Nitrate vulnerable zone designation 2012 (Groundwater)

Mae fersiwn Cymraeg o'r ddogfen hon ar gael

A Welsh version of this document is also available

Version 1.1, revised 27 June 2012

Evidence of Groundwater Water Nitrate Pollution 2012

INTRODUCTION

This document is intended to provide a summary of the evidence used in assessing the need for nitrate vulnerable zone (NVZ) designation under the Nitrates Directive reference(91/676/EEC of 12th Decmeber 1991). A full description of the methods used is given in the detailed methodologies for Surface Water, Groundwater and Eutrophic Water reports which are available from the Defra and Welsh Government websites. These methods were developed under the guidance of a Review Group convened by the Defra and the Welsh Government which included representatives from the farming and water industries as well as independent academic experts.

NVZ areas are designated based on a combination of both monitored water quality data and modelled nitrogen loadings that are based on the agricultural census and other data.

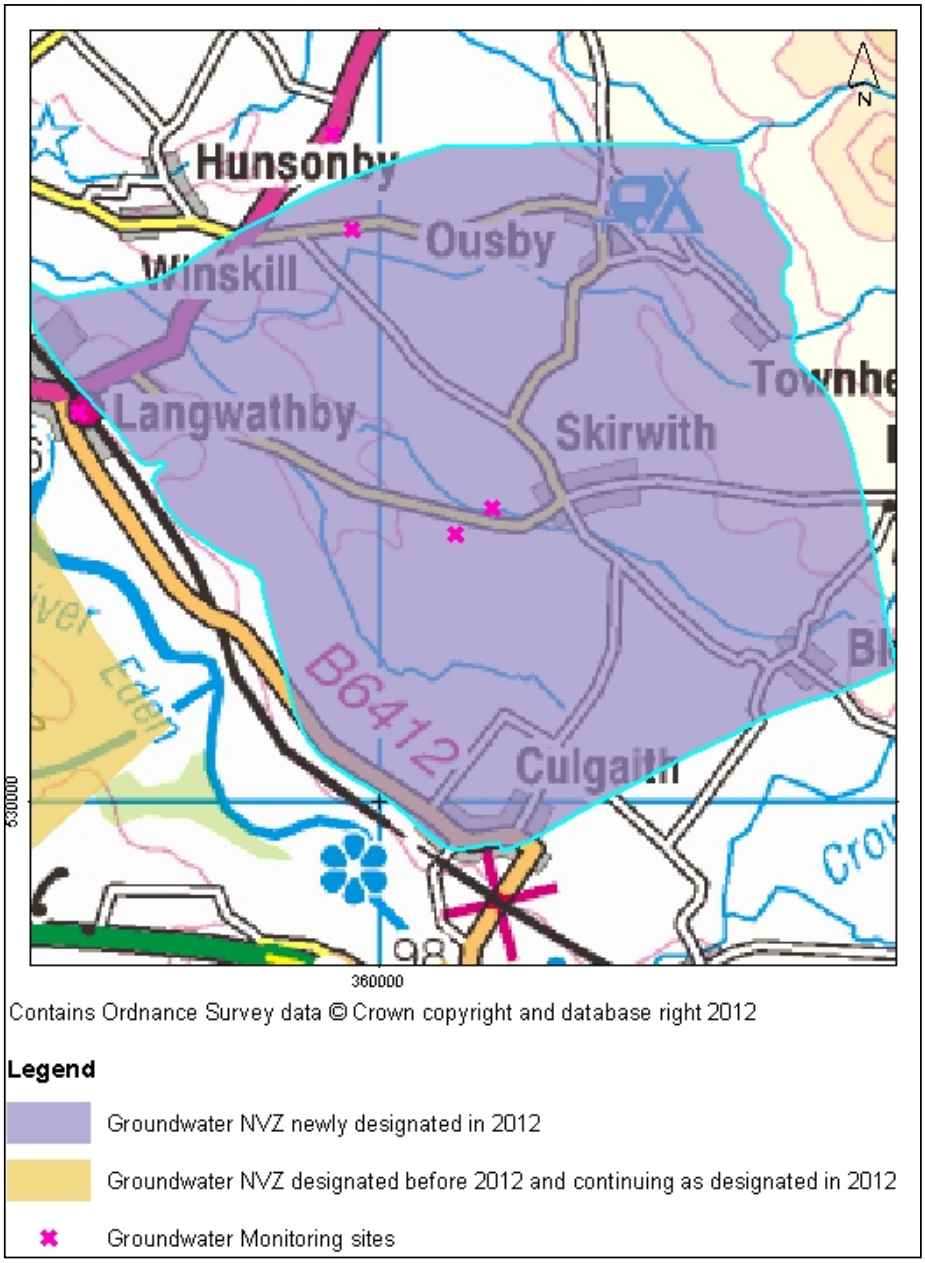
The concentration data is presented as milligrams of Nitrogen per litre. Please note 50 mg per litre of Nitrate is equivalent to 11.3 mg per litre as Nitrogen (N). Monitoring sites which exceed the concentration of 11.3 mg N/l set by the Nitrates Directive may lead to designation of all land draining to this point.

