Nitrate Vulnerable Zone (NVZ) designation, 2017 Eutrophication (lakes)

Publication Date: June 2016

NVZ Name: Groby Pool
NVZ ID: EL102
This document provides a summary of the evidence used in proposing an area of land as one which should be, or should continue to be, designated as a Nitrate Vulnerable Zone (NVZ) for the purposes of the Nitrate Pollution Prevention Regulations 2015.

A full description of the methods used in developing the NVZ proposals is set out in the detailed methodology for eutrophication-related NVZs, available via [http://apps.environment-agency.gov.uk/wiyby/141443.aspx](http://apps.environment-agency.gov.uk/wiyby/141443.aspx). These methods were developed under the guidance of a review group convened by the Defra for the last NVZ review (2011-2013), which included representatives from the farming and water industries as well as independent academic experts. Minor refinements to the methods have been made for the current review.

NVZs are areas of land that drain to polluted waters and which contribute to the pollution of those waters. Polluted waters include those which are eutrophic or may in the near future become so if the Regulations were not to apply there.

Eutrophication is defined as "the enrichment of water by nitrogen compounds, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned".

For both freshwaters and saline waters, a weight-of-evidence based approach to assessing the risks and impacts of eutrophication was employed. The evidence for individual water bodies was assessed against a national suite of criteria for eutrophication in the different categories/types of water for review. The criteria are both quantitative and qualitative and reflect scientific understanding of the process and effects of eutrophication. They are broken down in the same way for each water category as follows:-

- Nutrients
- Plants/algae
- Secondary and other effects

For each designated or candidate water body which might meet the criteria for eutrophication, a datasheet such as this one was completed, bringing together information about the water body, its catchment, its uses, evidence of eutrophication and the sources of nitrogen input.

This document is a record of the evidence used in the designation process, including results from national monitoring and assessment programmes, and further information supplied by Area staff. The proposals for NVZ designation are made as a result of close working between Area and national Environment Agency teams, with further quality assurance for the eutrophication designations through the use of a national expert panel.

An accompanying guide to these datasheets is available, which provides an explanation of the contents, acronyms and technical terms.

Some features of the maps within this report are based on digital spatial data licensed from the Centre for Ecology and Hydrology, ©. Please note that any maps shown here have not used detailed field boundaries and therefore represent the indicative 'soft' boundary only. The definitive NVZ area can be seen on the "What's in Your Backyard" (WIYBY) website ([http://apps.environment-agency.gov.uk/wiyby/141443.aspx](http://apps.environment-agency.gov.uk/wiyby/141443.aspx)).
Section 1. Lake and catchment characteristics

WB ID: 36536  
2013 NVZ status: Not Designated

Lake attributes

<table>
<thead>
<tr>
<th>EA Area</th>
<th>Derbyshire Nottinghamshire and Leicestershire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake grid co-ordinates (Easting/Northing)</td>
<td>452105 / 308179</td>
</tr>
<tr>
<td>Lake waterbody area (ha)</td>
<td>13.9</td>
</tr>
<tr>
<td>WFD Lake Typology</td>
<td>Organic, very shallow, small, lowland</td>
</tr>
<tr>
<td>Lake Alkalinity (ueq/L)</td>
<td>4016</td>
</tr>
<tr>
<td>Mean lake depth (m)</td>
<td>1.5</td>
</tr>
<tr>
<td>Is the lake heavily modified according to WFD?</td>
<td>Yes</td>
</tr>
<tr>
<td>Does stratification occur?</td>
<td>Well mixed</td>
</tr>
<tr>
<td>Is this waterbody a reservoir?</td>
<td>No</td>
</tr>
</tbody>
</table>

Natural or artificial lake:
Natural --- Now considered to be a "natural" waterbody, although may have originally been artificially created.

Type of artificial lake:
n/a --- Possibly originally created as an historic mill pond.

Lake perimeter (% artificial)
Natural

Significant changes in lake level due to seasonal drawdown:
N

Pumped storage or other reservoir:
n/a

Information on abstraction (if available)
### Lake Catchment Attributes

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake catchment area (ha)</td>
<td>752</td>
</tr>
<tr>
<td>If pumped, pumped catchment area (ha)</td>
<td></td>
</tr>
</tbody>
</table>

**Hydrological character**

Primarily surface water

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Please note that the map above has not used the detailed field boundaries and is the indicative ‘soft’ boundary. The definitive NVZ area can be seen on the Environment Agency website (www.environment-agency.gov.uk)

**Comments on accuracy of lake catchment:**

Is the map representative of the natural catchment?

Is the map representative of the artificial catchment?
Water Supply:
Controlled water (Section 104 of Water Resources Act):
Yes

Public Water Supply:
No

Drinking Water Protected Area:
No

UWWTD designation
No

Used for hydropower or flow regulation:
n/a

Recreational use:
Accessiblity to public:
Easily accessible, many visits

Recreational fishing:
No activity --- No fishing permitted.

