River Basin Management Plans – Groundwater Classification

Urban Areas

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An Agency within the Department of the Environment
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NIEA Northern Ireland Environment Agency
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1.0 Purpose

This paper describes the approach taken to assess the Water Framework Directive (WFD) chemical status of groundwater bodies with respect to impact from urban areas.

2.0 Background

The WFD requires that groundwater bodies must be classified as good or poor for both chemical status (in relation to a large range of pollution pressures) and quantitative status (in relation to groundwater abstraction pressures).

Potential impacts from urban areas have been considered in the context of four of the five tests developed for groundwater body chemical classification, based on WFD requirements and guidance provided at an EC and UK level[1]. The five tests consider groundwater chemical composition with respect to impacts on the groundwater body (including significant potable supplies), and on any ecological receptors which depend on it. The worst result from all five tests is taken as the overall chemical status result for each groundwater body.

Northern Ireland has a predominately rural land use with few major 'urban' population centres outside of the greater Belfast (including Lisburn) and Londonderry city areas. Other significant centres of population include: Bangor, Craigavon (inc. Lurgan/Portadown), Ballymena, Newtownards, Newry, Carrickfergus, Coleraine, Antrim, Omagh and Larne (population > 18000, as of 2001 census).

A variety of historic and current industrial activities is associated with each of the above settlements. Major industrial activity has mainly been located within or near to Belfast and Londonderry. Most significant industries currently in operation are regulated under IPPC legislation.

There has to date been only limited monitoring of groundwaters in and around these 'urban' areas. There is however patchy data available from site specific investigations and this can be used to make some assessment of potential impacts.

Urban areas represent settings where a cluster of point pollutant sources exists or has existed and where high-density/high volume infrastructure occurs with respect to transport and sewerage. The range of potential pollutants is likely to be wide including solvents, hydrocarbons, pesticides (amenity and domestic use), phosphorus and ammonia.

3.0 Classification

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

Chemical Classification

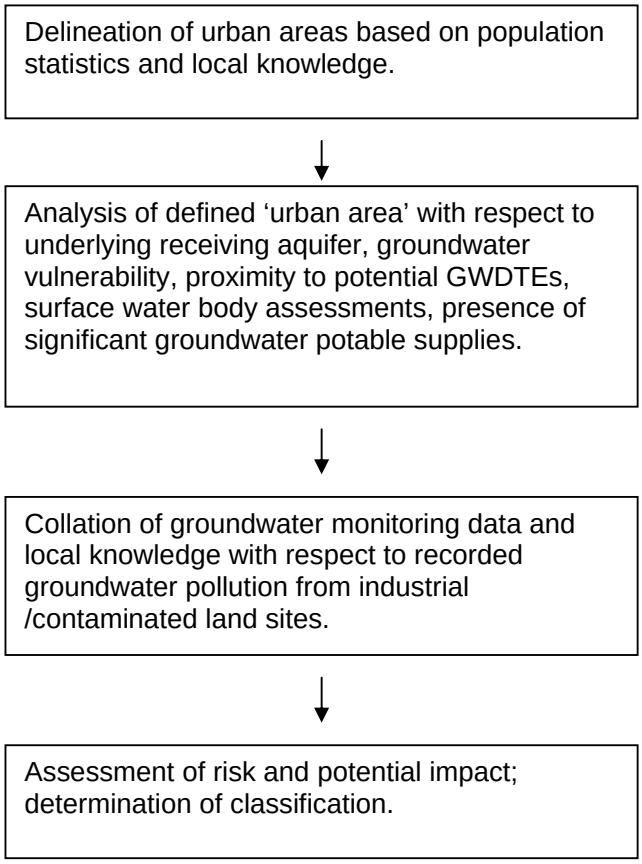
- No significant diminution of surface water chemistry and ecology
- Impact on Groundwater Dependent Terrestrial Ecosystems (GWDTEs)
- Impact on Drinking Water Protected Areas
- General assessment of quality

[1] UK Technical Advisory Group on the Water Framework Directive. Paper 11b(i): Groundwater Chemical Classification for the purposes of the Water Framework Directive. This paper can be downloaded from the www.wfduk.org web site.

4.0 Assessment Process

The following assessment process was undertaken, managed within a GIS-based project.

It should be noted that for potential GWDTEs (SPA, SAC, ASSIs and NNRs) there is limited knowledge available regarding their groundwater dependency and sensitivity to water chemistry changes. Where such sites occur within or near an identified urban area an opinion on potential for impact has been taken by reference to the hydrogeological setting and information available from NIEA ecologists familiar with the sites.



This assessment has sought to identify all significant urban areas and consider their potential impacts with respect to general groundwater quality, nearby surface water bodies, significant potable groundwater supplies and potential GWDTEs (SAC, SPA, ASSIs and NNRs).

The assessment was based on the information available regarding local knowledge of hydrogeological settings, reported pollution incidents and some limited urban groundwater monitoring data.

5.0 Outcome

No groundwater body has been classified as being at “poor” status for any classification element for this urban source pressure on the basis of this assessment. One groundwater body underlying Belfast and Lisburn (GBNI4NE005) which incorporates the most industrially intensive area in Northern Ireland has been observed as being at risk of impacting surface water and/or drinking water sources. Data from this urban area has confirmed impacts from a variety of sources. However with respect to the individual tests for determining chemical status no definite failure has been identified (NB: elements of the urban assessment overlap with other reported assessments such as DWPA).

This assessment has sought to identify all significant urban areas and consider their potential impacts with respect to general groundwater quality, nearby surface water bodies, significant potable groundwater supplies and potential GWDTEs (SAC, SPA, ASSIs and NNRs). Using local knowledge of hydrogeological settings, identified pollution incidents and some limited urban groundwater monitoring data a determination has been made. Due to the limited data relating to groundwater quality beneath the identified urban areas, the assessment is primarily qualitative and for groundwater bodies with any significant urban area a “low” confidence rating has been assigned. Research in the Republic of Ireland suggests that some level of contamination is usually found in groundwater samples obtained from beneath urban areas. Most urban areas represent only a relatively small proportion of their host groundwater bodies and therefore the potential that overall ‘mean’ groundwater quality is being impacted from this pressure is generally very low.

6.0 River Basin Planning Cycle

The urban areas generally represent only a very small proportion (other than Greater Belfast) of the groundwater body in which they are located. Limited groundwater monitoring data is available for urban areas. Further analysis of historical land use, monitoring requirements and risk assessment is required over the river basin planning cycle. Consideration will also be given to sub-division of groundwater bodies in order to focus risk assessment and, if required, target programmes of measures. Given the likely multiple sources of pollution, some known but most unknown, where more significant impacts are identified, it is unlikely that a cost-effective improvement in general water quality can be readily achieved. Ongoing land redevelopment and infrastructural improvement in such areas will however likely deliver a degree of improvement.

Northern Ireland Environment Agency
17 Antrim Road
Lisburn
BT28 3AL

www.ni environment.gov.uk

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