

# Nitrate Vulnerable Zones

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# The nitrate problem

- **The House of Commons Environmental Audit Committee has launched an inquiry into nitrates pollution in the UK**
  - Consider nature & scale
  - Impacts on environment and human health
  - Review the governments approach to regulation
- Nitrate is the main cause of groundwater bodies failures to meet good water quality under the Water Framework Directive
- Approximately 30 per cent of potable groundwater now has to be blended, treated or replaced in order to meet the Drinking Water nitrate standard of 50 mg/l
- Cost to Water Companies of £189 million between 2004/05 and 2008/09
- Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution
- They include about 58% of land in England

# Nitrate Vulnerable Zones



Groundwater - water held underground in the soil or in pores and crevices in rock, which has or could have if action is not taken, a nitrate concentration greater than 50mg/l

**Map legend**

Enter your Postcode to find your location then click within the Nitrate Vulnerable Zone to see more details about that designation

Proposed 2017 Nitrate Vulnerable Zones [i](#)

- Surface Water NVZ Area
- Groundwater NVZ Area
- Eutrophic NVZ Area

**G8** **ET4** NVZ Number  
**S221**

Existing Nitrate Vulnerable Zones [i](#)

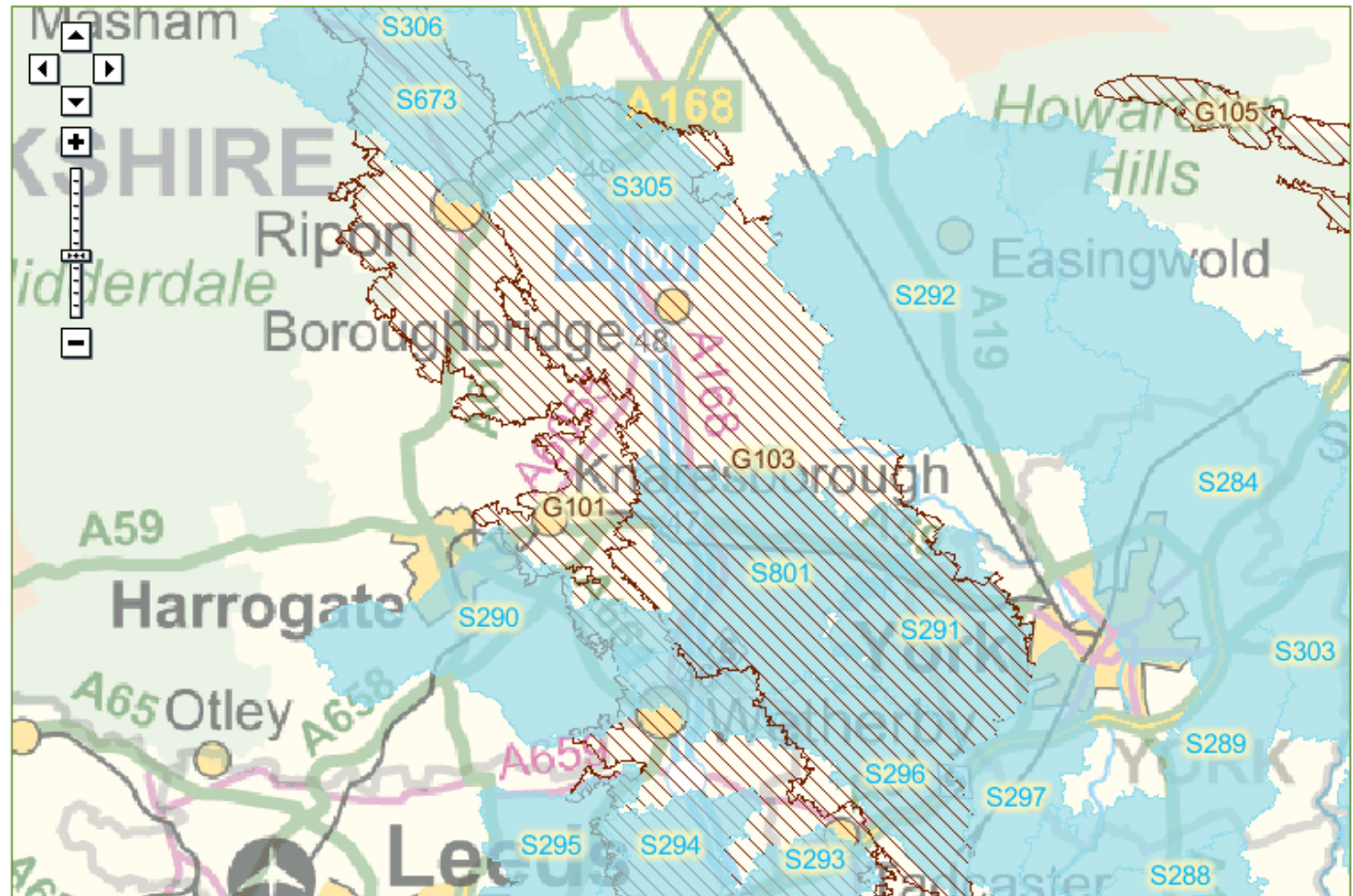
- Surface Water NVZ Area
- Groundwater NVZ Area
- Eutrophic NVZ Area