Contact watersports
No activity

Nature of watersports (if applicable):
---

Other public benefit visits:
Significant benefit- Birdwatching and walking.

Conservation status:
Conservation value of lake:
National

Habitats Directive site:
Not SPA or SAC

SPA or SAC for aquatic interest features
n/a ---

SSSI or local conservation designation:
SSSI --- SSSI, emergent vegetation & woodland, wintering wildfowl

Description of Aquatic interest features:
--- Notifiable features of the SSSI as a Whole: - MG5 - Cynosurus cristatus - Centaurea nigra grassland - S12 - Typha latifolia swamp - S13 - Typha angustifolia swamp - S14 - Sparganium erectum swamp - S25 - Phragmites australis - Eupatorium cannabinum tall-herb fen - S5 - Glyceria maxima swamp - S6 - Carex riparia swamp - Standing waters - W5 - Alnus glutinosa - Carex paniculata woodland - W6 - Alnus glutinosa - Urtica dioica woodland.  Habitat Types Represented:- Standing open water and canls - Lowland fen - Lowland neutral grassland - Broadleaved, mixed and yew woodland.  The Lake Unit Features :Eutrophic lakes The citation states a complex of wet grassland, marsh, reedswamp and open water. The plant communities are representative of those developed on neutral or slightly acid soils in the North Midlands
Section III - Causes - Nutrients

Total oxidised nitrogen (TON) data

<table>
<thead>
<tr>
<th>Mean summer TON (mg/l)</th>
<th>0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of summer TON samples</td>
<td>32</td>
</tr>
<tr>
<td>75th percentile annual TON (mg/l)</td>
<td>1.5</td>
</tr>
<tr>
<td>Total number of TON samples</td>
<td>57</td>
</tr>
<tr>
<td>Confidence of annual 75th %ile TON exceeding 1 mg/l</td>
<td>Low</td>
</tr>
<tr>
<td>Confidence of annual 75th %ile TON exceeding 2 mg/l</td>
<td>Not confident</td>
</tr>
<tr>
<td>Date range of TON samples</td>
<td>2010 - 2014</td>
</tr>
</tbody>
</table>

TON monitoring data

Sample date:
- 30/04/2010
- 30/07/2010
- 30/10/2010
- 30/01/2011
- 30/04/2011
- 30/07/2011
- 30/10/2011
- 30/01/2012
- 30/04/2012
- 30/07/2012
- 30/10/2012
- 30/01/2013
- 30/04/2013
- 30/07/2013
- 30/10/2013
- 30/01/2014
- 30/04/2014
- 30/07/2014
- 30/10/2014

NVZ Name: Groby Pool
NVZ ID: EL102
**Total nitrogen (TN) data**

<table>
<thead>
<tr>
<th>Mean annual TN (mg/l)</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of TN samples</td>
<td>57</td>
</tr>
<tr>
<td>Confidence of annual mean TN exceeding 1 mg/l</td>
<td>High</td>
</tr>
<tr>
<td>Confidence of annual mean TN exceeding 2 mg/l</td>
<td>Low</td>
</tr>
<tr>
<td>Date range of TN samples</td>
<td>2010 - 2014</td>
</tr>
</tbody>
</table>

**TN monitoring data**

Does any other (e.g. EA non-WFD, or third party) monitoring data for the lake provide improved evidence of significantly elevated nutrient nitrogen?

Strengthens
Does any other (e.g. EA non-WFD, or third party) monitoring data for the lake provide improved evidence of significantly elevated nutrient phosphorus?

n/k
Nutrient sources

Nitrogen loading estimates based on catchment map area

<table>
<thead>
<tr>
<th>Source</th>
<th>Leached N (kgN/yr)</th>
<th>Conc. (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From all agricultural sources</td>
<td>12294</td>
<td>6.8</td>
</tr>
<tr>
<td>From agricultural sources minus atmospheric deposition</td>
<td>11266</td>
<td>No data</td>
</tr>
<tr>
<td>From urban sources</td>
<td>741</td>
<td>0.4</td>
</tr>
<tr>
<td>From all sources</td>
<td>13034</td>
<td>7.2</td>
</tr>
<tr>
<td>From all sources (minus atmospheric deposition)</td>
<td>12006</td>
<td>6.7</td>
</tr>
<tr>
<td>Ranking based on nitrogen loading from agricultural sources</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

Local assessment 2015

Significance of loading from agricultural sources to the catchment of the lake

Principal source --- Major pollution incident of pond in past thought to be as a result of agricultural landspreading activity (pig slurry) (IF)

Significance of loading from human habitation to the catchment of the lake

Minor source

Significance of any other sources of nutrient loading to the lake or its catchment

NVZ Name: Groby Pool
NVZ ID: EL102
**Section IV - Response - Plants/Algae**

**Chlorophyll data**

<table>
<thead>
<tr>
<th>Annual mean Chlorophyll (ug/l)</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>total number of Chlorophyll samples</td>
<td>57</td>
</tr>
<tr>
<td>WFD face value Chlorophyll class</td>
<td>Good</td>
</tr>
<tr>
<td>Confidence of moderate or worse status</td>
<td>9%</td>
</tr>
<tr>
<td>Chlorophyll Good/Moderate boundary value</td>
<td>20</td>
</tr>
<tr>
<td>Date range of Chlorophyll samples</td>
<td>2010-2014</td>
</tr>
</tbody>
</table>

