River Basin Plans – Groundwater Classification

Trend Assessment and Points for Trend Reversal

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Water Framework Directive - Groundwater	Classification	
Quality pressures – Trend Assessment and points for trend reversal	Reference	
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1.0 Purpose

This paper describes the method for assessing upward trends in concentrations of pollutants and natural parameters in groundwater. It also sets out how we determine starting points for trend reversal. The identification and characterisation of trends is a requirement of the Water Framework Directive (WFD) and the Groundwater Daughter Directive (GWD) and forms part of the groundwater body chemical status assessment.

2.0 Background

The WFD and GWD require the identification and assessment of statistically significant and sustained upward trends in concentrations of pollutants in groundwater bodies. The identification of upward trends has to be made in sufficient time to allow programmes of measures to be implemented to reduce pollution, avoid deterioration of groundwater quality or avoid failure of any other relevant WFD objective, e.g. good status.

3.0 Classification

This assessment has been undertaken to support the following element of classification:

Chemical Classification

- Impact on Drinking Water Protected Areas

4.0 Assessment Process

The following assessment process was undertaken for nitrates. Since there is insufficient historical monitoring data to fully not long enough to undertake a statistically significant trend assessment, a simpler methodology was adopted to identify possible upward trends. The simplified methodology is described below.

An initial screening was used to identify monitoring points with a likely upward trend. Any monitoring points that had an annual average (over the 6-year period) higher than 56% of the nitrate Drinking Water Standard (DWS), 28.1mg NO_3/l, or had any single exceedences of the DWS, 50mg NO_3/l, had a trend assessment performed.

Trend assessment involved plotting the annual averages for each monitoring point identified from the screening and adding a linear trend line through the data points. Any monitoring point where the linear trend line had a positive gradient was identified as having an upward trend.

5.0 Outcome

The initial screening identified 6 monitoring points in the Belfast groundwater body and 2 monitoring points in the Ballymena groundwater body that had both an average of over 28.1mg NO_3/l and exceedences over 50mg NO_3/l. The trend analysis on the annual average results for the last 6 years of available data found that 4 of the 6 monitoring points for the Belfast groundwater body and 1 of the 2 monitoring point for the Ballymena groundwater body showed evidence of upward trends. All identified monitoring boreholes are located in areas known to be at risk from nitrate pressures.

The Belfast and Ballymena groundwater bodies have been designated at being at poor status as a result of the known nitrate pressures. The Nitrates Action Programme (NAP) Regulations (Northern Ireland) 2006 became operational on 1 January 2007 with the aim of reducing the pollution of water by nitrates from agricultural sources.

6.0 River Basin Planning Cycle

Nitrates and other parameters will be sampled regularly at monitoring stations where possible over the next River Basin Planning Cycle. The collected data of measured concentrations will allow trend analyses to be carried out and improved.

7.0 Starting Points for Trend Reversal

Article 17(5) of the WFD states that the starting point for trend reversal should be defined as 75% of a relevant environmental standard or threshold value, but that an earlier or later starting point can be chosen to meet environmental objectives cost – effectively.

For nitrate, the threshold value in Northern Ireland was set at 75% of the DWS equating to 37.5mg NO_3/l. Seventy-five percent of this threshold value (as set out in the WFD, see above) is 28.1mg NO_3/l equating to the starting point for trend reversal. The starting point for trend reversal is chosen at quite a low concentration to allow measures to be put in place to reverse trend in sufficient time to avoid failure of WFD environmental objectives. Five monitoring points have exceeded this concentration (28.1mg NO_3/l) corresponding to the time for starting points of trend reversal. However the NAP Regulations have been in place from 2007 and are a basic measure under the Programmes of Measures.