots), stable (yellow dots) and decreasing (blue dots) (Source: EPA)

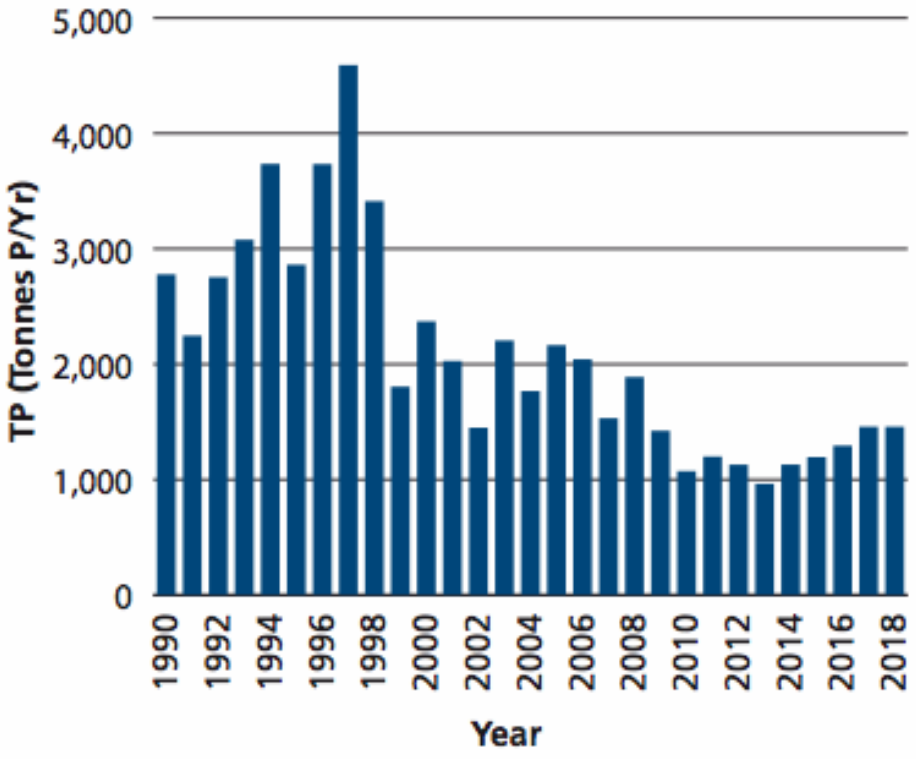


EPA 2020

Water Quality - Trends

Figure 7.10b Annual loads of total nitrogen (TN; left) and total phosphorus (TP; right) from rivers to the sea, 1990-2018. Loads of TN and TP have increased by 8800 (16%) tonnes and 326 (31%) tonnes, respectively, since 2012-2014 (Source: EPA)





What Can Farmers Do?

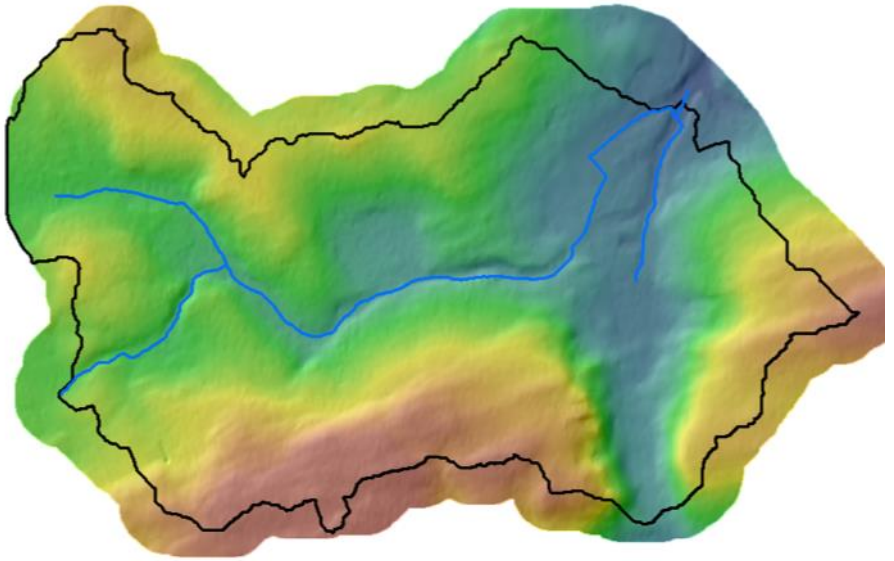
1. Soil Test and NMP

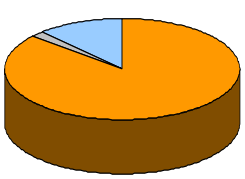
Table 6-1: The Soil Index system		
Soil Index	**Index description**	**Response to fertilizers**
1	Very low	Definite
2	Low	Likely
3	Medium / Adequate	Unlikely / Tenuous
4	Sufficient / High	None

