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GQA Headline Indicators of Water Courses - Nutrients National Dataset User Guide

Version 2.0.0
11th February 2013

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1.0 Record of amendment

Version number	Section number	Amendment description	Date
2.0.0	All	Document updated	11/02/13

2.0 Introduction

This document provides information to accompany the Environment Agency's General Quality Assessment Headline Indicator: Nutrients (GQAHl Nutrients) supplied to external users. It can be used to gain a better understanding of the GQAHl Nutrient data when used in conjunction with the current data release. For information relating to national datasets in general, please refer to the National Dataset Generic Text document.

Details of the Environment Agency's distribution policy can be found in the National Dataset Generic Text document, along with contact details for the Data & Information Management Team.

Information about the Environment Agency's web site can also be found in the National Dataset Generic document. The GQA website can be found at the following link:

<http://maps.environment-agency.gov.uk/wiyby/dataSearchController?lang=e&textonly=off&topic=riverquality>

This site includes links to other relevant web pages.

This data is now static and will not be updated, or revised.

2.1 Description of datasets

The database contains data from the GQAHl nutrients (England) and GQA nutrients (Wales), used by the Environment Agency for annual reporting. These are described below.

2.1.1 Description of GQAHl Nutrients (England) & GQA Nutrients (Wales)

The General Quality Assessment Headline Indicator scheme (GQAHl) was the Environment Agency's national method for creating a water quality indicator based on rivers and canals in England. This was a reduced network compared to the original GQA network used in England from 1990 to 2006. The Nutrients GQAHl scheme had over 3000 sampling sites which provided information for approximately 22500 km of watercourses. In Wales the full GQA monitoring network was maintained based on 800 sampling sites which provided information for approximately 4700km.

The data collected over three years were used to determine average nutrient concentrations, for example the classification for the year 2008 included the results for 2006 and 2007. We used data from three years (36 samples per site) because this reduced any variation due to unusual weather conditions. All the results collected over the three years are included. No extreme data values are excluded.

The GQAHl/GQA scheme was designed to provide an accurate and consistent assessment of the state of water quality and how it changed over time. The Nutrients GQA describes quality in terms of two nutrients: nitrates (mg NO₃ /l) and phosphates (mg P/l).

A grade from 1 to 6 is allocated for both phosphate and nitrate. These are not combined into a single nutrients grade. In this respect it differs from the chemistry GQA which combine factors into a single grade. This cannot be done for nutrients.

There are no set 'good' or 'bad' concentrations for nutrients in rivers in the way that we describe chemical and biological quality. Rivers in different parts of the country have naturally different concentrations of nutrients. 'Very low' nutrient concentrations, for example, are not necessarily good or bad; the classification merely states that concentrations in this river are very low relative to other rivers.

2.1.2 Description of Phosphate grades

The table below gives the limit for each phosphate grade, i.e. averages less than 0.02 are graded class 1. The description given uses common terms to distinguish between the classes.

Classification for phosphate	Grade limit (mgP/l) Average	Description
1	<0.02	Very low
2	>0.02 to 0.06	Low
3	>0.06 to 0.1	Moderate
4	>0.1 to 0.2	High
5	>0.2 to 1.0	Very high
6	>1.0	Excessively high

The descriptors used relate to the concentrations in the grades. 'High' descriptions are used for all the grades where the average is more than 0.1 mg/l. This is the concentration is considered indicative of possible existing or future problems of 'eutrophication'. (This is the term given to the enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, causing accelerated growth of algae and higher plant forms to produce an undesirable disturbance to the balance of organisms present in the water and the quality of the water concerned.)

High concentrations of phosphate do not necessarily mean that the river is eutrophic. Other factors have to be taken into account such as the amount and type of algae present, flow rates, and dissolved oxygen concentrations.

2.1.3 Description of Nitrate grades

The table below gives the limits for each grade. For example, grade 2 is assigned to averages between 5 and 10 mg NO₃/l. The descriptors use common terms to distinguish between the grades.

Classification for nitrate	Grade limit (mg NO ₃ /l) Average	Description
1	<5	Very low
2	>5 to 10	Low
3	>10 to 20	Moderately low
4	>20 to 30	Moderate
5	>30 to 40	High
6	>40	Very high

The descriptors relate to the nitrate concentrations in each class. 'High' concentrations refer to average concentrations above 30 mg/l. This limit very roughly corresponds with a 95 percentile limit of 50 mg/l which is used in the EC Drinking Water Directive and the EC Nitrate Directive. There is, however, no direct comparison because the methods used to calculate the 95 percentile for the purposes of these Directives are strictly laid down and cannot be estimated from average concentrations over three years.

GQA Nutrients grades are available for the years 1990, 1995 and 2000-2008. Availability of historic data from 1990 & 1995 varies due to differences in regional sampling programmes.

