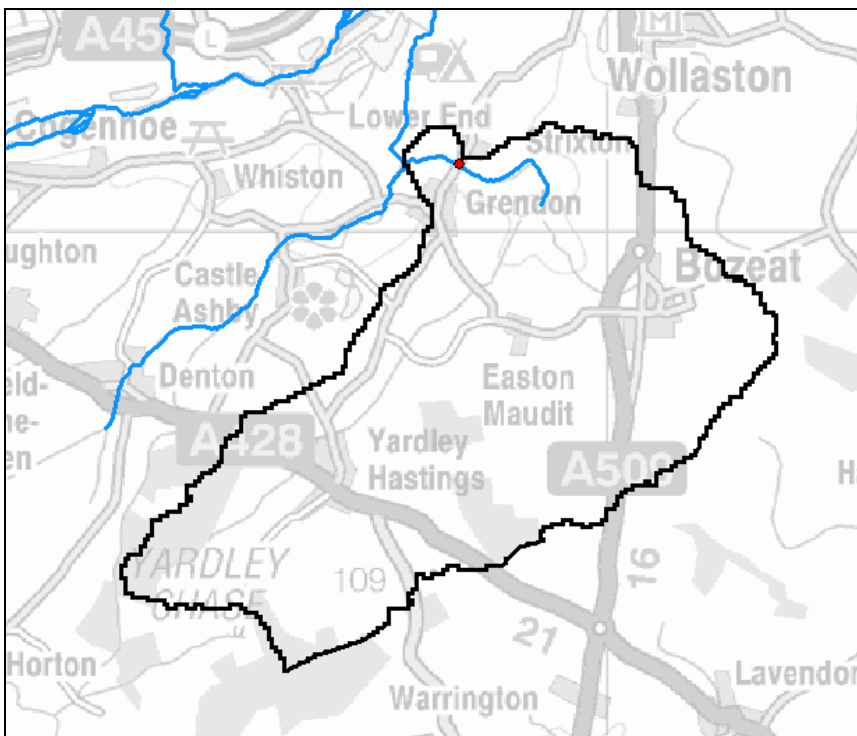


Nene Catchment Partnership - Your Water Catchment

River Nene – Grendon Brook

Grendon Brook is a tributary of the River Nene. The water catchment of Grendon Brook is highlighted in black on the map below.



This bulletin provides a summary of the available water quality data for the catchment, and some of the key environmental features and issues.

The villages of Strixton, Grendon, Bozeat, Easton Maudit and Yardley Hastings are located within the catchment which is predominantly rural with a mixture of arable and grazing activities. Bozeat and Yardley Hastings are the most populated areas within the catchment.

Grendon Brook joins the River Nene, North of Grendon. The Brook has three main tributaries flowing through the catchment which enter the main channel east of the village of Grendon to form Grendon Brook. The tributaries flow from south to north through Yardley Hastings, Easton Maudits and Bozeat.

A walkover was carried out on the Grendon Brook in May 2012 and no significant agricultural or other land management issues were highlighted within this catchment which could lead to obvious sources of sediment loss and associated elevated levels of phosphate. Topography shows gentle slopes within the floodplain of the main channel with the channel being heavily modified.

Predominant soil types in the area:

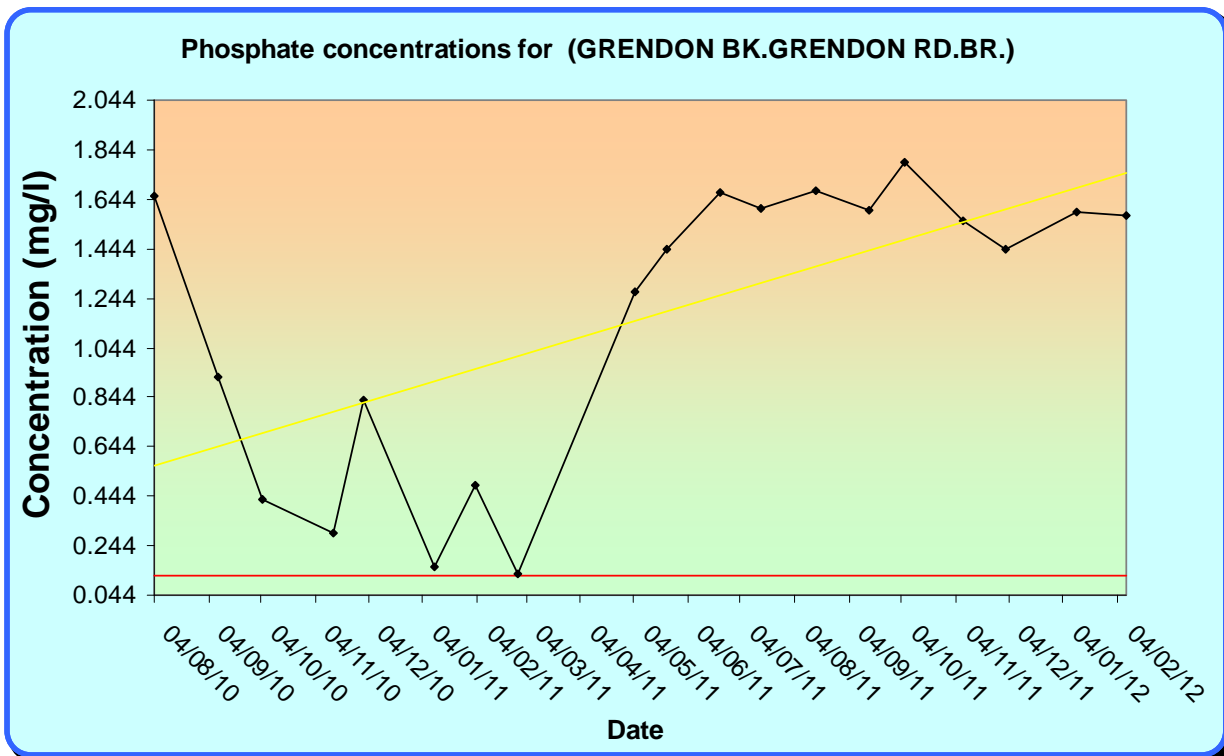
Soil Name: MORTON
Soil Description: clayey over limestone
Dominant Soil Properties: Well drained calcareous clayey and fine loamy soils over limestone in places shallow and brashy.

Soil Name: HANSLOPE
Soil Description: deep clay
Dominant Soil Properties: Slowly permeable calcareous clayey soils.

Soil Name: OXPASTURE
Soil Description: deep loam to clay
Dominant Soil Properties: Fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogged

Grendon Brook is currently classified at Poor status by the **Water Framework Directive (WFD)**. The WFD requires that all waterbodies meet Good Ecological Status by 2027, and the Nene Catchment Partnership is working with the Environment Agency to achieve this. The Environment Agency has one permanent sampling point relevant to this catchment which monitors the water quality on a monthly basis.