Table 6-4: The P Index system		
Soil P Index	**Soil P ranges (mg/l)**	
	Grassland crops	**Other crops**
1	0.0 – 3.0	0.0 – 3.0
2	3.1 – 5.0	3.1 – 6.0
3	5.1 – 8.0	6.1 – 10.0
4	Above 8.0	Above 10.0

Wall and Plunkett 2020

Timoleague Catchment

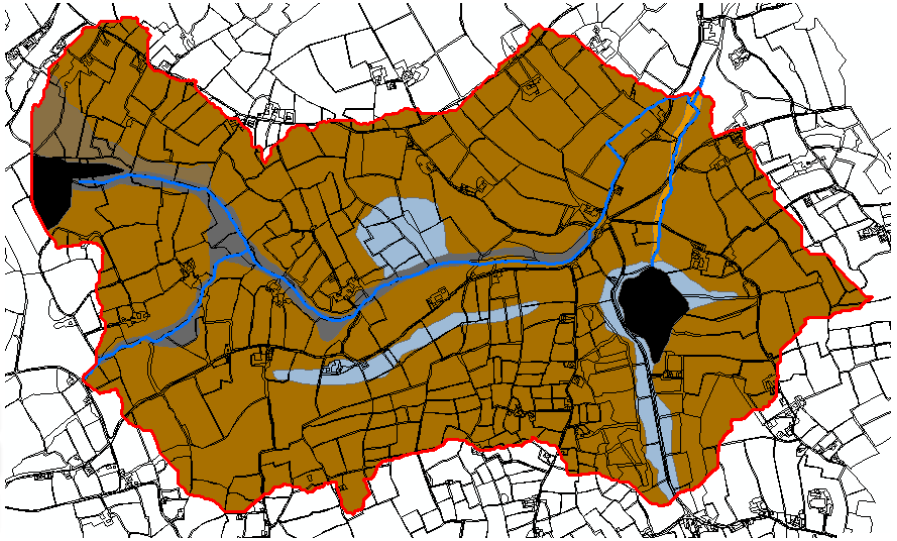




Well drained

Imperfectly drained

Poorly drained



Typical Brown Earth

