

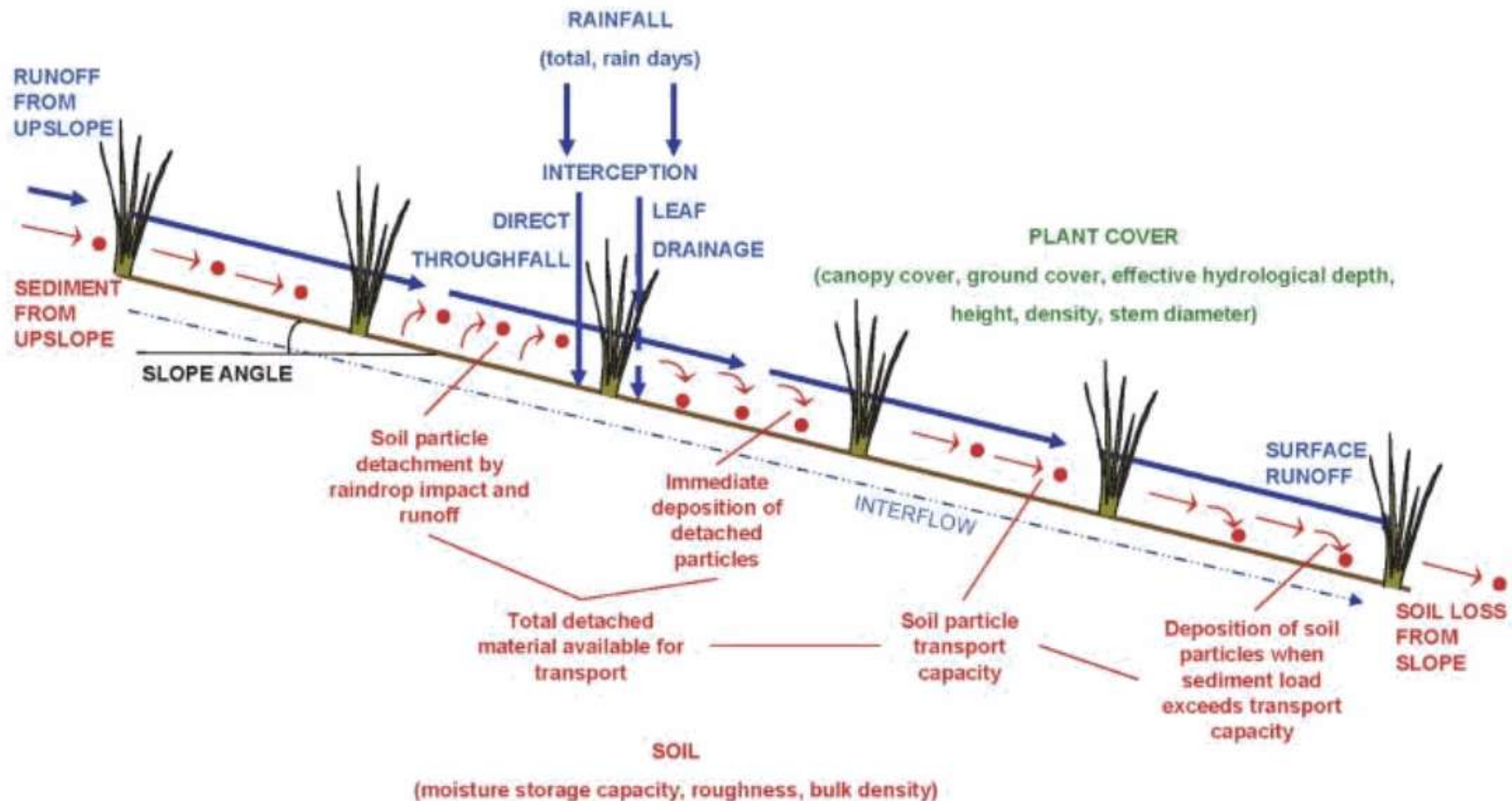
Evaluation of the Modified Morgan-Morgan-Finney Model for Predicting the Impact of Soil Erosion on Water Quality

Bonnie Mercer

Aim

- to evaluate the modified MMF model for predicting the impact of field scale erosion on water quality

The model links together the empirical relationships describing soil erosion - rainfall, run-off, detachment, transport capacity, and deposition