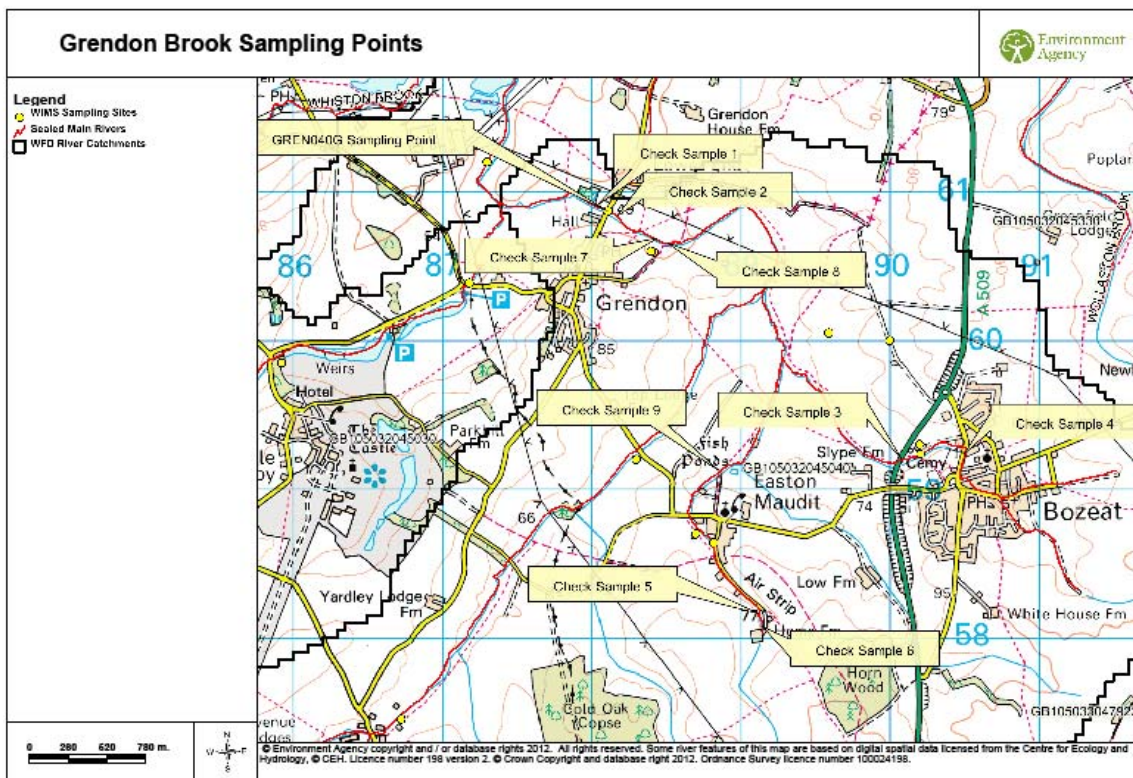
The poor classification relates to phosphates levels within the water body. Ammonia, pH and dissolved oxygen exceed good criteria (classified as High). **Phosphate** is the most common failing element nationally under WFD. The WFD target for phosphate is 0.12mg/l, the graphs below shows that Grendon Brook exceeds this target with the annual average being 0.91mg/l. The 'poor' phosphate classification has been confirmed. It should be noted that routine sampling of at this point only commenced in August 2010 and further analysis is required to establish long-term trends.



Phosphate exists in both the organic and inorganic form, but it is organic phosphate that is the limiting nutrient for plant growth in freshwater ecosystems. An excess of organic phosphate results in eutrophication of freshwater ecosystems with resulting algal blooms which limits light and oxygen levels leading to a reduction in the variety of habitats and subsequent aquatic flora and fauna.

Phosphates are a waste product from protein breakdown and are found in human and animal waste, as well as some industrial effluents (food and drink, fire retardants). As an important plant nutrient, diffuse sources of phosphate also include agricultural fertilisers and the subsequent run-off from agricultural land of both organophosphate and phosphate bound to soil particles. Sediment itself affects the habitat of rivers by smothering riffles used by fish to spawn and changing river morphology. Other sources of phosphorus include sewage treatment works (STWs) and septic tanks, both of which are being assessed as part of meeting the WFD targets.

The map below shows the location of the permanent Environment Agency sampling point and 9 further sample points taken within the catchment to provide an indication of potential sources of phosphates:



Below is a summary of the sampling results on the three main tributaries within the catchment feeding into Grendon Brook:

Easton Maudits

Stream profile through Easton Maudits is modified, narrow, slow flowing and has a number of domestic surface water inlets and consented discharges from domestic sewage treatment plants.

Sample 6 was of a domestic misconnection to the surface water system and contained 5.76 mg/l of phosphate in the discharge.

Sample 5 was taken approx 20m downstream of the discharge from Oakfields Nursing Home sewage treatment plant and contained 1.96mg/l phosphate.

Sample 9 was taken about 200m downstream from Monks Road Easton Maudits with in stream phosphate levels of 1.27 mg/l. Predominantly arable and well fenced grazing land in the area surrounding the village.

Bozeat

River is diverted through Bozeat via a extensive modified channel.

Sample 4 was taken at London Road upstream of Bozeat Sewage Treatment Works, phosphate levels were 0.487 mg/l at this point, sample 3 taken at the A609 bridge downstream of the sewage treatment works contained phosphate levels of 5.08 mg/l.

