

South Downs Way Ahead Nature Improvement Area



South Downs Collaborative Nitrate Modelling Project



Downs & Harbours
Clean Water
Partnership



Chris.Manning@southdowns.gov.uk

Introduction



- Component of 'South Downs Way Ahead Nature Improvement Area' (NIA).
- Principal aim: production of compelling evidence to support existing or new initiatives to deliver groundwater quality improvements through sustainable land management.

Introduction



- Initiatives include:
 - catchment management schemes (e.g. CSF partnerships or water company funded actions);
 - environmental stewardship schemes;
 - voluntary changes to land management;
 - and,
 - enforcement by EA.

Methodology

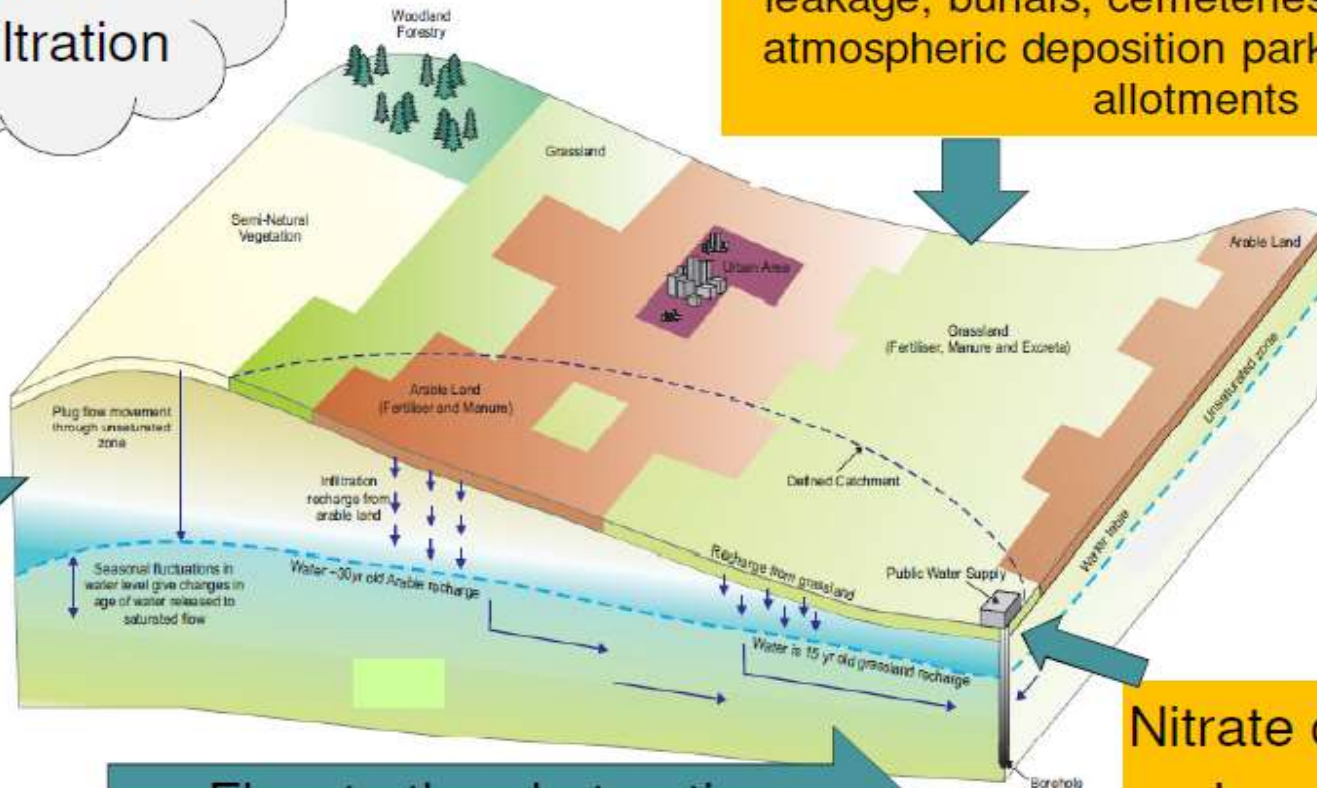
1. Nitrate source apportionment modelling
2. Risk mapping
3. Trend modelling
 - Undertaken at different spatial scales to establish set of potential actions.
 - Action identified for individual PWS abstractions assessed economically to establish most cost effective measure per abstraction.