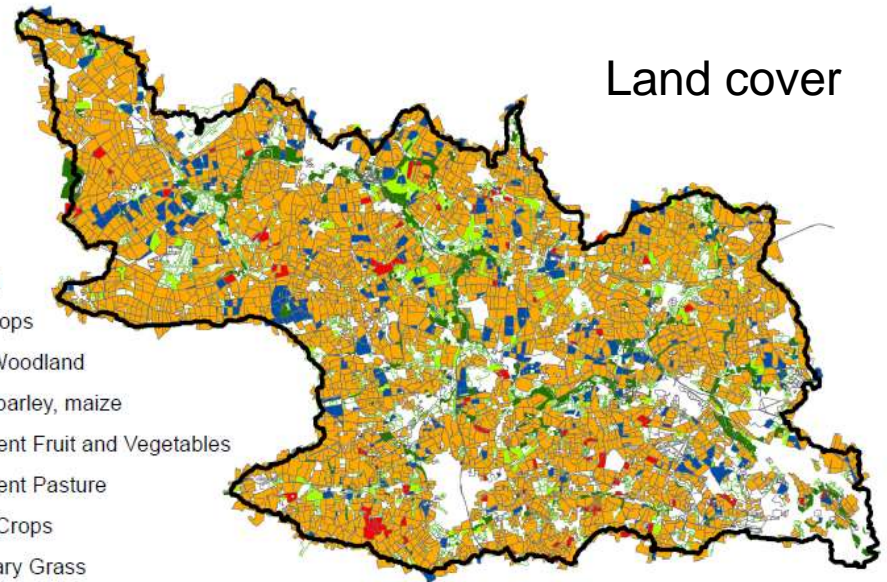


Input data

Land cover

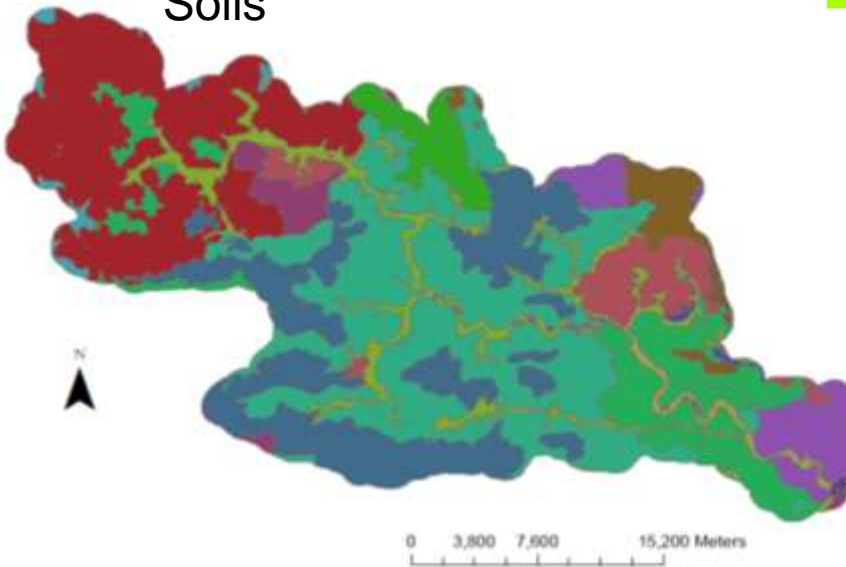
Legend

- General
- Other crops
- Forest/Woodland
- Wheat, barley, maize
- Permanent Fruit and Vegetables
- Permanent Pasture
- Protein Crops
- Temporary Grass