Designation Notice Tranche [i](#)

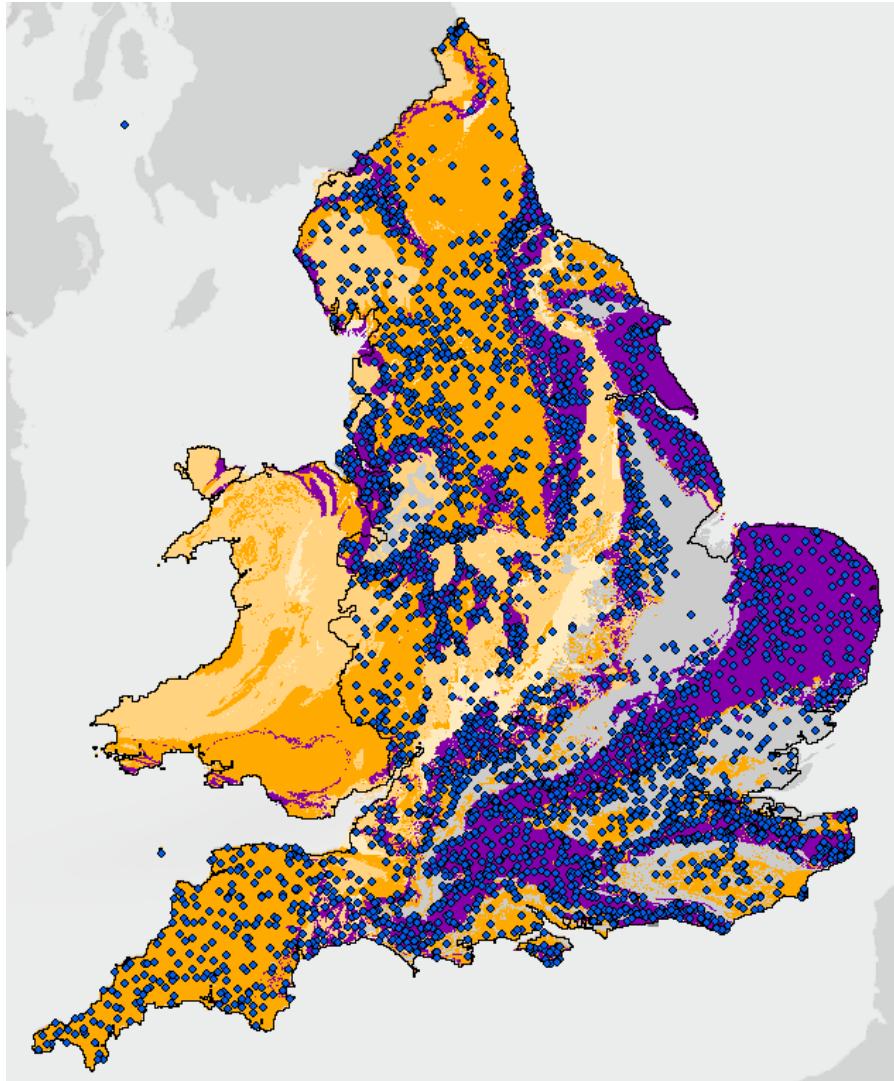
Tranche 1

Ripon, North Yorkshire at scale 1:300,000

Other maps Data search Text only version



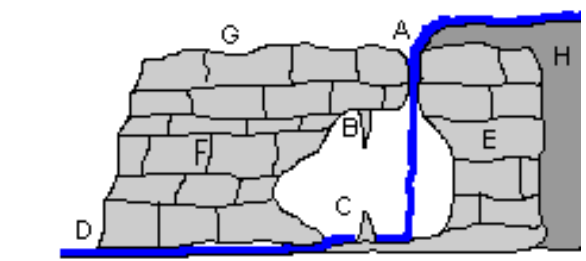
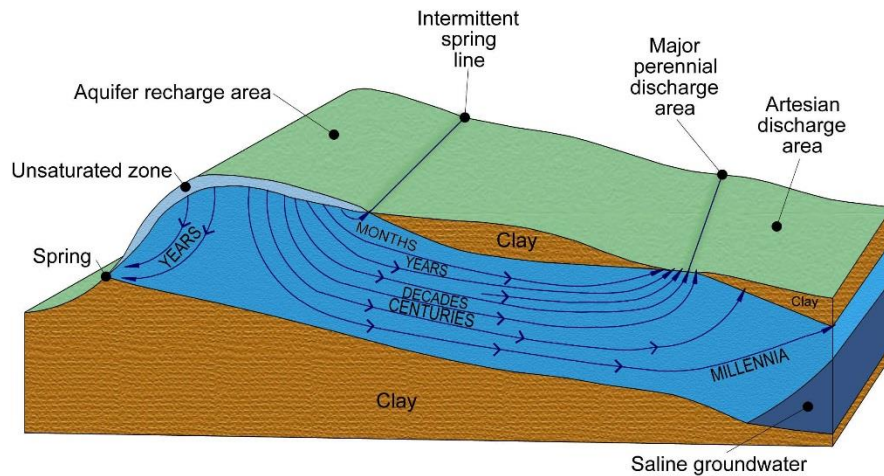
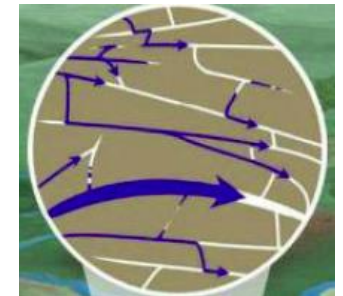
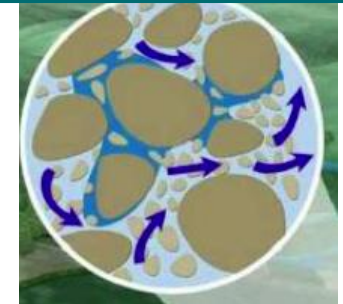
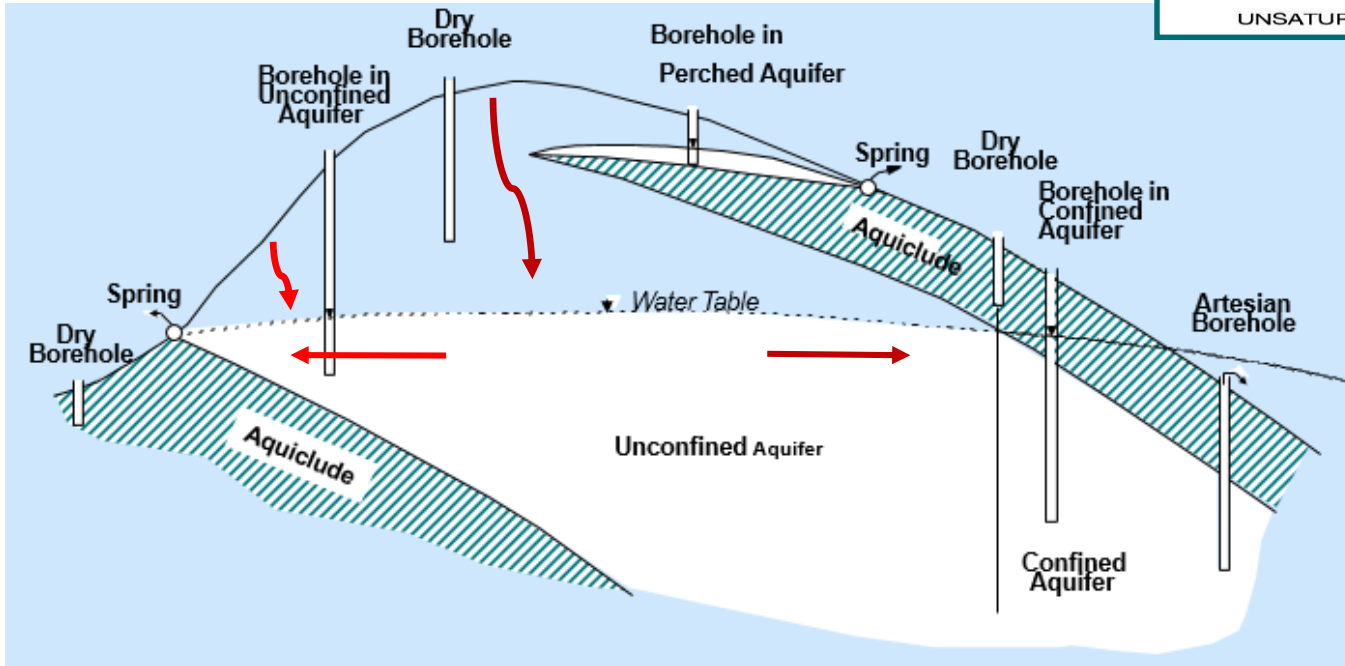
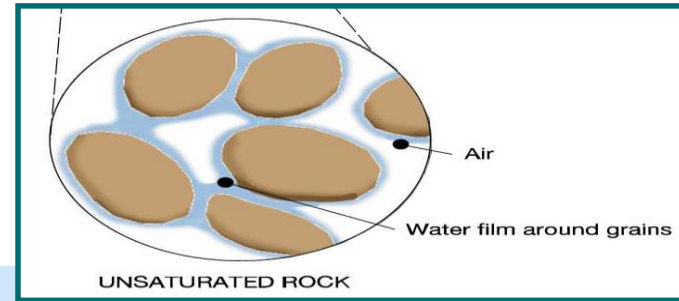
# Groundwater monitoring network



- The groundwater network comprises circa.3000 points across England
- Network is irregularly distributed - sparser in secondary aquifers (e.g. NW)
- Variable borehole construction – depth, screen length, pumping regime
- Variable sampling regime – length of record, frequency, missing years
- Type – Public Water Supplies - 43%, other abstractions - 54%, Observation boreholes - 3%

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unproductive

# Geological factors



A - Swallow Hole B - Stalactite C - Stalagmite  
 D - Resurgence E - Bedding Plane F - Joint  
 G - Limestone Pavement H - Impermeable Rock

# The challenge

- What might the nitrate concentration be in groundwater between these monitoring points?
- Currently we use Ordinary Kriging to interpolate between points
- This doesn't take account of underlying geology, notably aquifer boundaries
- Nor does it consider other environmental factors which impact nitrate concentration
- However it does provide an estimate of the uncertainty associated with each interpolated measurement
- Can this be taken a step further to inform monitoring design and strategy, assess whether mitigations measures have been effective