Typical Brown Alluvial Soil

Stagnic Brown

Gleyic Brown Alluvial

Surface-water Gley

Peat

N

0 1080

Meters

Teagasc

Agriculture and Food Development Authority

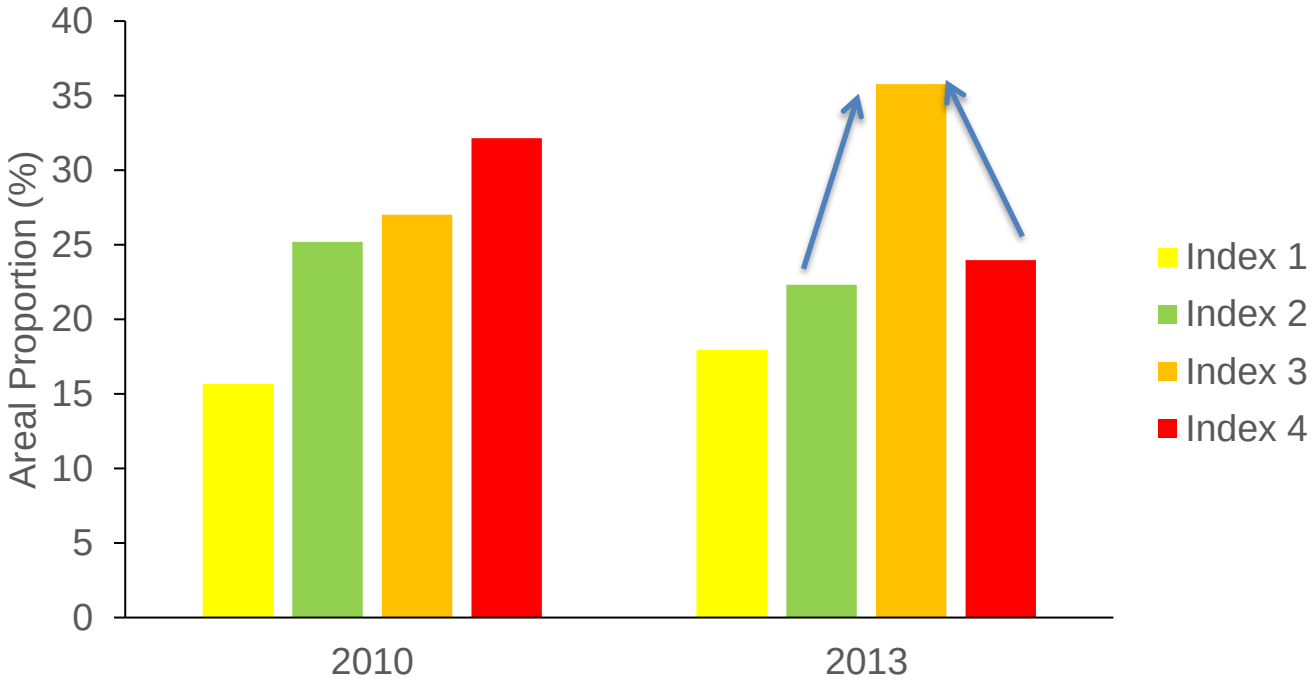
Agricultural Catchments Programme

Timoleague Catchment

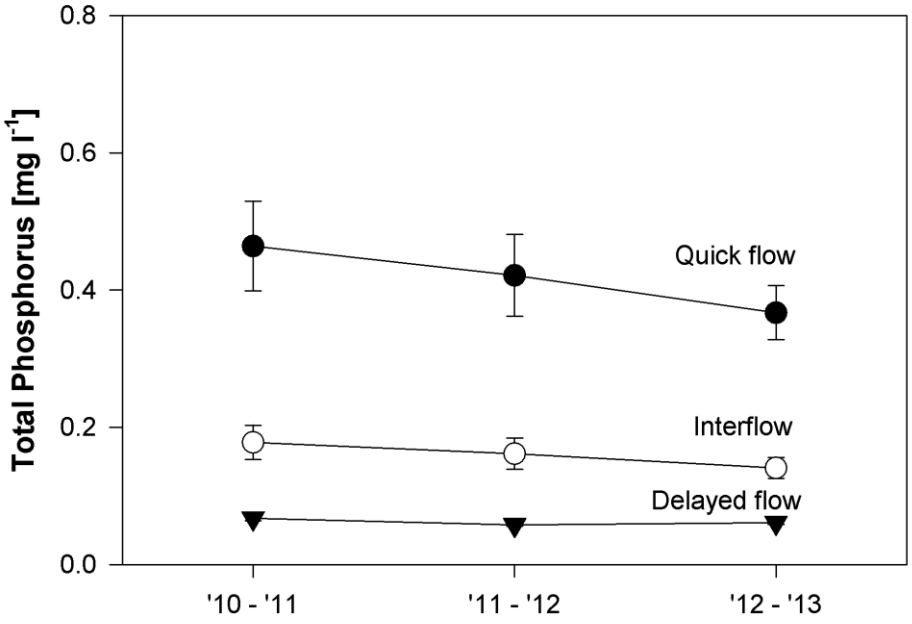
Teagasc
Agriculture and Food Development Authority