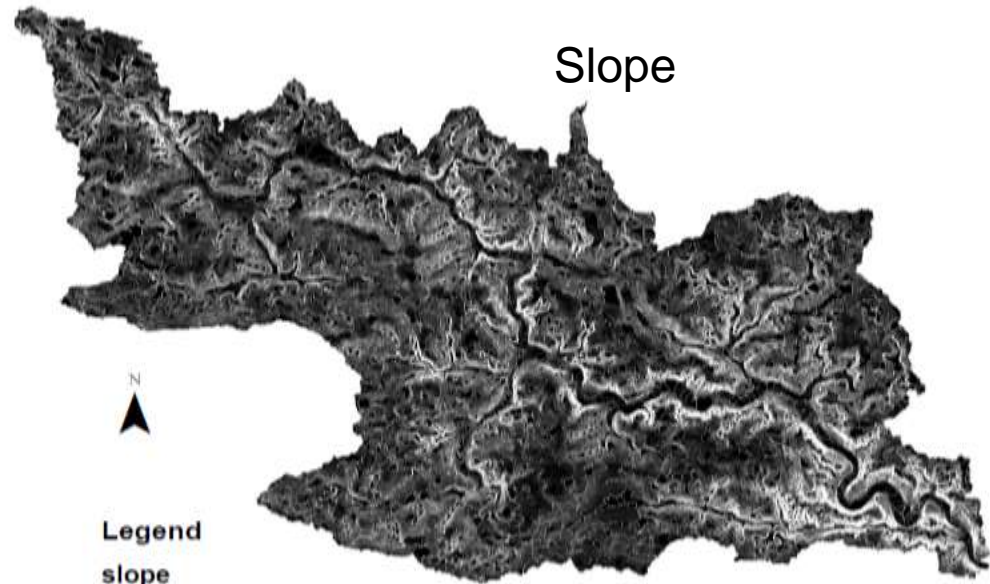
0 4,000 8,000 16,000 Meters

Soils



0 3,800 7,600 15,200 Meters

Slope



Legend

slope

Value

High : 32.2468

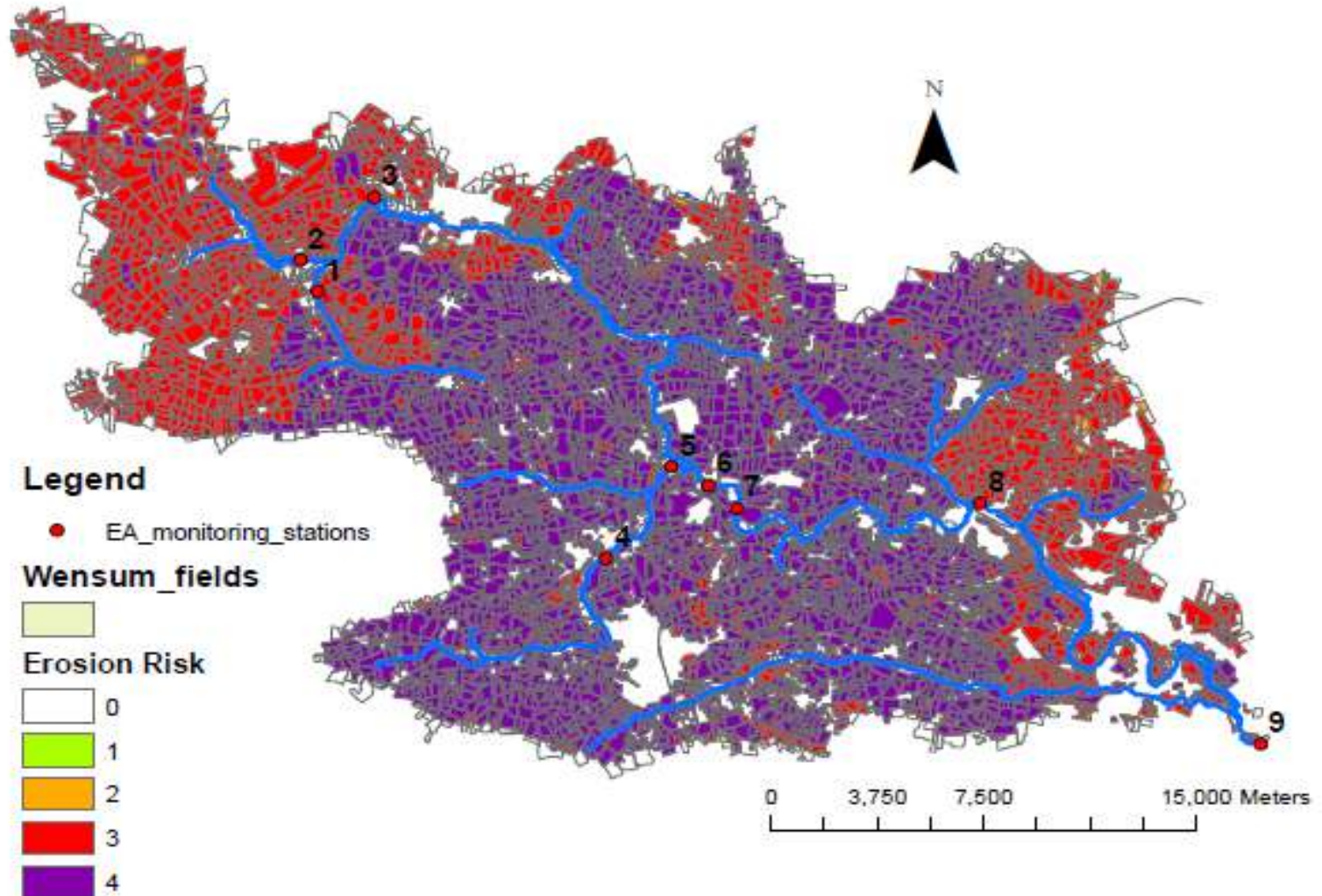