What catchment data have we looked at?

Rainfall and
infiltration

Land-use – mapping, agricultural, census data, population data, landfill, septic tank and package treatment plant, sewer and mains leakage, burials, cemeteries, urban run-off, atmospheric deposition parks, gardens and allotments

Travel
to
water
table



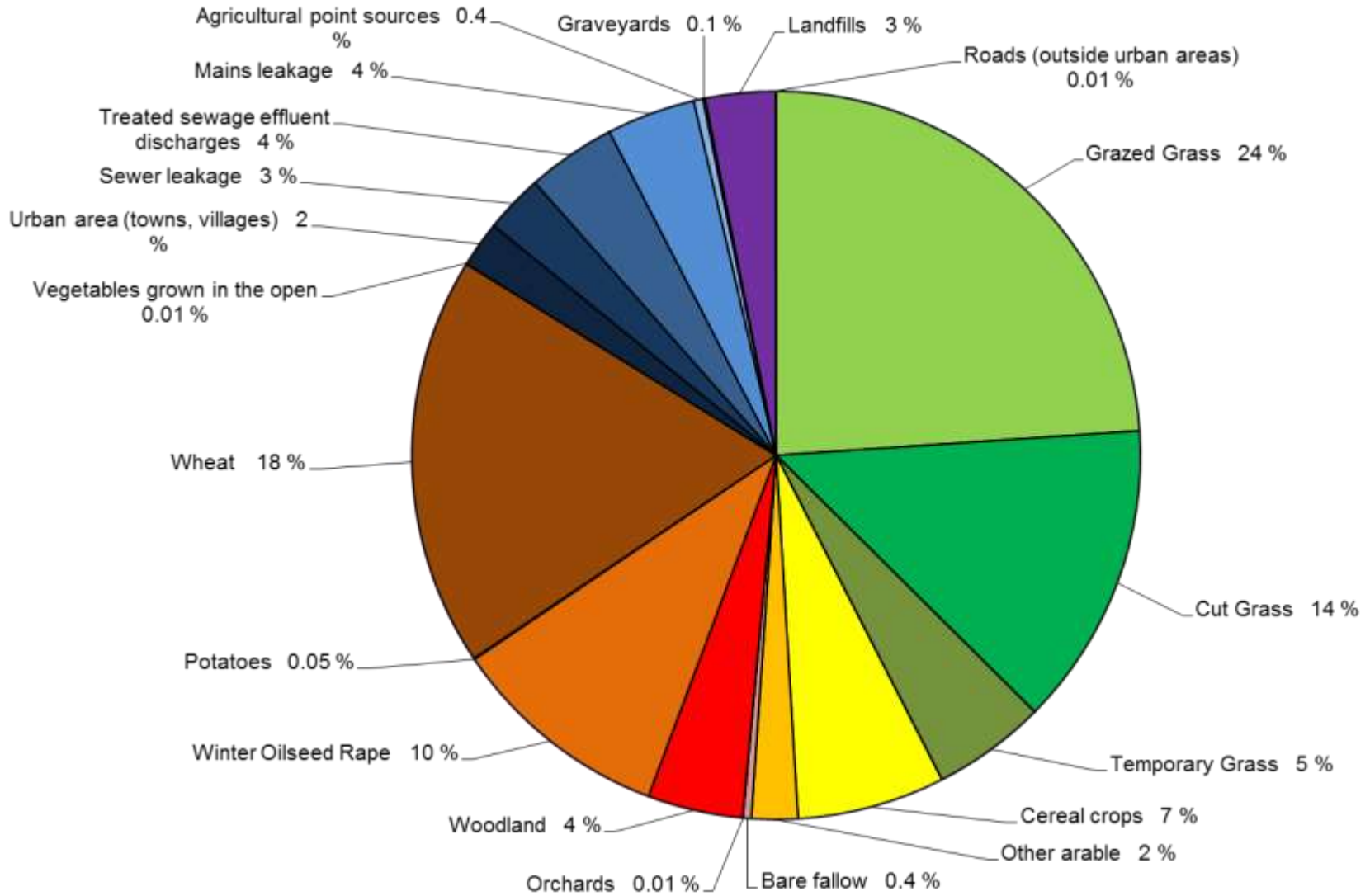