Note that for land already designated as a groundwater NVZ prior to this assessment, the land will remain designated even if the 95%ile concentration is now below 11.3 mg N/l. At least two cycles of low Nitrate concentrations are needed to show a sustained decrease that would then be considered for removal from NVZ designation.

For each NVZ area, monitoring data in combination with information on land-use indicate that concentrations of nitrates in one or more groundwaters are likely to exceed the level set out in the EU Nitrates Directive. Agricultural sources are likely to make a significant contribution to the observed or expected concentration of nitrate. Hence the land area draining to these groundwaters has been identified for designation as a Nitrate Vulnerable Zone.

ID of designated NVZ:50

Map of the designated area.



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Legend

Groundwater NVZ newly designated in 2012

Groundwater NVZ designated before 2012 and continuing as designated in 2012

Groundwater Monitoring sites

Description of the boundary

Surface Water Zone designations are applied at a waterbody scale, for groundwater zones, other factors such as geology need to be taken into account. Physical boundaries influencing groundwater NVZs delineation have been defined based on expert discussion at local level. The following represents a selection of the types of boundaries that have been used to delineate the NVZs and determine the land draining to a polluted groundwater.

- Geological boundaries such as faults and geological contacts.
- Surface water catchment boundaries.
- Groundwater level contours.
- High permeability drift outcrops.
- Low permeability drift outcrops.
- Rivers, acting as groundwater catchment divides.
- Coastlines.
- Solution features.

For NVZ area 50 the boundary is based on;

> *Skirwith NVZ (ID 50) The western and eastern boundaries of the NVZ are defined by the bottom and top of the St Bees Sandstone outcrop locally. The northern boundary is defined using a flow line from sandstone groundwater contours (2000); its location is chosen by the inclusion of Crewgarth BH within the NVZ. The southern boundary is defined by another flow line from sandstone groundwater contours (2000).*

ID of monitoring site(s):

> *88020693, 88021128, 88021129*

Previously designated area, new area or new area adjacent to previously designated area: *New designated area*

Total new area designated (Km2): *29.93*

Monitored Nitrate data for sites in zone ID: 50

For the 2012 designations monitoring data was analysed where available for the years 1980 - 2009. Where sufficient data was available results were projected to give a predicted concentration in 2027. For the earlier 2008 designation, monitoring data was analysed to 2006 and trend predicted to 2021. The results of the analysis were then compared to the standard of a 95%ile value of 11.3 mg N /l. See section 3 of the Groundwater Methodology report for more details.

The following tables summarise the nitrate concentrations for monitoring sites that either exceed the threshold or show increasing trend for nitrate. Data for these and other nearby sites are presented in Appendix A

This area was designated in 2012.

Results for 2012 monitoring data.