Low : 0

0 3,375 6,750 13,500 Meters

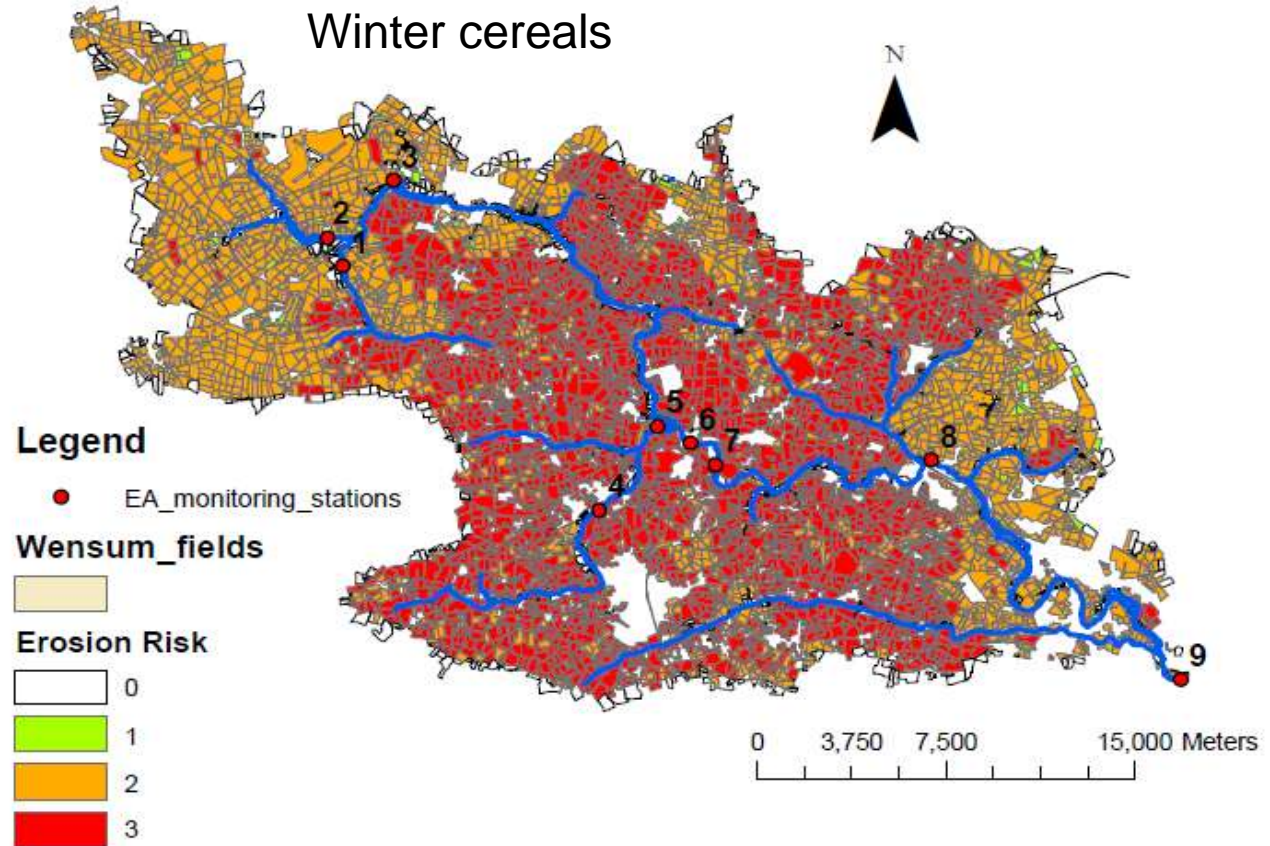
Climate

Wensum Erosion risk

Maize



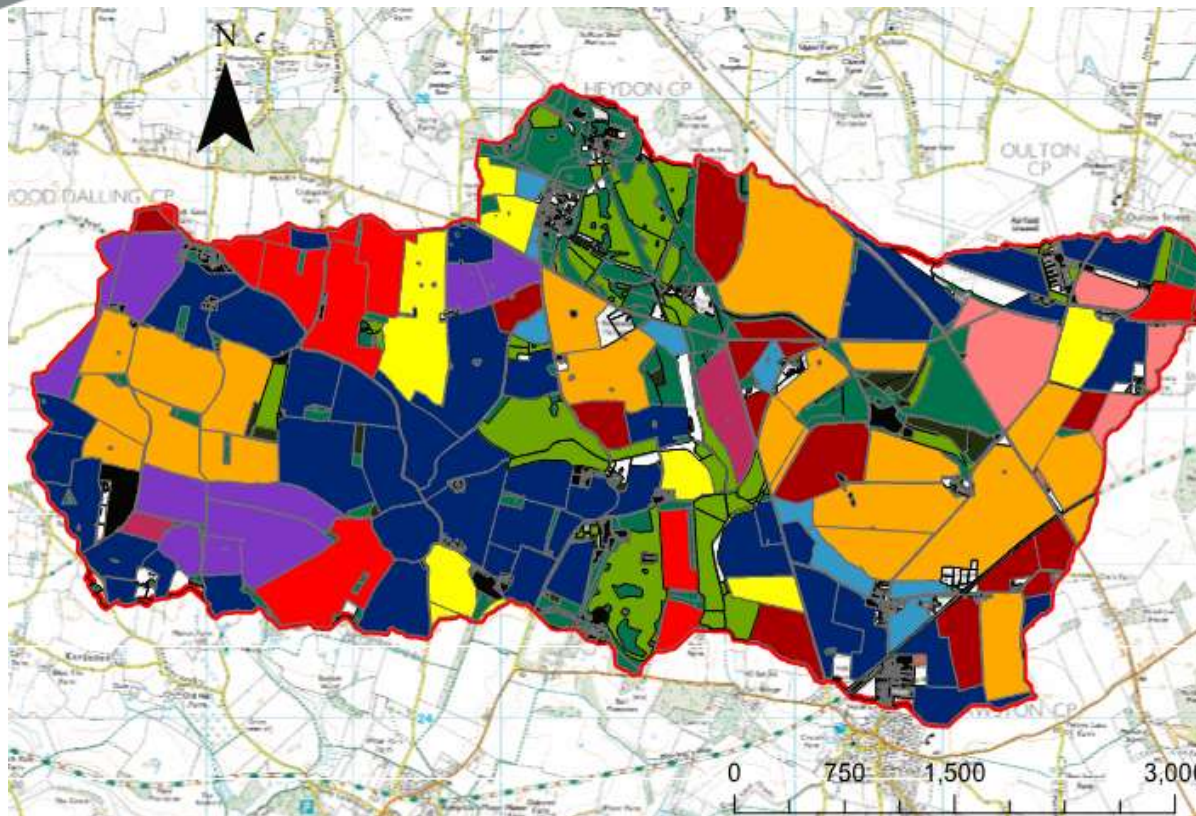
Wensum Erosion risk