Flow to the abstraction

Nitrate concentration
In groundwater

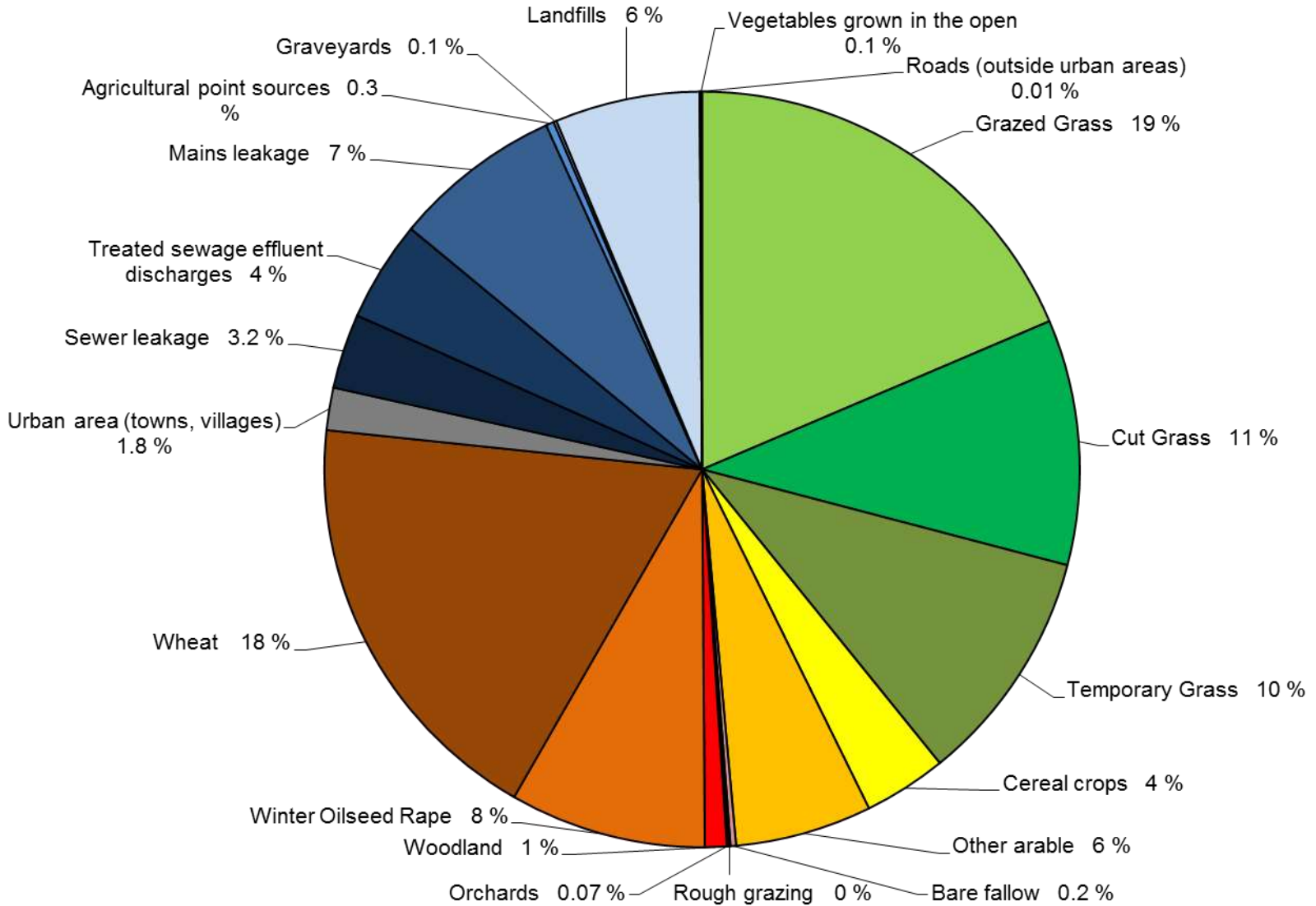
Results

- 3 GWBs in Cuckmere & Pevensy Levels.
- Seaford & Eastbourne Chalk - average observed nitrate 28.9mg/l NO₃, predicted 30mg/l NO₃.
- Lower Greensand - no observed data, predicted 39mg/l NO₃.
- Hastings Beds - average observed nitrate 1.1mg/l NO₃, predicted 26 mg/l NO₃.