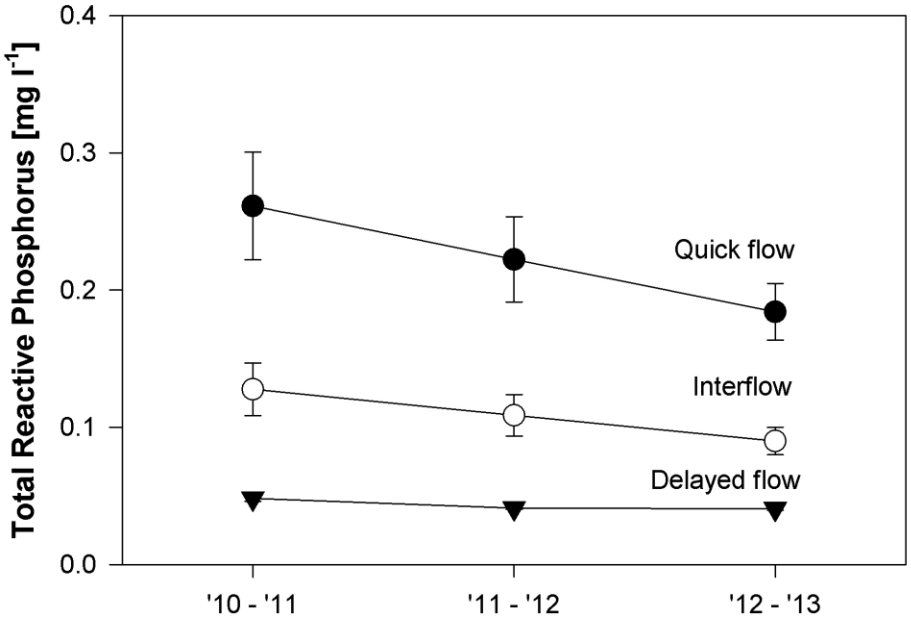
Agricultural Catchments Programme

Soil P Status

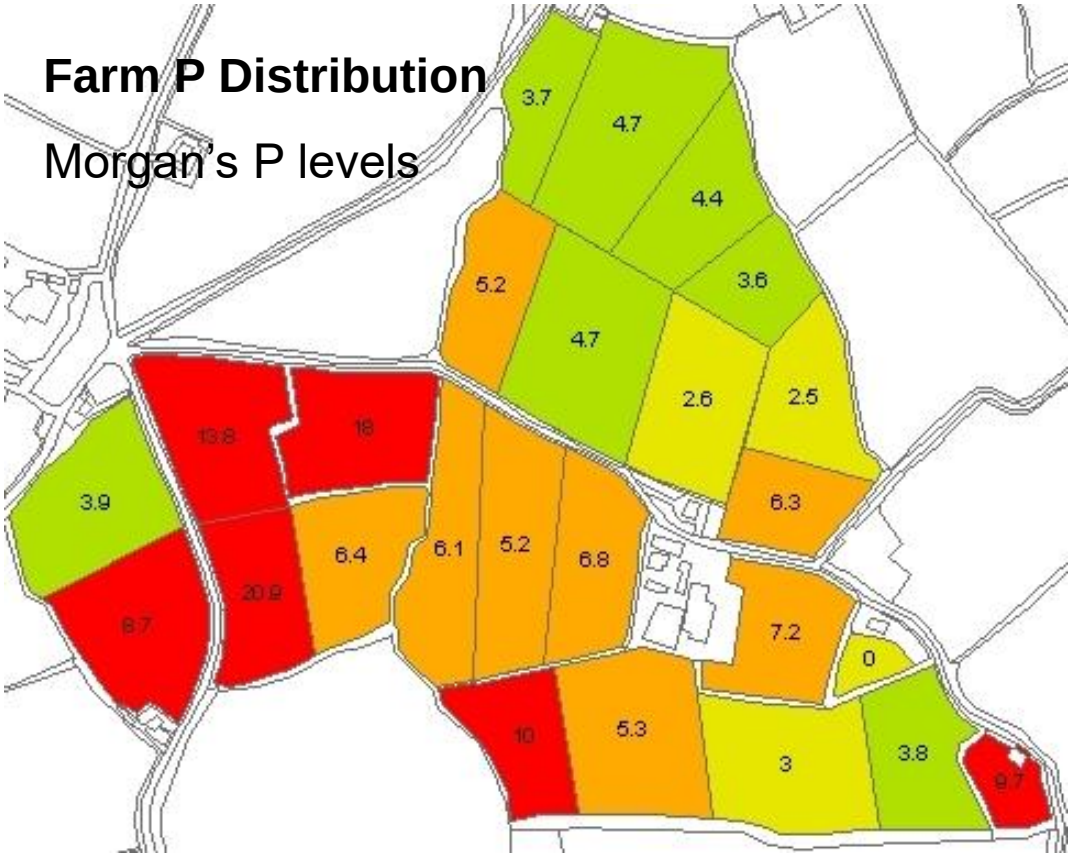


‘Closed Period’ Stream P Concentrations



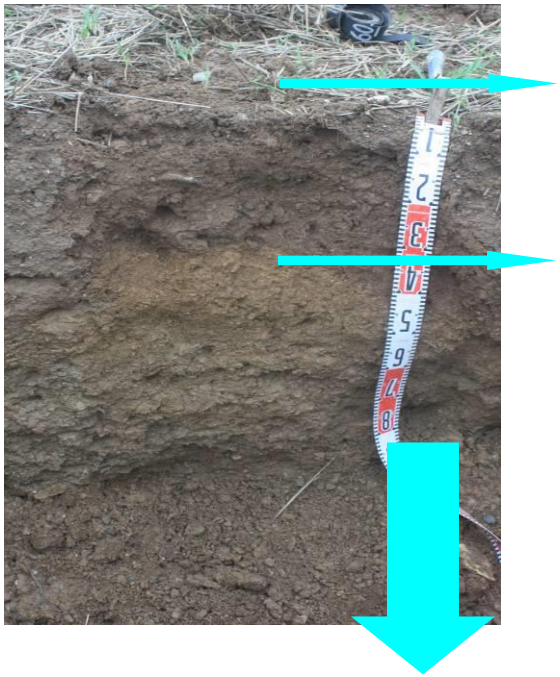


Soil Test P Index - Farm



2. Soil Type is Important

Well Drained
Brown Earth



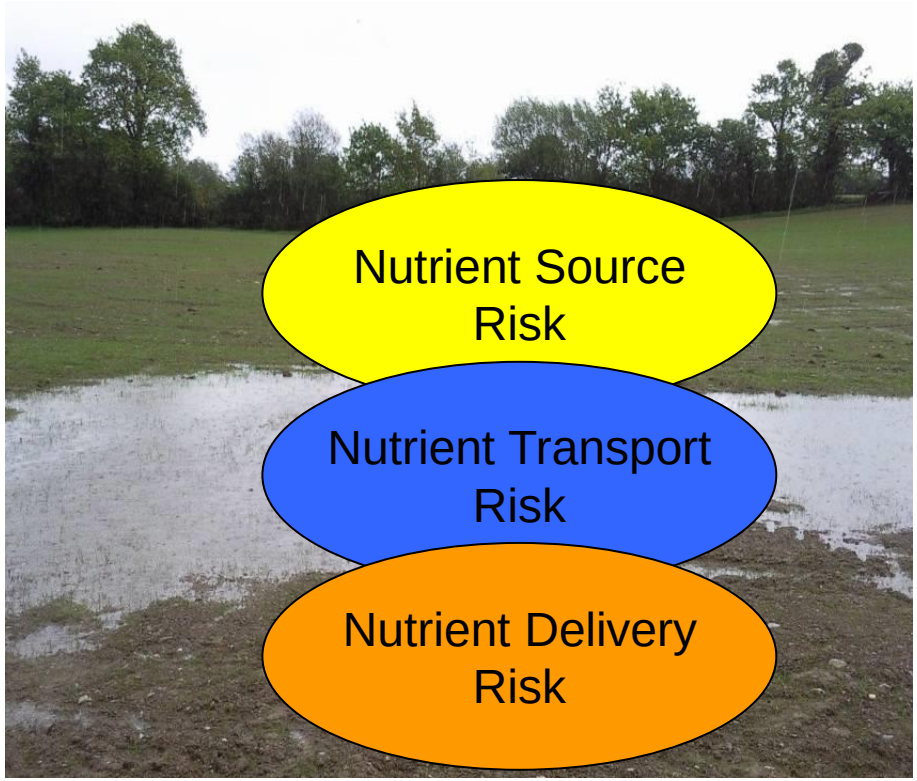
N Risky