Woodland < Pasture < Winter cereals < Spring cereals < Maize < Field beans

Max							
t/ha/a	0.33	0.53	1.82	2.11	3.96	4.81	

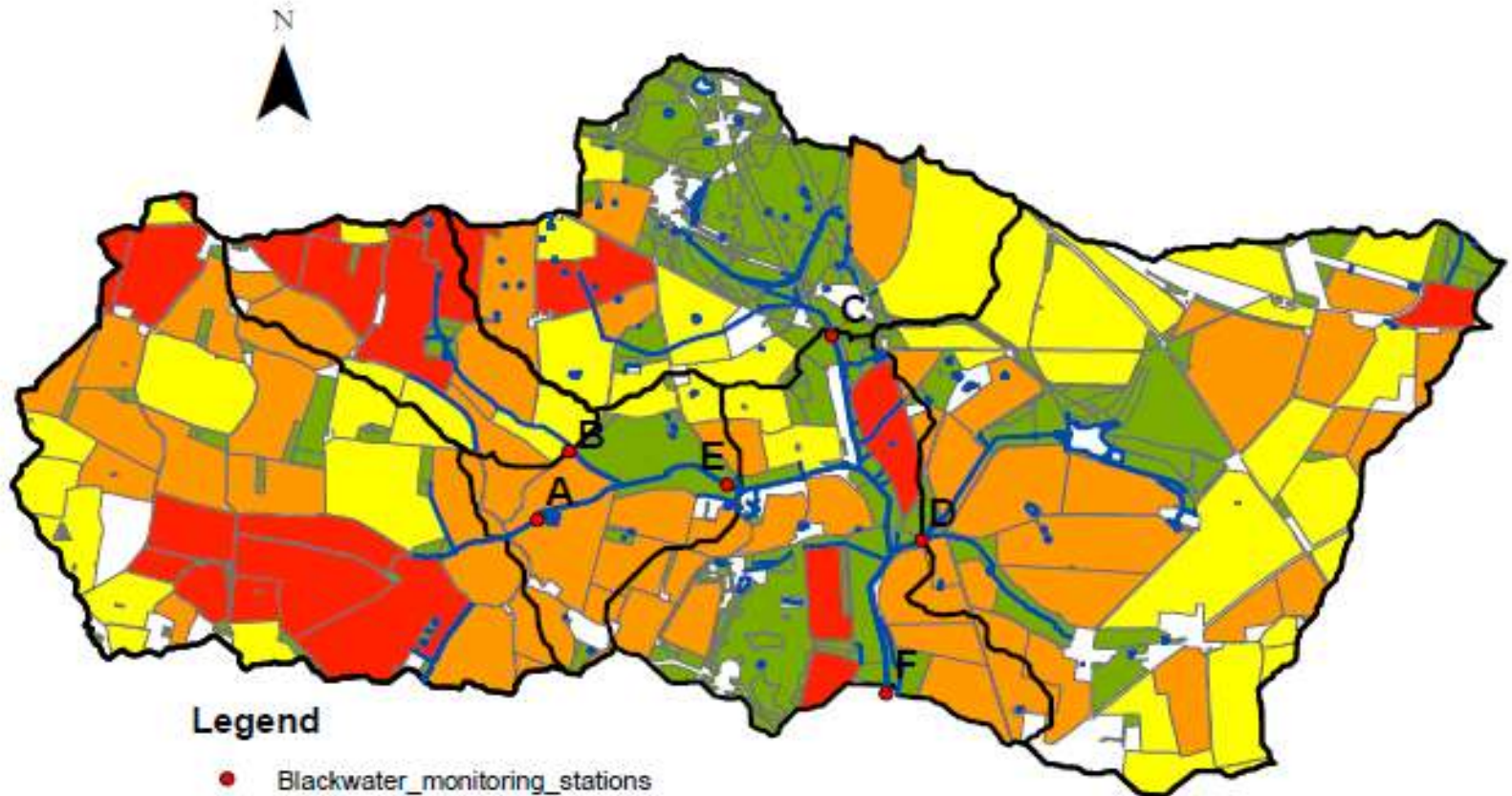
Blackwater subcatchment



Legend