2.2 Data extraction

The GQA nutrients data were extracted from WIMS (Water Information Management System) nationally, using SQL code, into Microsoft Access database tables. This data was compiled into summary statistics for each year, and combined with previous years into a prepared table. These prepared data tables were then processed through an Access application program to calculate the GQA grades.

The GQA nutrients data was updated annually with 2009 being the final year in England and 2010 in Wales. After 2009 this indicator will be replaced with one based on Water Framework Directive sampling networks however this will not be ready until at least 2014.

2.3 Related data sources

GQA Nutrients relate to the GQAHI & GQA chemistry, biology and RQO as they use the same (river) stretch network. For further information on this consult the GQA Biology national dataset user guide.

3.0 Public Register and non Public Register data

For a general description of what constitutes public register and non-public register data please refer to the National Dataset Generic Text document

All GQAHl & GQA nutrients data is non-public register.

3.1 National Security

A discussion of national security issues can be found in the Generic Text document. There are no exclusions from this dataset for national security reasons.

3.2 Legislation relevant to the GQAHl and GQA Nutrients dataset

GQAHl (England) & GQA (Wales) do not arise from legislation and therefore they are not statutory, but originate from Government and the Environment Agency commitments towards the improvement of water quality.

4.0 Data structure

The detailed data structures of the GQAHI & GQA Nutrients are shown in the National Dataset Field Attribute document called GQA_HI_Nutrients_attributes_v2.0.doc.

All the data is provided in flat file MS Access tables.

There are four tables:

- nitrate GQA grades 2009 (England)
- nitrate GQA grades 2010 (Wales)
- phosphate GQA grades 2009 (England)
- phosphate GQA grades 2010 (Wales)

Some stretches are used for both England and Wales as they are effectively the border between the two, which is why England and Wales have separate tables.

5.0 Data quality

5.1 Data standards

For data standards applicable to a number of national datasets please consult the National Dataset Generic Text document. Any standards specific to the GQAHl & GQA Nutrients data are detailed below.

5.1.1 Locational data standards

The precision of NGR data range between 1m for NGRs composed of 12 digits (2 letters and 10 numbers) and 10m for NGRs composed of 10 digits (2 letters and 8 numbers).

5.2 Reporting errors

Methods of reporting errors and the recording of data queries are included in the generic text document, whilst information on providing feedback can be found at the end of this user guide.

This data is now static and will not be amended or revised.

5.3 Validation rules and completeness checks

Every effort was made to minimise data errors occurring in the GQAHl & GQA Nutrients data release. For background information on the data validation process and general completeness checks that we carry out, please refer to the Generic Text document.

5.4 Validation checks specific to the GQAHl (England) and GQA (Wales) Nutrients

GQAHl & GQA nutrients summary statistics were collated and held nationally. The following checks quality assurance were performed:

- 1) Verify the number of samples taken in the year at each sampling point for each determinand.
- 2) Detect unusual or unexpected grades/changes in compliance and double-check raw data if necessary.

5.5 Known quality issues

For a number of records, it might occur that the field RNAME describing river names appear truncated. In-depth work on data quality is currently ongoing and issues will be notified as soon as known.

6.0 Frequently Asked Questions (FAQ)

7.0 Useful information when using the data

You should take into account the following information when analysing the data. This section also points out information that is not included in the data, as well as any limitations on interpreting the data.

7.1 What is not included in the data

The dataset does not include individual summary statistics of raw results from which the grades are calculated. However individual results can be supplied under specific request.

7.2 Recommendations on how to use or analyse the data

The GQAHl (England) & GQA (Wales) network can be plotted in a Geographic Information System (GIS) as a series of arcs connecting the upstream and downstream limits of each stretch. The monitoring points can also be plotted. The monitoring points are relatively widely spaced, however they are seen as indicative of water quality for the whole stretches they represent. This permits the presentation and analysis of graded stretches of river in relation to other data layers using a GIS.

7.3 Changes in the data

This data is now static as the GQAHl assessment has ceased.

8.0 Glossary

GQAHl	General Quality Assessment Headline Indicator
GQA	General Quality Assessment
NGR	National Grid Reference
RQO	River Quality Objectives
RE	Rivers Ecosystem
WIMS	Water Information Management System

9.0 Feedback

We welcome feedback on our data. If you have any comments please send us an email at the address below with the following details

The National Dataset to which the feedback relates.

Any feedback on the contents of the documentation

Any feedback on the data content

Any general feedback

**Data Sharing and Access
Environment Agency
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10.0 Appendix 1

Complete list of all amendments ever made to the document

Version number	Section number	Amendment description	Date
2.0.0	All	Document updated	11/02/13
1.0.0	All	Document created	21/01/10