Poorly Drained
Gleysol

P Risky

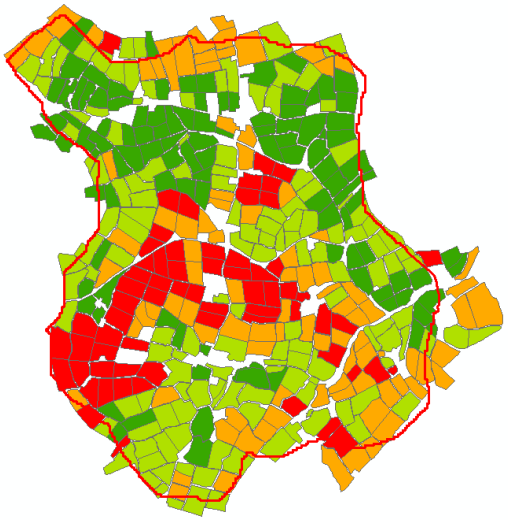
Critical Source Areas

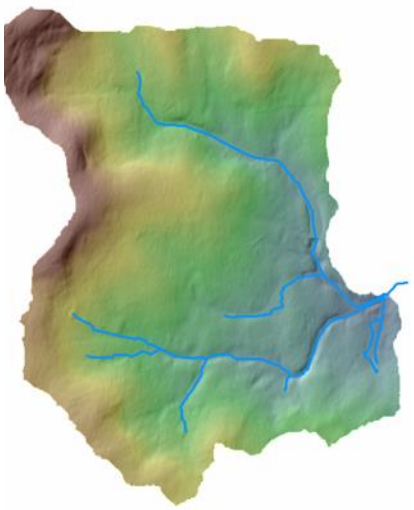
- Small area can contribute large nutrient losses over short time periods
- 90 % P from <10 % land in few events
- Critical Source Areas (CSA)
- Focus for management
- Increase effectiveness and efficiency of measures