Yardley Hastings

An average of 5.04 mg/l of phosphate from 12 samples taken in 2008 have been collected at Environment Agency sample point YHAST, this represents the final effluent from the sewage treatment works prior to entering the main channel. The channel itself flows through predominantly arable land with gentle slopes

Grendon

Main river channel is modified being narrow, slow flowing and receiving surface water drainage from predominantly arable land and surface drainage from the town of Grendon. Consented discharges exist from the main sewage treatment works and Grendon Hall.

Sample 8 taken 30 upstream from the sewage treatment works contained phosphate levels of 1.68 mg/l and sample 2 taken 10 m downstream of the sewage works outlet contained 3.64 mg/l phosphate. It should be noted that sample point 8 is downstream from where the three tributaries join to form Grendon Brook.

Further samples 1 and 2 were downstream and upstream of Environment Agency sample point GREN040G contained phosphate levels of 0.64 mg/l and 1.53 mg/l respectively.

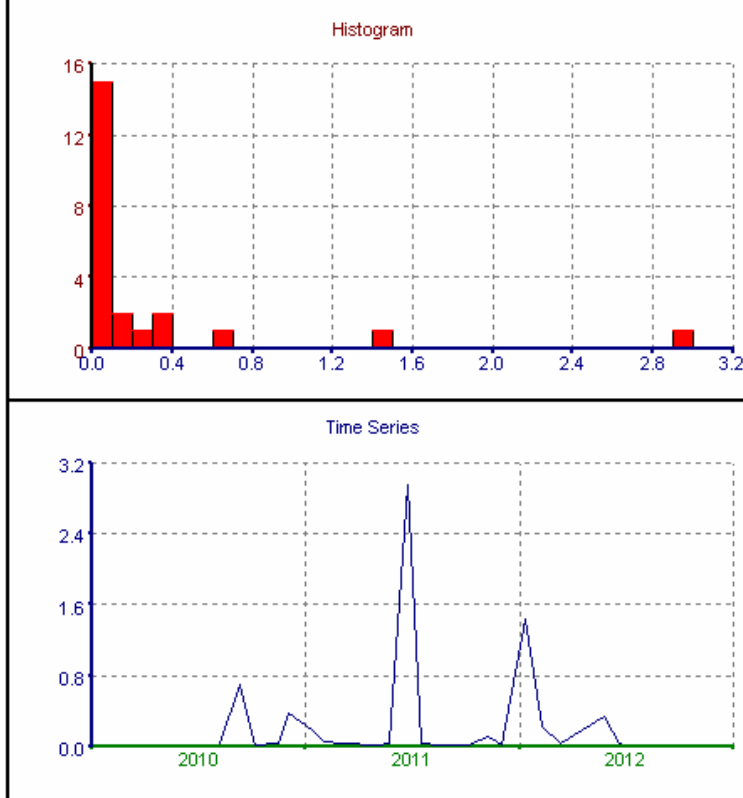
Therefore initial investigations show the main sources of failure in relation to phosphate within this catchment originates from consented discharges from sewage treatment works on the three tributaries and Grendon Brook. . None of the STWs in this catchment have phosphate stripping and we are investigating how this impacts on the phosphate concentrations in the catchment. All catchments are different, but as a general rule it is thought that, in rural catchments, agriculture inputs about 35% of phosphate into the water and STWs about 60%.

Ammonia

Ammonia is found in sewage, manures and fertiliser. It is highly soluble in water and toxic to fish. The graph below shows ammonia concentrations in mg/l, to achieve a Good Status under WFD ammonia concentrations must be < 0.6mg/l therefore Grendon Brook currently exceeds good status in relation to ammonia levels with a mean of 0.3 mg/l.