**Chlorophyll monitoring data**

- NVZ Name: Groby Pool
- NVZ ID: EL102
### EQR

<table>
<thead>
<tr>
<th>Phytoplankton (Pluto EQR)</th>
<th>Macrophytes (EQR)</th>
<th>Diatoms (EQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.45</td>
<td>0.5</td>
<td>0.4</td>
</tr>
</tbody>
</table>

**Total number of samples/surveys**
- Phytoplankton: 34
- Macrophytes: 2
- Diatoms: 6

**WFD face value class**
- Phytoplankton: Moderate
- Macrophytes: Moderate
- Diatoms: Poor

**Confidence of moderate or worse status**
- Phytoplankton: 61%
- Macrophytes: 98%
- Diatoms: 100%

**Date range of samples**
- Phytoplankton: 2011 - 2013
- Macrophytes: 2010 - 2013
- Diatoms: 2011 - 2013

**Number of years when algal blooms were observed based on reactive monitoring 2010-2015:**
- 0

### Other responses

Does any other (e.g. EA non-WFD, or third party monitoring data for the lake) provide improved evidence of eutrophication? (local judgement)
- Strengthens evidence

To which biological element(s) does it relate?
- --

### Palaeolimnology

<table>
<thead>
<tr>
<th>Change as Square Chord Distance</th>
<th>No data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Diatom community</td>
<td>No data</td>
</tr>
</tbody>
</table>

Evidence that designated aquatic interest features associated with the lake show evidence of eutrophic disturbance? (local judgement)
- Likely to be affected - Notifiable features above likely to be affected

**Strength of evidence (local judgement)**
- Strong evidence ---

**Local judgement on the evidence of eutrophic disturbance**
- Y, maybe --- No data for P in inlet stream but lots of anecdotal evidence of eutrophication
## Comments and decisions

**WFD Weight of evidence for eutrophication:**

<table>
<thead>
<tr>
<th>Certainty of eutrophication problem based on core WFD tools:</th>
<th>Very certain eutrophication problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certainty of eutrophication problem based on overall weight of evidence:</td>
<td>Very certain eutrophication problem</td>
</tr>
<tr>
<td>WFD overall ecological status:</td>
<td>Poor</td>
</tr>
<tr>
<td>Confidence in WFD status:</td>
<td>Very Certain</td>
</tr>
</tbody>
</table>

### Current assessment of weight of evidence supporting designation in 2017

**First national panel**

**Recommended action:** Needs further investigation

**Comments from first panel:**

N is elevated and there is supporting evidence of impact on the biological elements. Is there any additional supporting evidence, impact on uses etc?

**Second national panel**

**Comments from second national panel:**


**Recommendation:** Designate

**Local summary and recommendation:**

Notwithstanding that this lake is already situated within a Nitrate Vulnerable Zone, we feel there is sufficient enough strong and relevant evidence to support the case for having it designated as a Polluted Water (Eutrophic) under the Nitrate Directive.

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**NVZ Name:** Groby Pool  
**NVZ ID:** EL102
Final summary (2017)

2017 Recommendation: Designate
2013 Decision: Not Designated
2008 Decision: Not Designated

Lake Description:
Groby Pool is a small very shallow lowland lake which sits within the Groby Pool & Woods SSSI. It may have originated as a mill pool.

Why the lake should be designated as a Polluted Water (eutrophic):
Groby Pool lies within an existing surface water NVZ designation. Agriculture is the principal source of nitrogen and the only discharge consent in the catchment has been out of use since 2007. The ecology of the lake has been affected by eutrophication, this is shown by the WFD status for phytoplankton, macrophytes and diatoms. Sediment cores show that this lake used to have a more diverse ecological community. Low summer TON concentrations suggest that phytoplankton concentrations are being limited by the amount of available nitrogen, so further reduction of nitrogen concentrations through designating the catchment as an NVZ is recommended.

Nitrogen:
Nitrogen concentrations are within the 1-2mg/l range. 75th percentile TON is 1.5 mg/l. Mean annual TN is 2mg/l taking it to the upper boundary of the threshold range. TON declines to below the limit of detection in the growth season, indicating nitrogen is limiting at this time.

Phosphorus:
The WFD total phosphorus classification is Bad status. There are peaks of concentration in the summer months suggesting that re-release of phosphorus from sediments is taking place at that season.

Ecological response:
Phytoplankton and submerged plants are at Moderate status for WFD and Diatoms are at Poor status, all indicative of eutrophic impact.

Supplementary evidence:

NVZ Name: Groby Pool
NVZ ID: EL102
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Then call us on
03708 506 506 (Monday to Friday, 8am to 6pm)

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enquiries@environment-agency.gov.uk

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