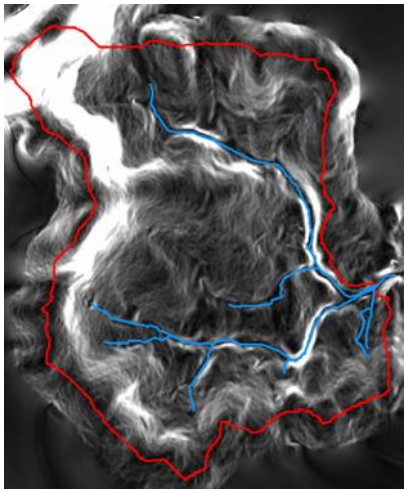


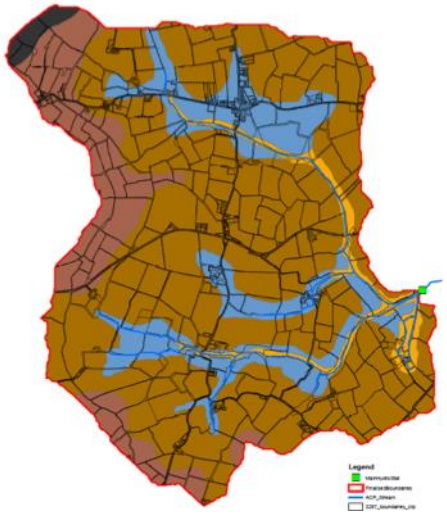
Critical Source Areas

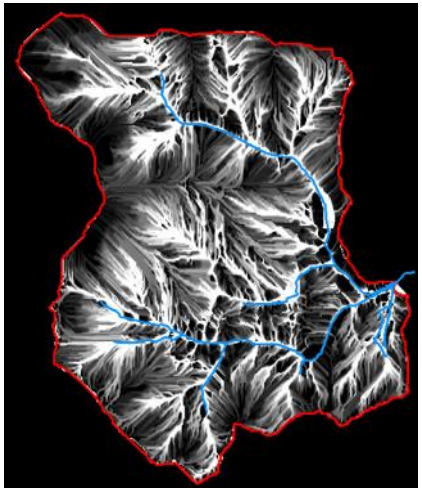
Critical Source Area Factors

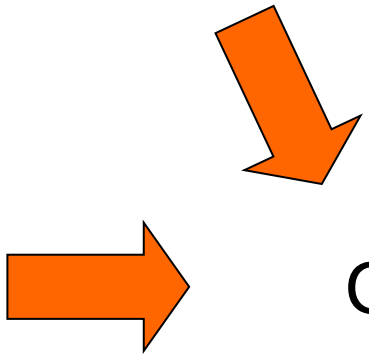






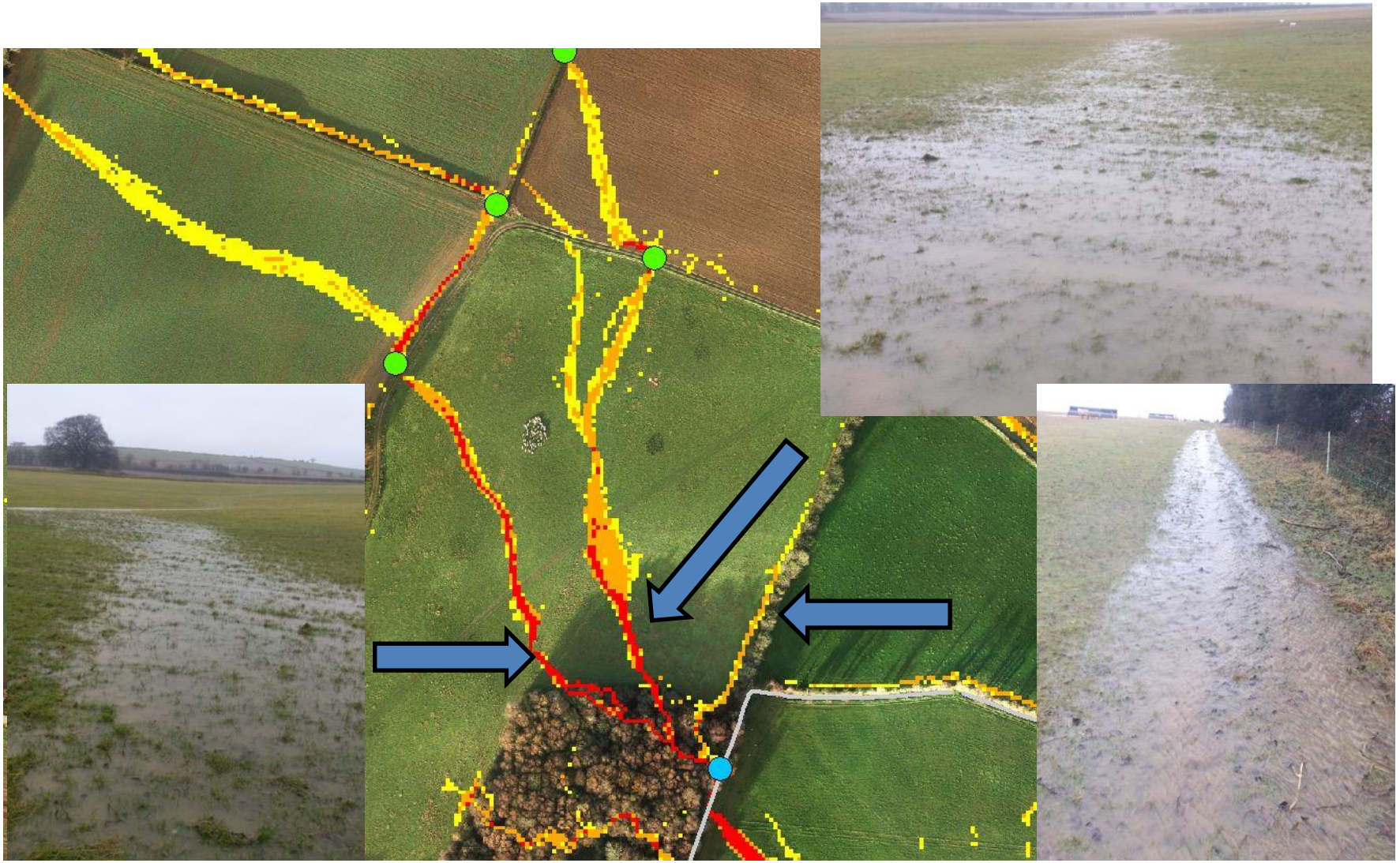






CSAs

Critical Source Areas



Critical Source Areas- Measures

3. Grass/Clover and Multispecies