Blackwater subcatchment



Legend

● Blackwater_monitoring_stations

Field risk t/ha/a



0



0-0.5



0.5-1.0



1.0-2.0

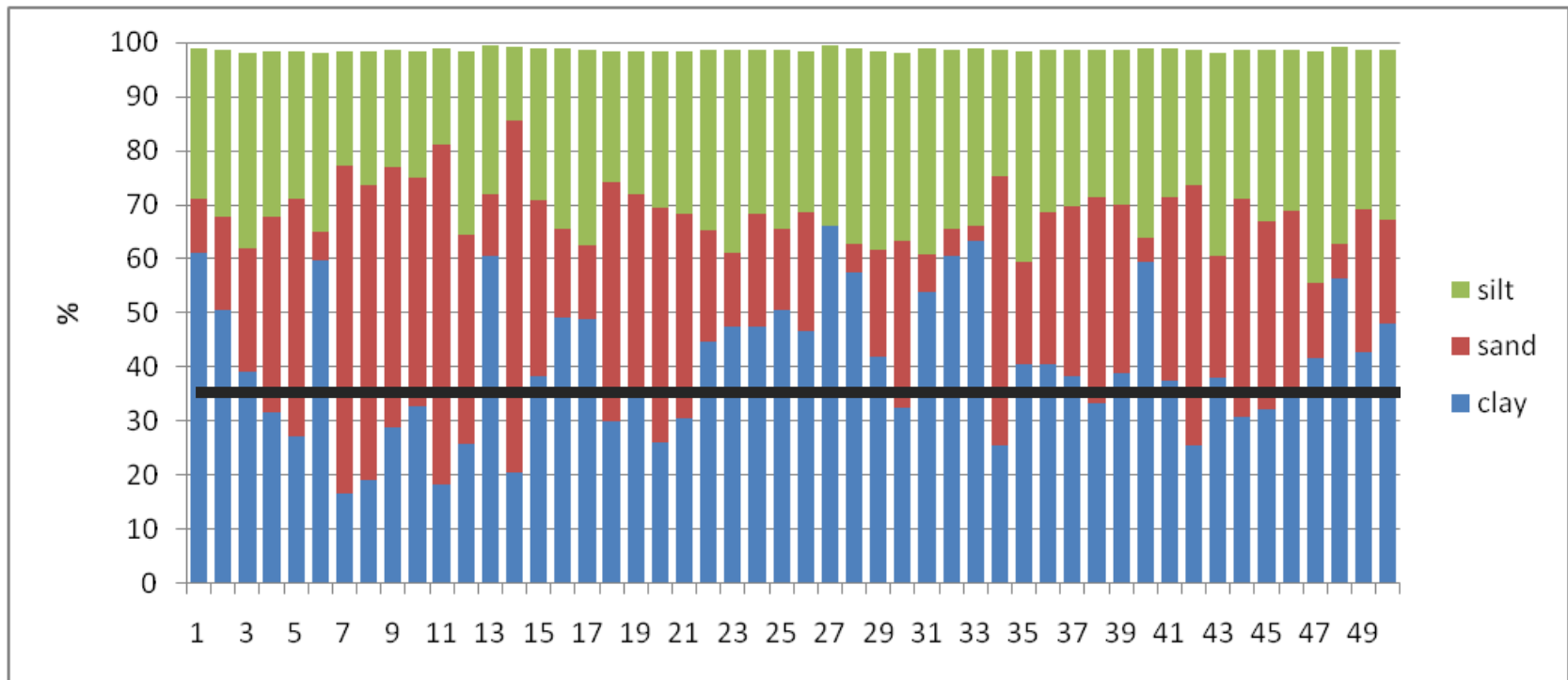


2.0-5.0

0 750 1,500 3,000 Meters