GREN040G; GRENDON BK.GRENDON RD.BR.
Determinand Summary - 0111 Ammonia(N) mg/l

Number of Observations (LT)	23 (7)
Date Range	04-08-2010 to 25-06-2012
Minimum	0.0150
Mean	0.2934
Maximum	2.9500
Standard deviation	0.6613
SDD	0.7184
Non-Parametric estimate (Weibull) of:	
5 Percentile	0.0150
10 Percentile	0.0150
20 Percentile	0.0150
Median	0.0400
80 Percentile	0.3456
90 Percentile	1.1356
95 Percentile	2.6460



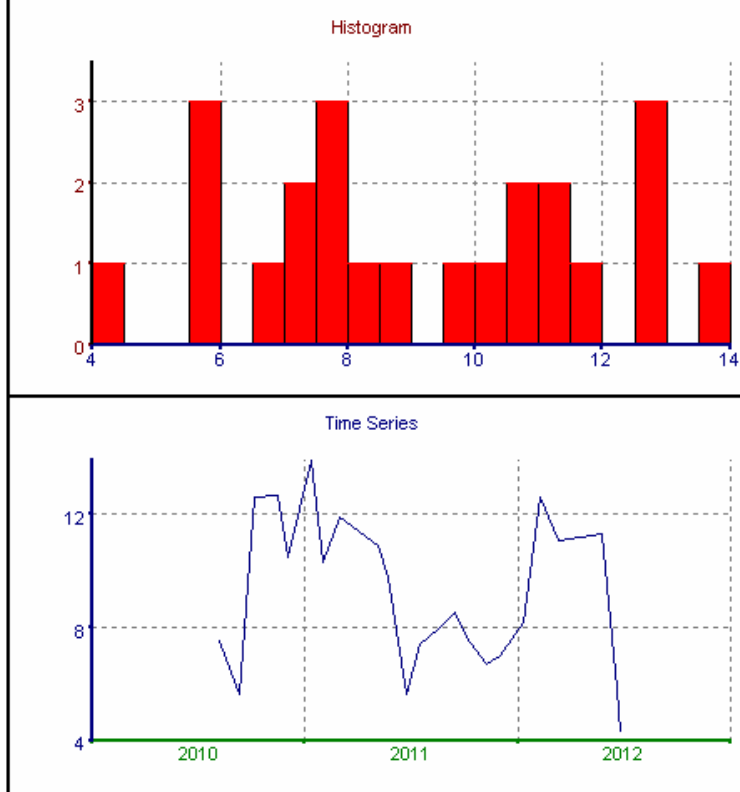
Nitrate

Grendon Brook, along with most of England, is in a Nitrate Vulnerable Zone (NVZ). Nitrate pollution problems occur when too much chemical / organic fertiliser is applied to the land. Nitrate can runoff land into rivers and lakes or leach into groundwater. Some experts believe that high levels of nitrate in drinking water may pose a threat to health. A European directive states that drinking water should not contain more than 50 mg of nitrates per litre of water.

In rivers, streams, ponds and lakes, too much nitrate can create a 'pea soup' effect. The water becomes clogged with fast-growing plant life like algae and weeds. This is a major problem especially in some areas of England such as East Anglia. In problem areas, some farmers voluntarily control their use of nitrogen. Nitrate levels in the Grendon Brook catchment are below the 50 mg/l limit with an average of 9.14 mg/l.