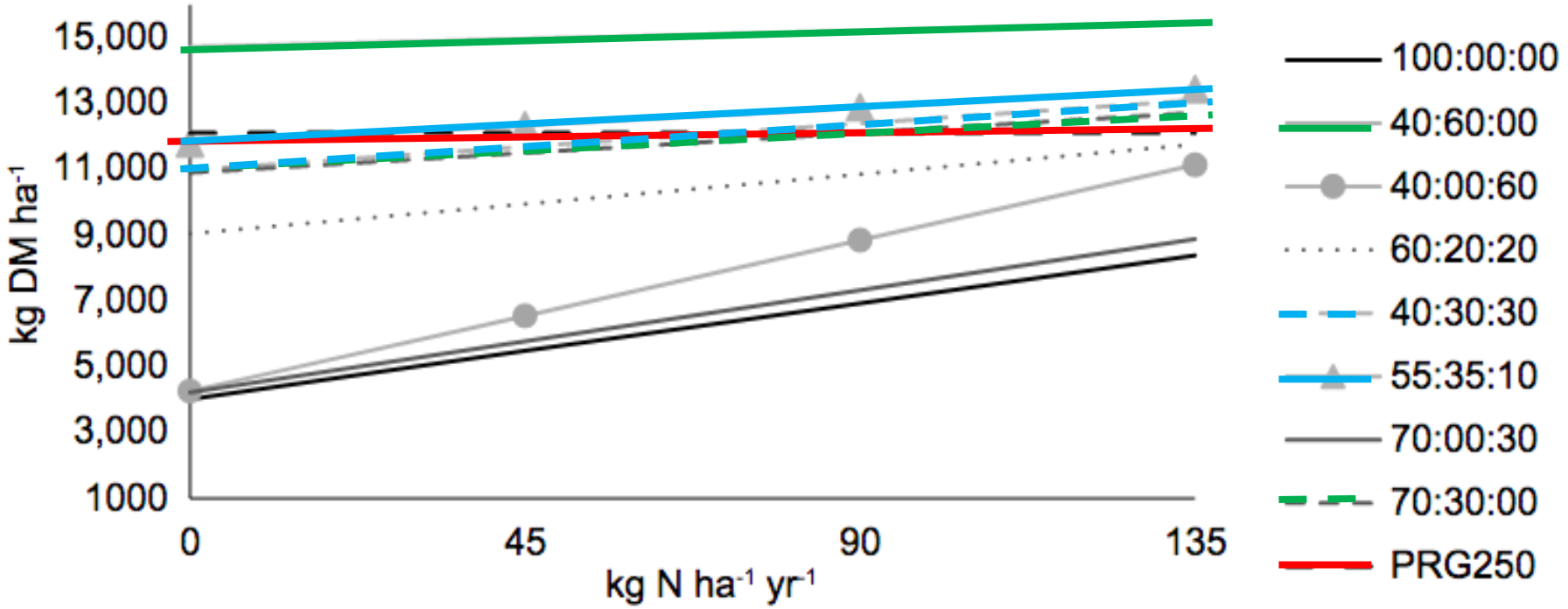


Figure 1. The effect of N application rate on the annual DM production of a range of multispecies swards, compared to a perennial ryegrass only sward receiving 250 kg N ha^{-1} yr^{-1}. Ratios relate to grass : legume : herb proportions (means are an average of the three levels of richness and of the two years).