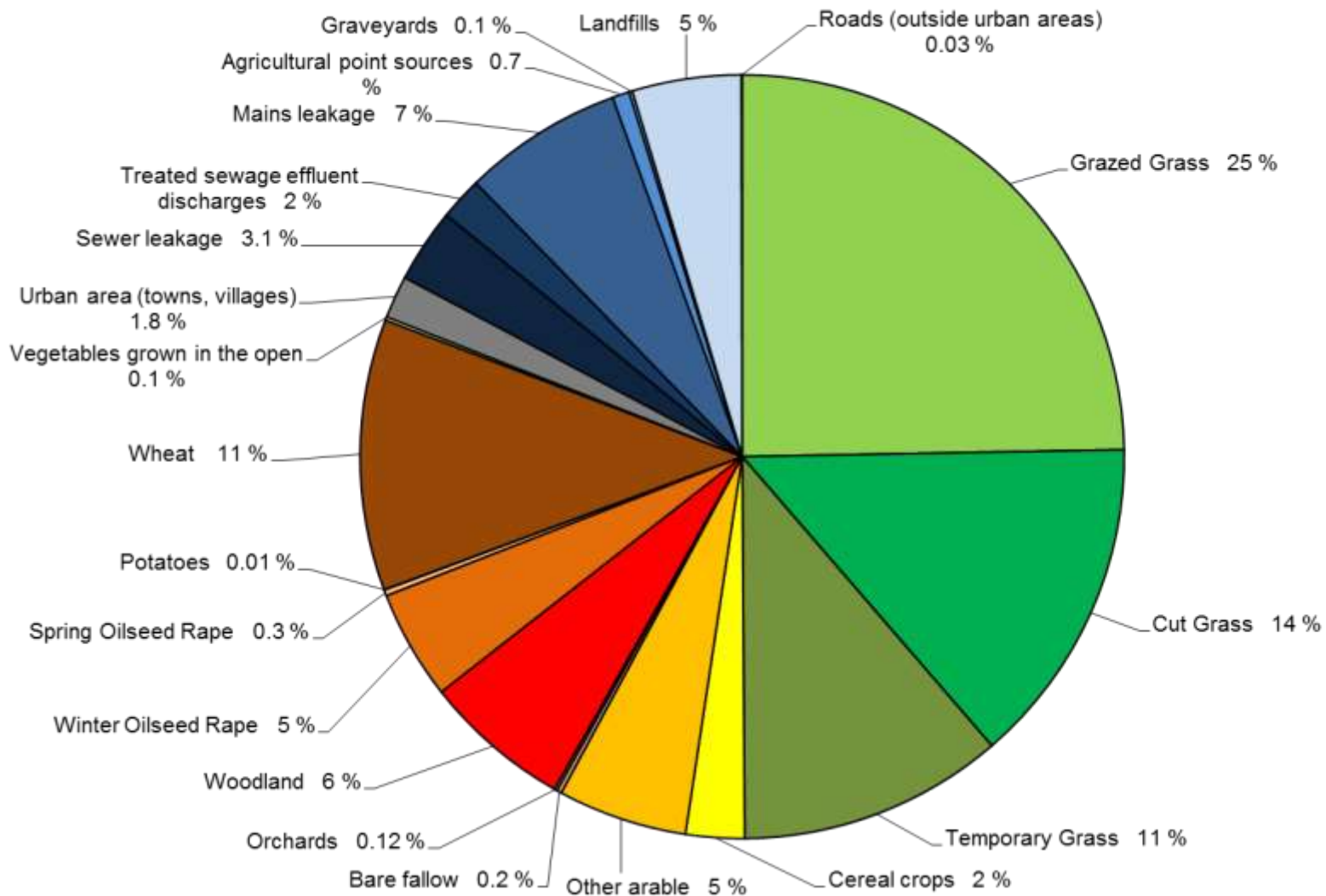
Seaford and Eastbourne Chalk - All N inputs to GW