Soil erosion risk map based on
actual 2010 land use

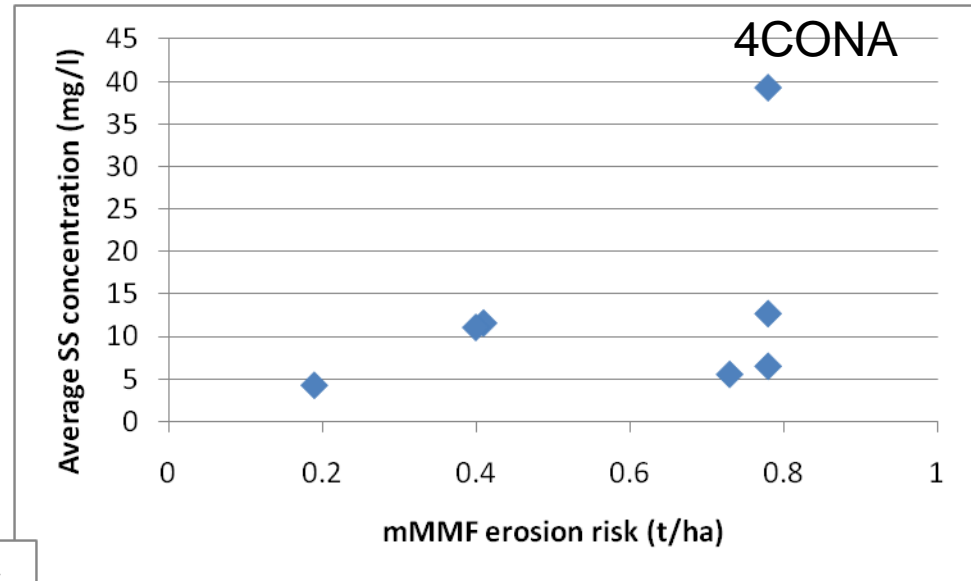
Topsoil texture



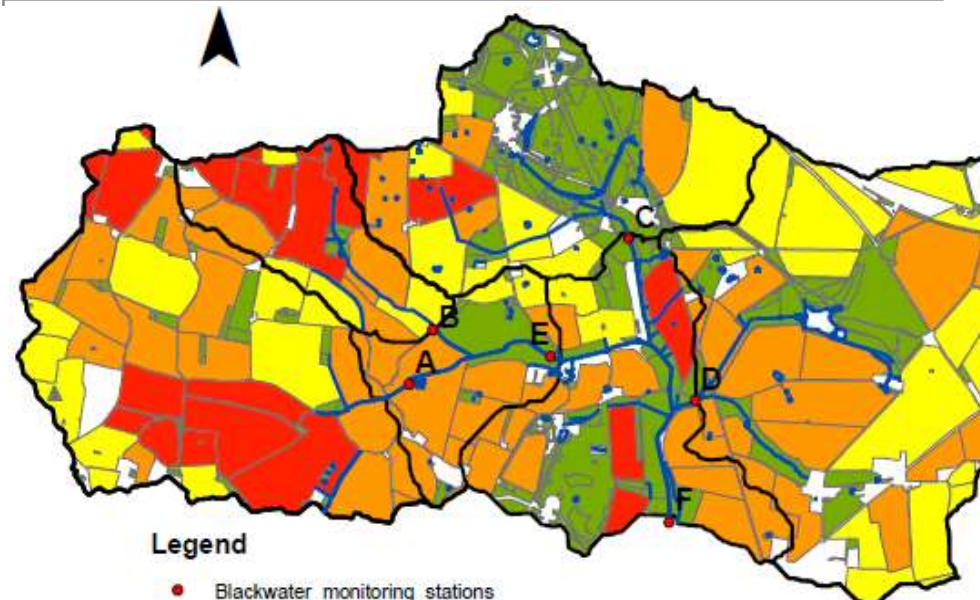
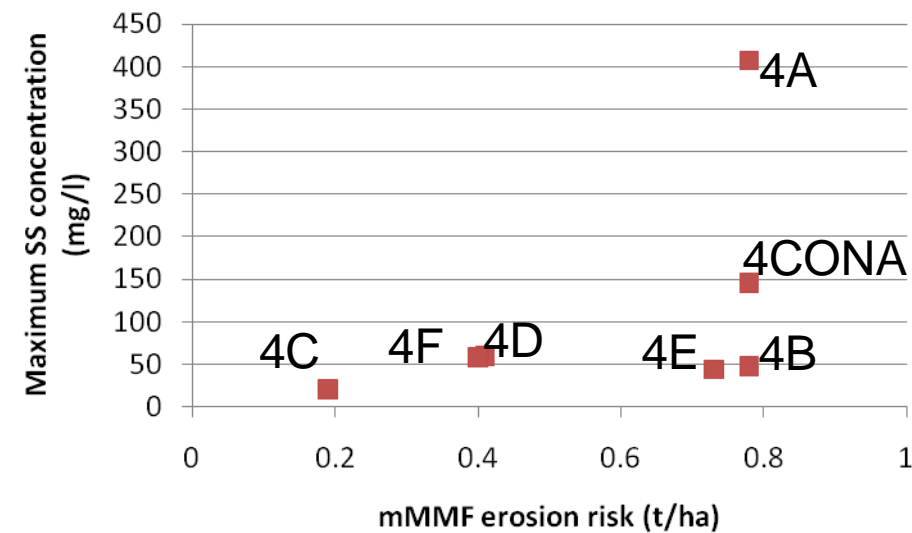
Source: BGS