GREN040G; GRENDON BK.GRENDON RD.BR.
Determinand Summary - 0117 Nitrate-N mg/l

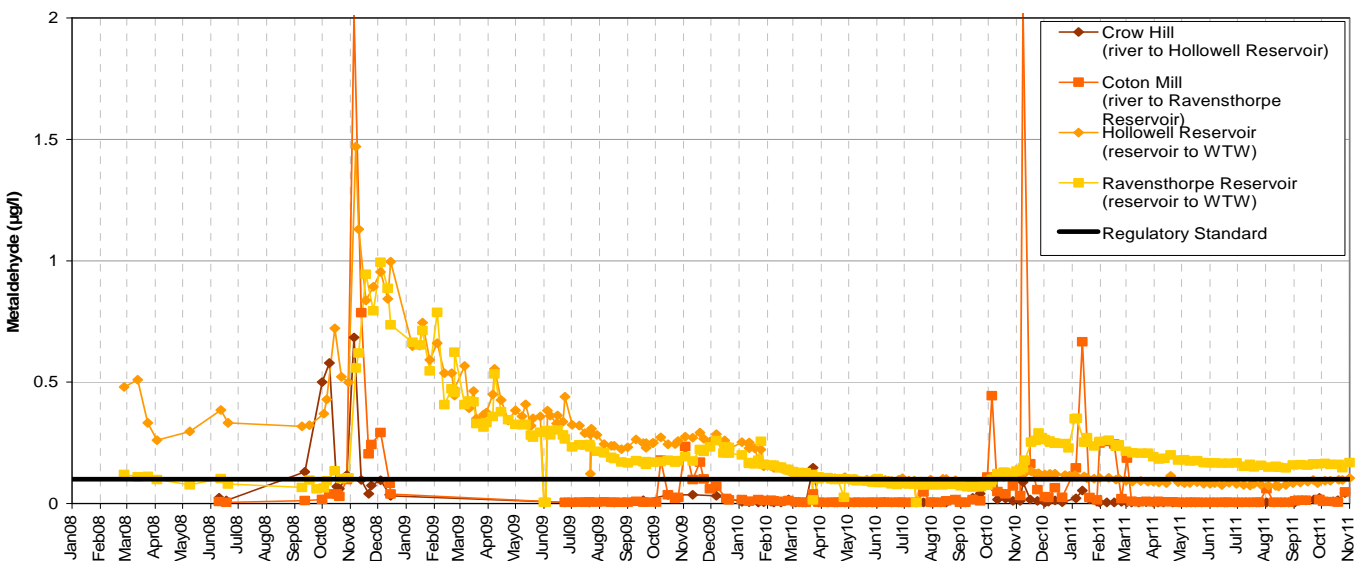
Number of Observations (LT)	23
Date Range	04-08-2010 to 25-06-2012
Minimum	4.30
Mean	9.14
Maximum	13.90
Standard deviation	2.710
SDD	1.979
Non-Parametric estimate (Weibull) of:	
5 Percentile	4.57
10 Percentile	5.63
20 Percentile	6.56
Median	8.55
80 Percentile	12.04
90 Percentile	12.66
95 Percentile	13.66