Monitoring Site ID	88020693
Easting	359760
Northing	534980
Total Inorganic Nitrogen concentration 95%ile (mg/l)	13.78
Future predicted 95%ile Total Inorganic Nitrogen estimate (mg/l)	12.67
Trend (upward, downward, stagnation):	Downward

Monitoring Site ID	88021128
Easting	360980
Northing	532560
Total Inorganic Nitrogen concentration 95%ile (mg/l)	14.38
Future predicted 95%ile Total Inorganic Nitrogen estimate (mg/l)	14.38
Trend (upward, downward, stagnation):	Stagnation

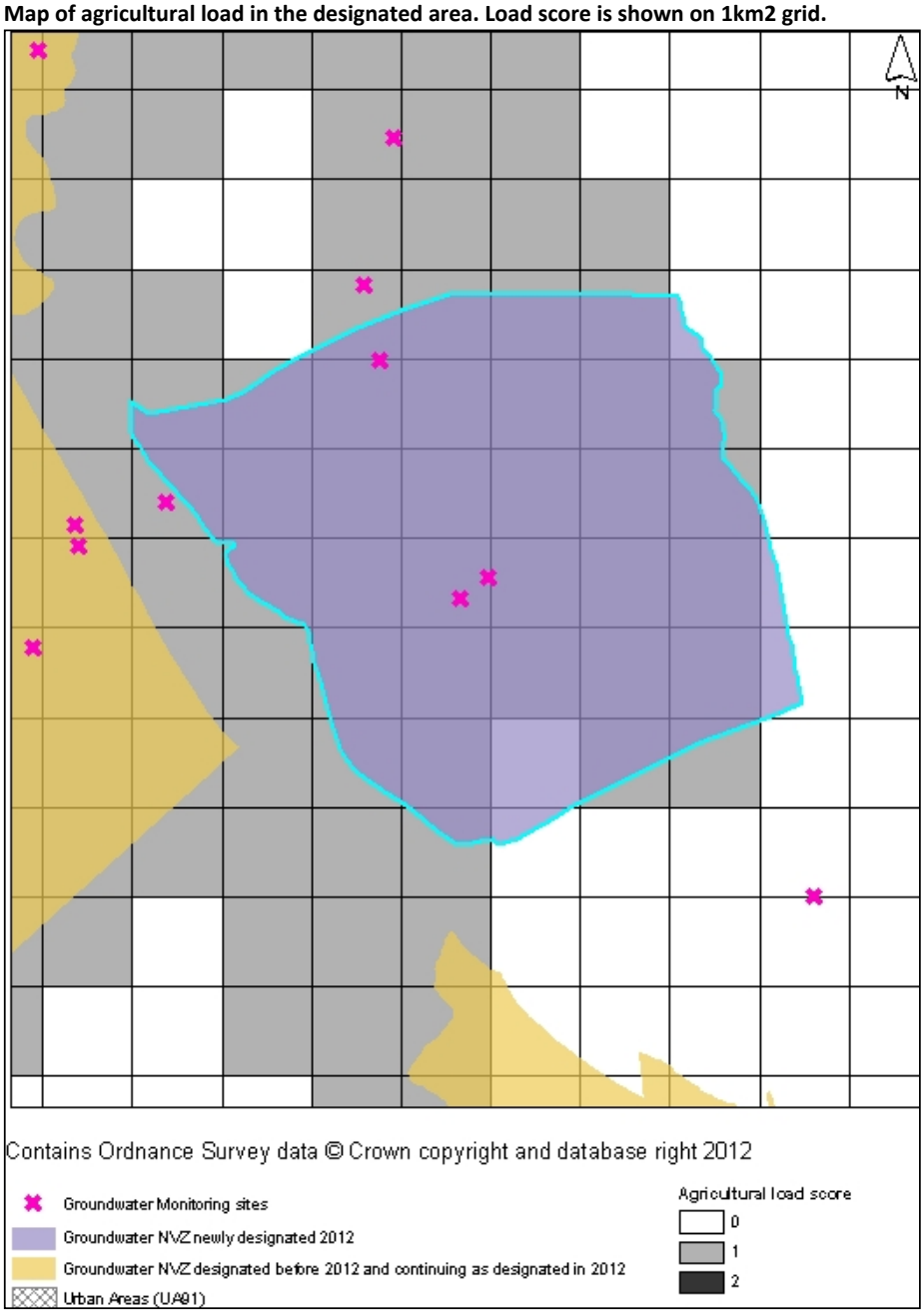
Monitoring Site ID	88021129
Easting	360660
Northing	532320
Total Inorganic Nitrogen concentration 95%ile (mg/l)	16.37
Future predicted 95%ile Total Inorganic Nitrogen estimate (mg/l)	16.37
Trend (upward, downward, stagnation):	Stagnation