Relationship with water quality

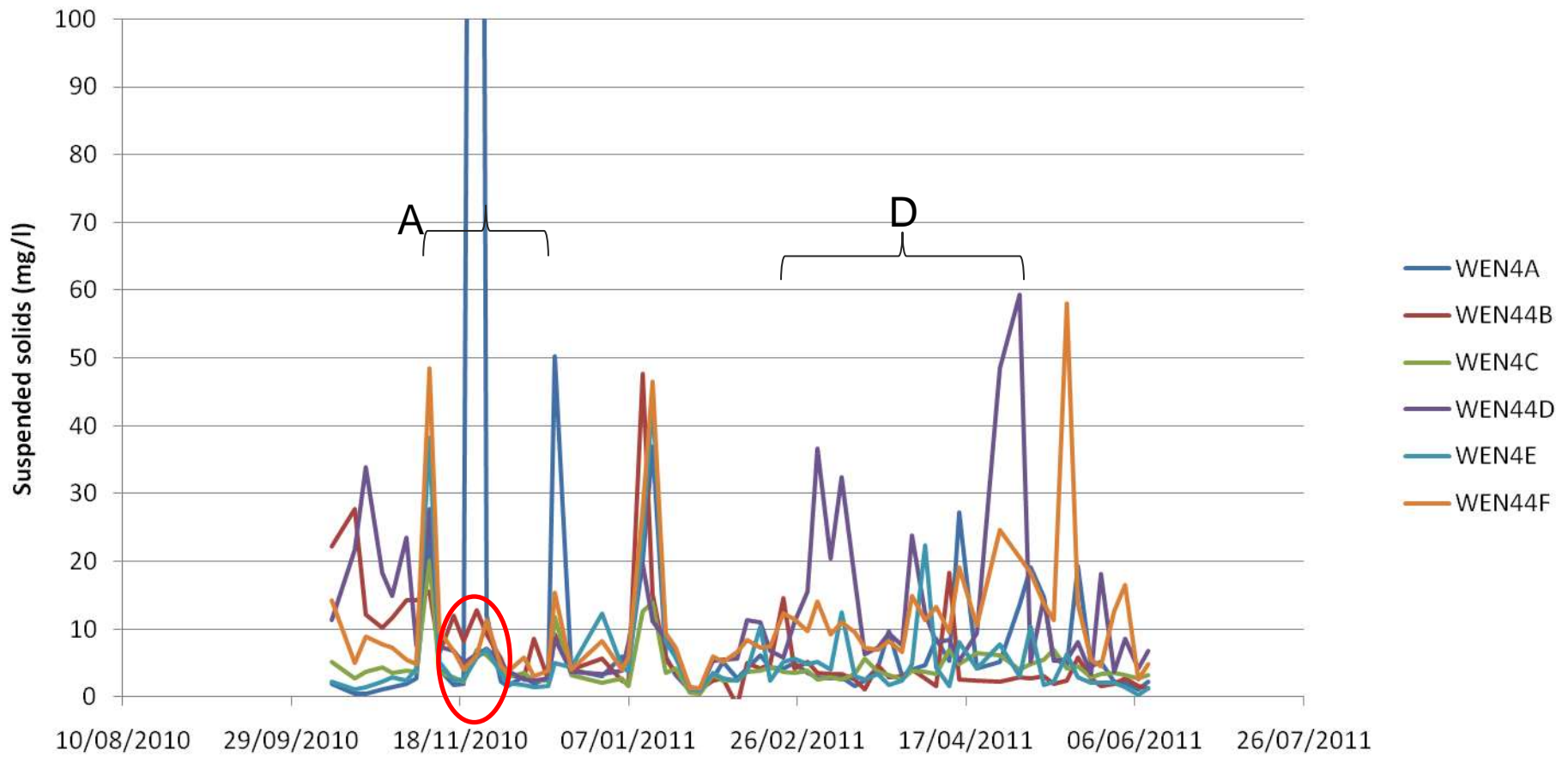
Average



Maximum



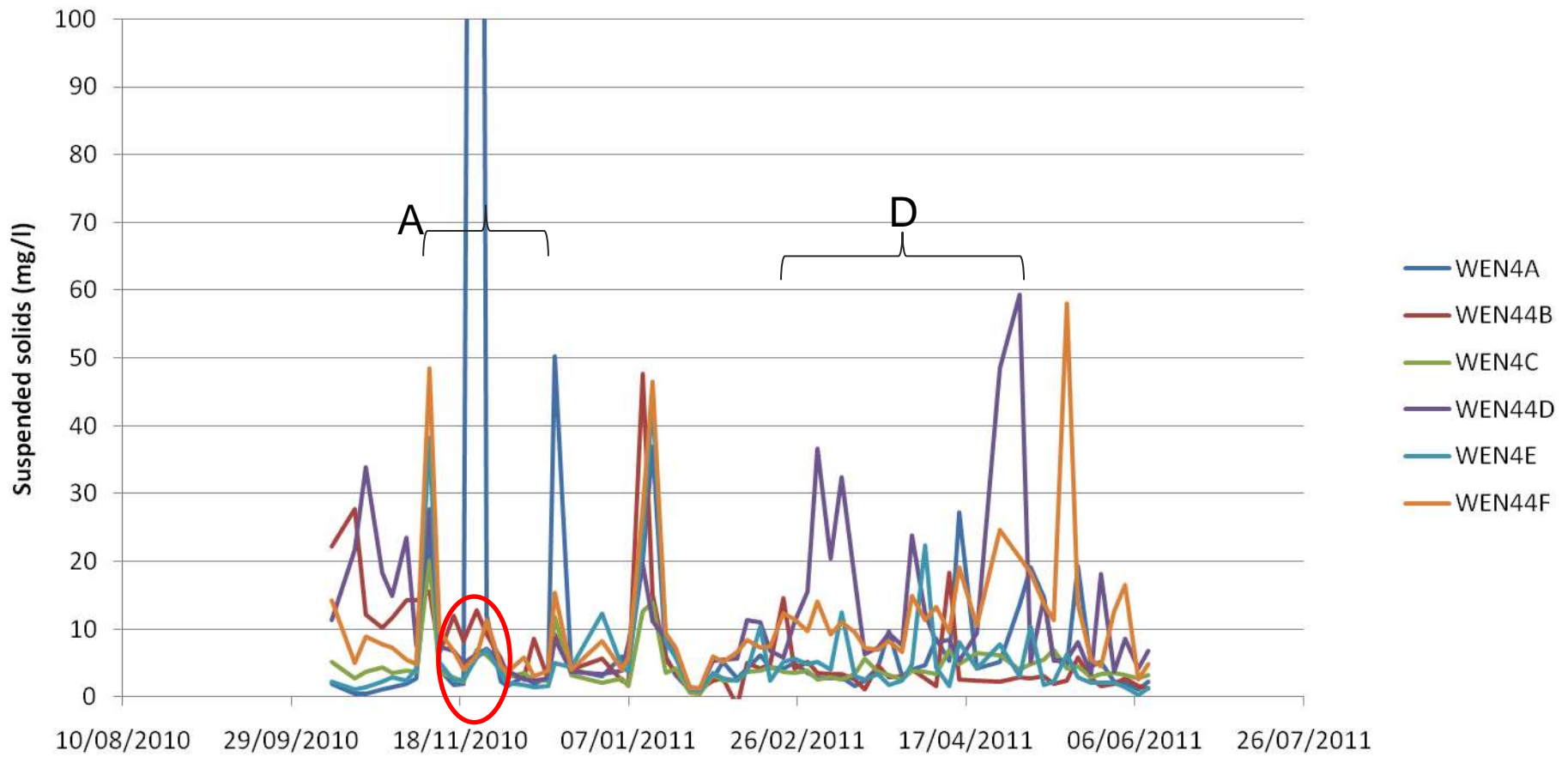
UEA grab samples



November 2010



UEA grab samples



- Erosion risk in the Wensum is mostly a function of crop type and slope (also soil)
- Role of under-drains
- Areas of predicted high soil loss do not necessarily have a detrimental impact on water quality
- Importance of connectivity within landscape and in-channel processes
- Avoid high risk crops on high risk areas (slopes + connectivity)