

Abstraction and Flow Regulation Risk Assessment Summary

1. Summary

The aims of the methodology are to determine whether water bodies (rivers, lakes and transitional) identified in Northern Ireland are at risk or not at risk, with low or high confidence, from the combined pressures of abstraction and flow regulation. The deviation from natural flow or the flushing/level change for lakes according to ecological thresholds will be used to determine the risk, in line with UKTAG guidance¹. A two tier approach has been adopted. Tier 1 involved the screening of river, lake and transitional water bodies using a simple presence and absence assessment. A Tier 2 assessment refined the Tier 1 assessment by using a water balance approach where the magnitude of the pressure and sensitivity of the water body are considered. The assessment of abstraction pressures on groundwater is recorded elsewhere.²

2. Data Sources

Data on abstractions, impoundments and discharges have been collated. Data on fish farms and hydro-schemes were also included. Discharge data were collated from the EHS industrial consents database and Water Service Regulation database.

Abstraction and impoundment data were collated from a number of sources, but mainly from Water Service, Drinking Water Inspectorate and British Geological Survey records. Flow data/level data from Rivers Agency and Micro Low Flow (flow estimation software developed in 1998 by Institute of Hydrology) were used for Tier 2 assessments.

3. Risk Analysis

Tier One

The Tier 1 approach was based on the presence or absence of abstractions and flow regulation pressures on water bodies using the datasets described above.

All water bodies that have significant abstractions or flow regulation pressures, using the abstraction, discharge and impoundment datasets, were assessed provisionally as 'probably at risk' (1b). Water bodies that do not have any significant abstractions or flow regulation pressures were assessed provisionally as 'probably not at risk' (2a). The low confidence level assigned to these water bodies is based on the assumption that some water bodies assigned 'probably not at risk' may still contain a number of small abstractions.

Lakes were assessed as 'probably at risk' (1b) if significant abstractions (e.g. public water supply) and a physical structure exist, enabling impoundment of the lake.

Where a physical structure exists on a lake or river, flow regulation pressures affect water bodies downstream of the outlet. For initial characterisation purposes, water

¹ http://www.wfduk.org/tag_guidance/Article_05/Folder.2004-02-16.5332/TAG2003_WP_7b_%2802%29/view

² http://www.ehsni.gov.uk/pubs/publications/RA_Groundwater.pdf

bodies immediately downstream of impoundment structures were assessed as 'probably at risk'.

Tier Two

Further work has continued to refine the original Tier 1 assessment. Estimates of the natural flows have been compared with estimated, artificially influenced flows where the sum of all discharges and abstractions acting on a water body have been considered. Risk categories will then be assigned to the water body depending on the deviation from natural flow in rivers or flushing regime for lakes in line with UKTAG guidance.

4. Data Gaps and Future Work

The risk assessment exercise has highlighted a number of data gaps, and there is a need to further develop flow estimation models and new gauging sites to provide more accurate estimates of both natural and artificial regimes relevant to Northern Ireland hydrometric conditions. The sensitivity of rivers and lakes to flow reduction is not yet fully understood, and precautionary measures need to be adopted. The impact of flow regulation from impoundments can be difficult to quantify without measured data and further investigation on volumes released. Information on abstraction and discharge volumes will require further validation, as these are areas where relatively new datasets based on estimation rather than measurement have been used to inform the impact on flows.