C&PL Lower Greensand - All N inputs to GW



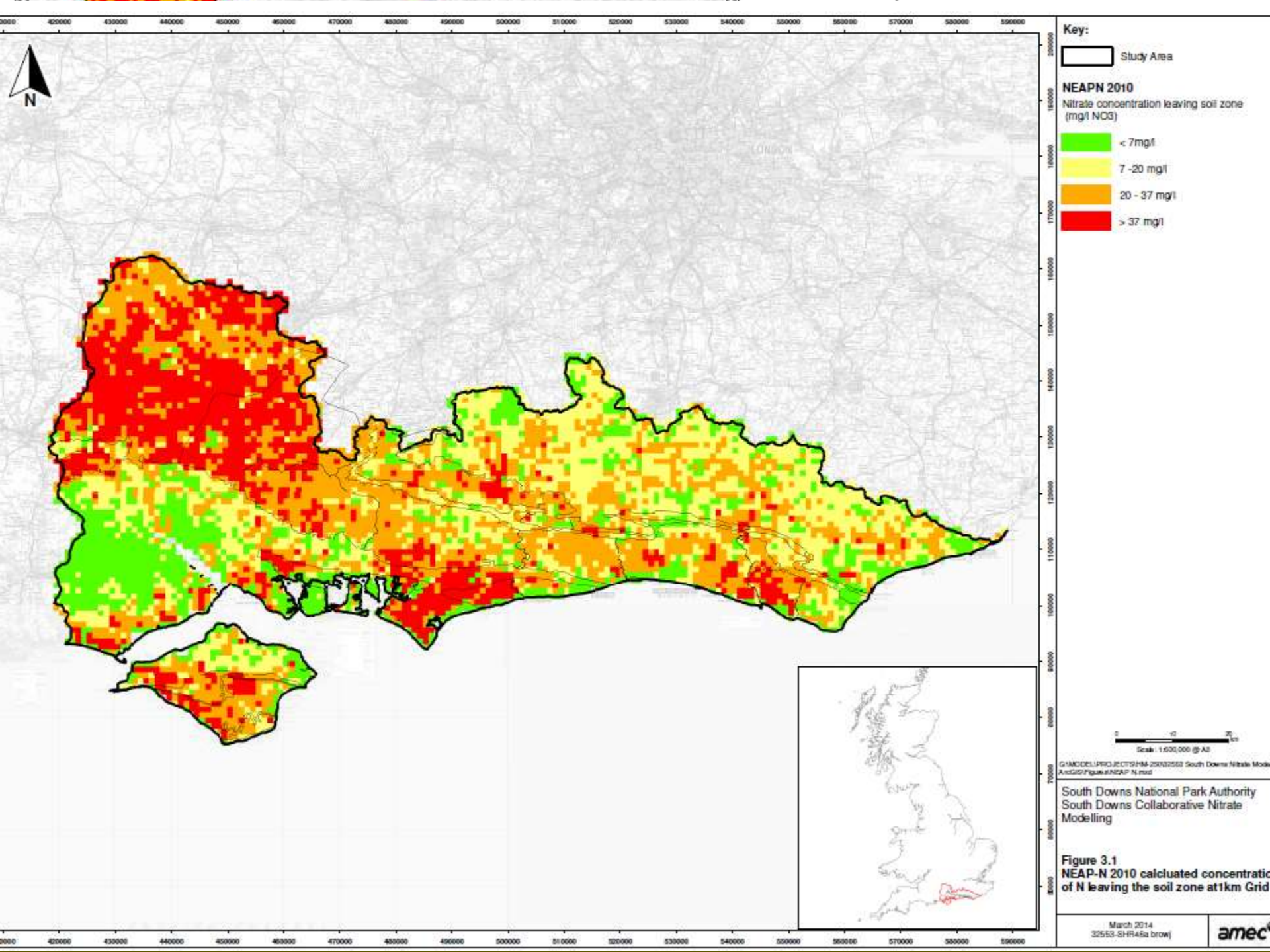
C&PL Secondary - All N inputs to GW

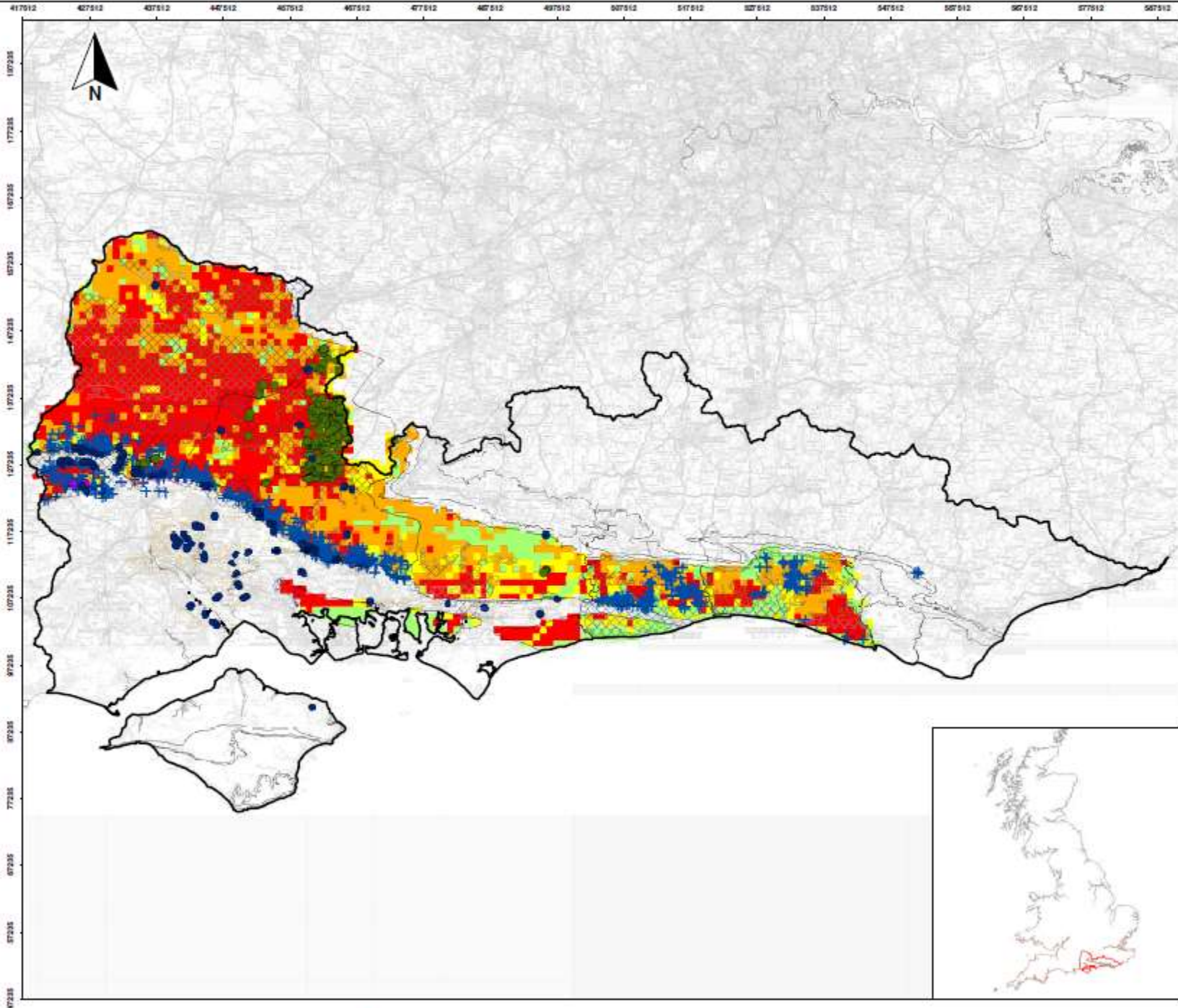


Results summary



- Greatest contributions from improved grassland, wheat & oil seed rape.
- Reflects large amount of grassland (~40%) and arable land (~25%) in the aquifer areas.
- Risk maps...





Key:

- Groundwater Body

Risk Score Nitrate Vulnerability

- High
- Low
- Medium
- Medium Low

Risk Overlay

- Chalk Transmissivity
- Mapped dissolution

BGS Karst Features

- Stream sink point
- Cavity point
- Doline point

0 5 10 15 20
Scale: 1:500,000 @ A3

G:\MODELS\PROJECTS\HM-259-32553 South
WestGIS\Figures\32553_259349a Fig 3-4.mxd

South Downs National Park
South Downs Collaborative
Modelling

Figure 3.4
Nitrate risk mapping based on
Chalk water table, NEAP-N

Conclusions

- Chalk – average nitrate ~10mg/l NO₃ below WFD threshold (37.5 10mg/l NO₃), predicted values in same range as observed.
- Focus on keeping nitrate below threshold through farm engagement to realise improvements in efficiency of N applications on arable and grassland.
- Hastings Beds – significant attenuation so no action required.

Conclusions

- Lower Greensand – predicted values above threshold but impact of denitrification unknown – likely to be some (e.g. Rother LGS). Potential further investigation.

Thank you

Steering Group

Chris Manning 

Lucy Roberts
Polly Wallace  Environment Agency

Alastair Stewart  Downs & Harbours
Clean Water Partnership

Mike Packman  Southern Water

Tracey Viney  Portsmouth Water
150 years of quality service

