

River Basin Management Plans – Groundwater Classification

Mine Workings

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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 mine workings.

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 mine workings have been considered in the context of two of the five tests developed for groundwater body chemical classification, based on WFD requirements and guidance provided at an EC and UK level¹. The five tests consider groundwater chemical composition with respect to impacts both on the groundwater body (including significant potable supplies), and on the 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 over 2000 abandoned mine workings mostly dating from the 18th to the early 20th Century. Mining was mainly for iron ore, coal, lead and salt and the majority of the mine workings were small with minimal surface disturbance.

There are few active mines in Northern Ireland although there are significant areas which are the subject of prospect licences issued by DETI. Kilroot salt mine near Carrickfergus (Co. Antrim) is the largest active mine where rock salt is extracted from Triassic evaporite deposits. Two main gold deposits have been identified in the west of Northern Ireland in Co. Tyrone at Curraghinalt and Cavanacaw. Production by surface extraction has begun at Cavanacaw. Hard coal was extracted in the more recent past from two small coalfields at Coalisland (Co. Tyrone) and Ballycastle (Co. Antrim).

Environmental impact on the water environment from mines is usually associated with operational discharges of waters during the mine active life or following mine closure where dewatering ceases and water levels recover, eventually discharging poor quality water (e.g. low pH, elevated metals) to surface water systems at natural or artificial (e.g. adits) overflow points. Compared to some other parts of the UK where there are large scale coalfields (Midlands and Scotland) or metalliferous mines (Cornwall), Northern Ireland has a relatively minimal 'environmental' legacy from mining.

The Geological Survey of Northern Ireland (GSNI-DETI) has responsibility for reviewing safety at abandoned mines. Their survey of such mines indicated that only a very small percentage of the sites were discharging water at the time of inspection.

A variety of factors will influence whether or not an individual site poses a particular risk to the water environment including: size and depth of the site, the local hydrogeological setting and proximity to sensitive receptors.

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.

3.0 Classification

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

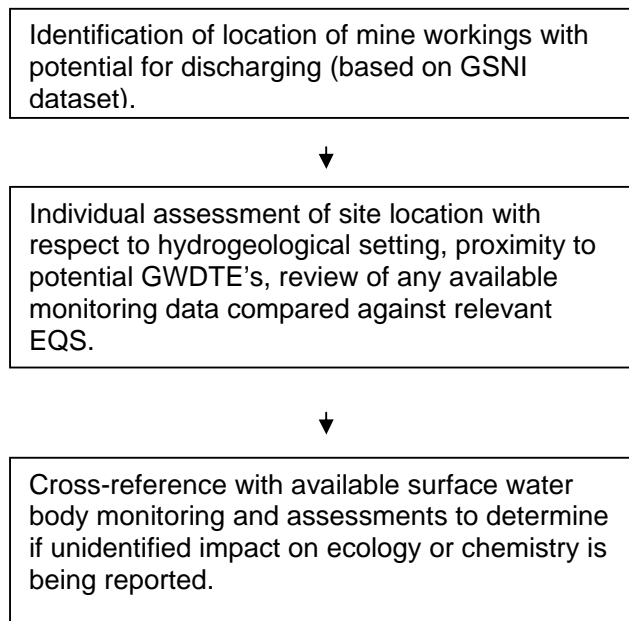
Chemical Classification

- No significant diminution of surface water chemistry and ecology; and
- Impact on Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

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), limited knowledge is presently available regarding their groundwater dependency and sensitivity to water level/flow changes. Where a mine site is identified in close proximity to potential GWDTEs an opinion on potential for impact has been made by reference to the hydrogeological setting and information available from NIEA ecologists familiar with the sites.



A representative selection of abandoned mine sites where GSNI inspections identified water discharging was visited and the associated discharges sampled. For all such sites the surface water body classification was checked and none found to be at less than “good” chemical (pH) status.

For the current active mine at Kilroot, there are no known significant discharges or pollution issues. Nearby abandoned salt workings have had some temporary problems as a result of roof collapses where high conductivity saline water has discharged at the surface for a limited period of time. There are currently no known significant saline seepages in this area

5.0 Outcome

No groundwater body has been assessed as being at “poor status” due to significant impact from this pressure. There are no known impacts on surface waters (based upon surface water pH classification and water chemistry analysis). Monitoring did show some discharge water marginally elevated in some metals (but not at significant levels) but with relatively low discharge volumes.

There is relatively little current or historical large scale mining activity in Northern Ireland therefore little potential for significant impact. For groundwater bodies where there were no known existing mines or historical mine workings with no water discharge identified a high confidence was determined. For those bodies where a number of mines with discharge were identified or where the few more significant mine workings occur, a low confidence was determined.

6.0 River Basin Planning Cycle

For those bodies with discharging mines, further monitoring of discharge volumes, discharge quality and receiving water quality should lead to improved confidence in the assessment. For more significant sites a more detailed survey of any associated mine ‘waste’ deposits may also be appropriate.

Northern Ireland Environment Agency
17 Antrim Road
Lisburn
BT28 3AL

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