Grace et al. 2018

Grass/Clover and Multispecies

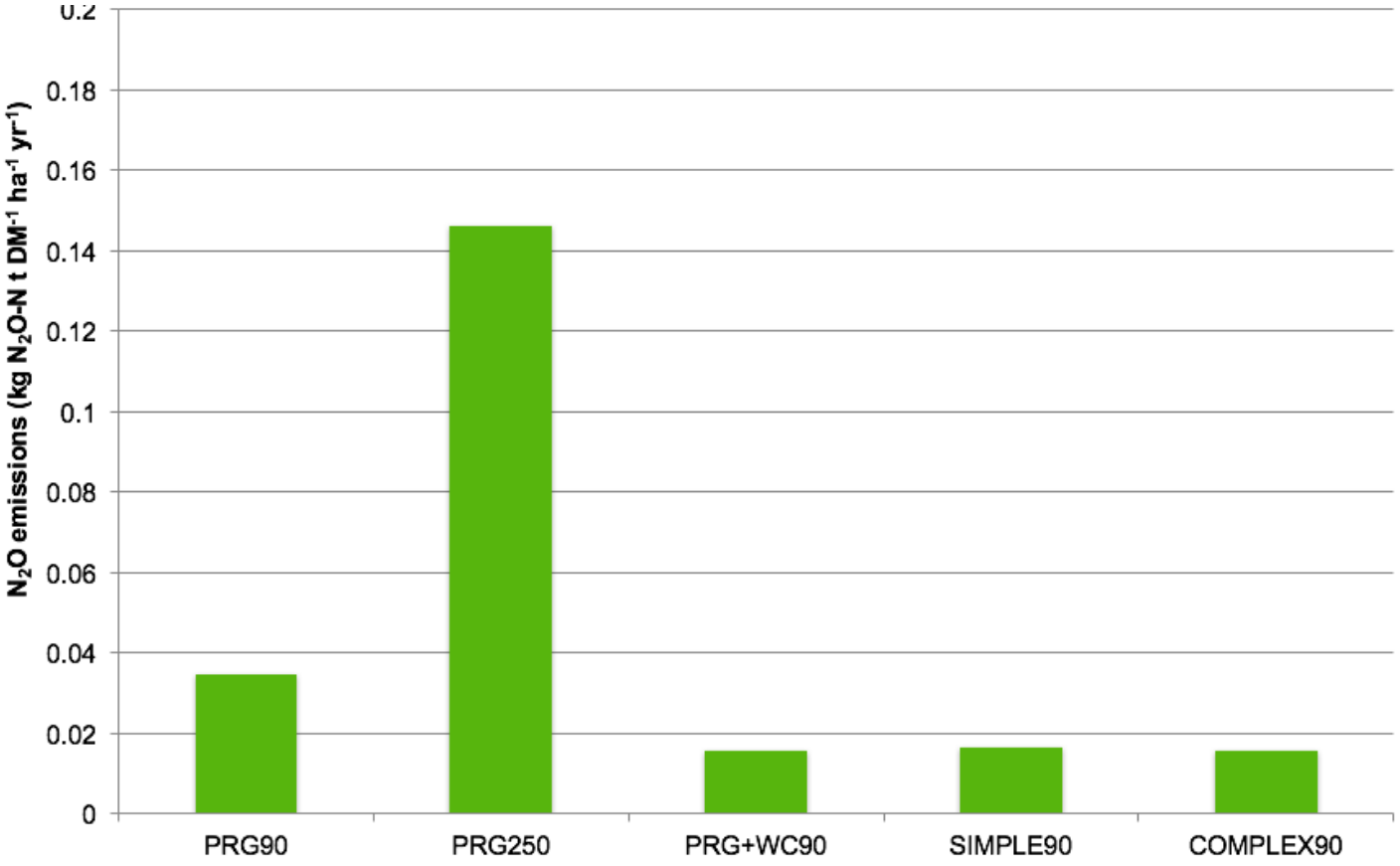


Fig. 2 Estimated N_2O emissions associated with a tonne of grass DM production (kg N emitted as N_2O t DM^{-1} ha^{-1} yr^{-1}), using "Tier 2" EFs of 1.49% for CAN and 0.25% for Urea.

Murphy et al. 2018

Long-term Grazing Platform

UCD Lyons Research Farm

https://globalfarmplatform.org/lyons-farm/

Long-term Grazing Platform

Better Management Practices

- Soil Test regularly- P, K, pH
- Field/paddock scale
- Nutrient Management Plan
- Apply appropriate rates of N and P for crop requirement, soil index and soil type
- Apply at appropriate times
- Avoid application to waterlogged soil/before heavy rain/during winter
- Avoid spreading close to streams/shores
- Buffer Zones- PIP maps
- Fence off watercourses

Better Management Practices

- Ensure sufficient slurry/manure storage- well maintained
- Plan and maintain farm roads to minimise nutrient inputs to streams/drains
- Use low-emission slurry application (trailing shoe/band spreader, shallow injection)
- Use protected urea, where appropriate
- Use grass/clover and multispecies swards
- Manage (minimise) fertiliser N appropriately for these swards
- Maintain winter cover crop
- Contour plough

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