Metaldehyde

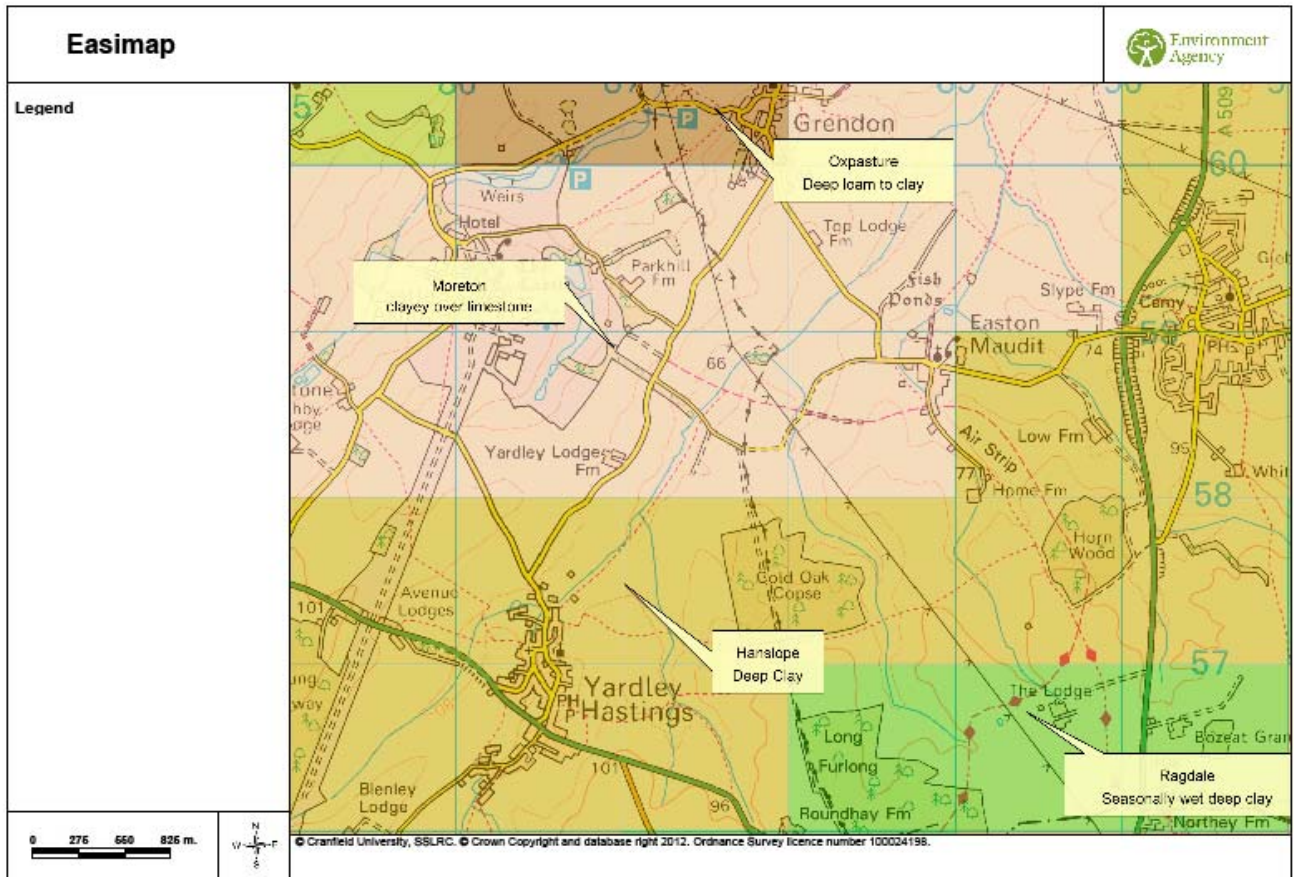
The drinking water limit for metaldehyde is 0.1µg/l. Metaldehyde is the most widely used pesticide for slug control. Our reservoirs are monitored for metaldehyde and routinely fail the 0.1µg/l level. Concentrations of metaldehyde in Ravensthorpe Reservoir (see graph below) for example have generally been decreasing since the peak in 2008, but peaks are still appearing in winter (2009 and 2010), following autumn applications. For further information and best practice advice for applications visit the Metaldehyde Stewardship Group (MSG) website at <http://www.getpelletwise.co.uk/>.

Ravensthorpe Water Treatment Works - Metaldehyde



Soils

The soil is a farmer's most valuable resource. Soil security is vital if we are to ensure future food production. The map below shows the main soil types (1 km squares) for the Grendon Brook catchment.



Groundwater

The bedrock beneath the soil is connected and can store water (underground reservoirs known as aquifers). Limestone generally holds water the best and is therefore classed as a major aquifer, ironstone and sandstone are minor aquifers and mudstone has no aquifer. Predominant geology in this catchment is a Blisworth Limestone Formation and classed as a Major Aquifer.

Catchment Sensitive Farming (CSF)

The Grendon Brook is in a CSF area under the Nene and Ise Catchment Partnership. CSF aims to reduce diffuse pollution from agriculture. This means farmers in this catchment have access to free advice, workshops and training events to assist with soil, nutrient and pesticide management, as well as priority access to funding through the CSF Capital Grant Scheme.

To find out more Tel: 01604 236764

Email: RNRP@northamptonshire.gov.uk

Web: <http://www.rnrp.org/CSF>

Campaign for the Farmed Environment (CFE)

The priority in Northamptonshire is surface water protection. The ELS options that contribute towards this are:

Buffer strips - to slow, filter and trap pollutants (soil, nutrients and pesticides) before they enter the watercourse

Cover crops - to reduce leaching of nutrients

Field corners - to reduce overland flow and erosion of soil

To find out about free events or to get more information, contact your local CFE Advisor, Alex Butler (01572 718763).

What can you do next?

If you would like to collect some of your own water quality data, arrange a free Catchment Sensitive Farming visit, or simply to discuss the issues further then please contact the Nene Catchment Partnership team at the RNRP offices (see CSF section for details).