Land Use Model results

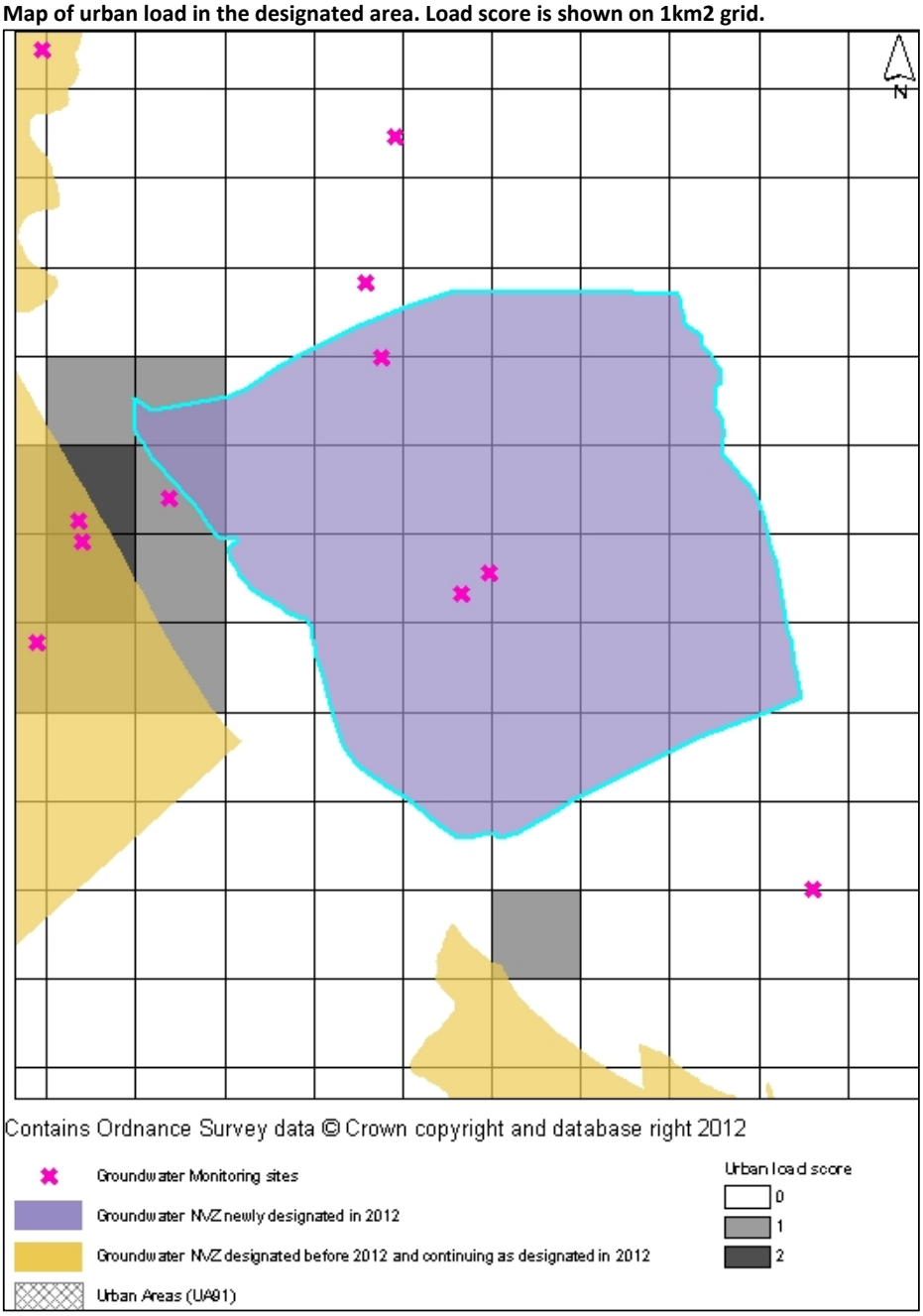
Urban and agricultural load were included in the assessment to identify if agriculture provides a main contribution of nitrate to the groundwater.

The following maps and associated figures indicate the annual average concentration of nitrate from agriculture contained in soil water. The figures are derived from farm scale research undertaken for Defra and are extrapolated based on farming land-use data for the land area covered by this report obtained in 2010 and long-term average rainfall based, using a model called NEAP-N developed by ADAS. The maps indicate those areas within the catchment with higher or lower levels of potential agricultural nitrate leaching to the groundwater.

Map of agricultural load in the designated area. Load score is shown on 1km2 grid.



Map of urban load in the designated area. Load score is shown on 1km2 grid.



Additional Lines of evidence

Advice was sought from local Environment Agency staff to identify any additional data that could be used in the risk model to improve the robustness of the decision making process. Examples include the location of point sources (e.g. industrial or septic discharges), monitoring data from different groundwater bodies and monitoring data from related surface waters. See section 6 of the Groundwater Methodology report for more details.

For this area, no lines of evidence have been modified from local Environment Agency staff.

Appendix A: Environment Agency monitoring data

This appendix presents historical concentration data at every monitoring site. For the 2012 designation, samples collected before 1980 were excluded because they may not be indicative of present day groundwater quality.

Monitoring point ID	Easting	Northing	Date	Nitrate (mg N / l)
88020693	359760	534980	17/10/2001	12.2
88020693	359760	534980	11/12/2001	10
88020693	359760	534980	23/01/2002	8.4
88020693	359760	534980	05/09/2002	10.7
88020693	359760	534980	09/12/2002	7.7
88020693	359760	534980	04/06/2003	9.5
88020693	359760	534980	05/12/2003	11.2
88020693	359760	534980	24/06/2004	7.3
88020693	359760	534980	04/03/2005	8.9
88020693	359760	534980	08/07/2005	7.6
88020693	359760	534980	14/12/2005	10.7
88020693	359760	534980	08/06/2006	9.4
88020693	359760	534980	14/02/2007	7.6
88020693	359760	534980	15/06/2007	7.4
88020693	359760	534980	27/11/2007	10.4
88020693	359760	534980	16/06/2008	10.9
88020693	359760	534980	28/11/2008	10.4
88020693	359760	534980	24/08/2009	9.1
88021128	360980	532560	26/04/2006	12.7
88021128	360980	532560	27/06/2006	12.8
88021128	360980	532560	30/11/2006	13.1
88021128	360980	532560	11/06/2007	12.4
88021128	360980	532560	28/11/2007	12.8
88021128	360980	532560	09/10/2008	12.8
88021128	360980	532560	27/11/2008	14.1
88021128	360980	532560	02/07/2009	12.7
88021129	360660	532320	26/04/2006	15
88021129	360660	532320	27/06/2006	15.2
88021129	360660	532320	01/12/2006	14.3
88021129	360660	532320	11/06/2007	14.2
88021129	360660	532320	28/11/2007	15
88021129	360660	532320	09/10/2008	14.7
88021129	360660	532320	27/11/2008	15.1
88021129	360660	532320	02/07/2009	14.2

References

http://www.defra.gov.uk/food-farm/land-manage/nitrates-watercourses/nitrates/

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