

**\*\*Please note – this report must be read in conjunction with the Northern Ireland Water Framework Directive Summary Report of the characterisation and impact analyses required by Article 5\*\***

**(<http://www.ehsni.gov.uk/pubs/publications/article5report.pdf>)**

## **Freshwater Morphology Risk Assessment Summary**

### **1. Summary**

This method summary details the approach taken to assessing river and lake water bodies which are at risk of failing the environmental objectives of the Water Framework Directive (WFD), because of morphological alterations. Assessment methods for transitional and coastal water bodies are recorded elsewhere<sup>1</sup>. Morphological alterations are not relevant to groundwater bodies.

Guidance has been produced on how this assessment may be done at EU level through the Common Implementation Strategy (CIS) IMPRESS Guidance<sup>2</sup>, and by UKTAG<sup>3</sup>.

Pressures on morphology of surface waters can arise from a number of anthropogenic sources:

- Agriculture
- Coastal defence/protection
- Forestry
- Fisheries (freshwater and marine)
- Navigation
- Recreation
- Urban development
- Water supply and treatment
- Power generation

These activities can lead to physical alterations such as river substrate manipulation, channel straightening and culverting, changes to flood plains, construction of weirs, dams, and shoreline defences, land reclamation, dredging and deposition of material.

### **2. Data Sources**

EHS WMU has no in-house data sets to assess morphological alterations. Therefore the following data sets were sourced from other departments and agencies:

- River Habitat Survey Database from EHS Natural Heritage
- Land Use Data from Land Cover Map 2000
- Flood defence embankments and culverts, from DARD Rivers Agency
- Impoundments data from DRD Water Service

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<sup>1</sup> [http://www.ehsni.gov.uk/pubs/publications/RA\\_Trac.pdf](http://www.ehsni.gov.uk/pubs/publications/RA_Trac.pdf)

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[http://forum.europa.eu.int/Public/irc/env/wfd/library?l=/framework\\_directive/guidance\\_documents/modified\\_guidance&vm=detailed&sb=Title](http://forum.europa.eu.int/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents/modified_guidance&vm=detailed&sb=Title)

<sup>3</sup> [http://www.wfduk.org/tag\\_guidance/Article\\_05/Folder.2004-02-16.5332/TAG2003WP7c\\_%2801%29Draft\\_guidance\\_on\\_morphological\\_pressures\\_%28P2.v3-26.01.04%29/view](http://www.wfduk.org/tag_guidance/Article_05/Folder.2004-02-16.5332/TAG2003WP7c_%2801%29Draft_guidance_on_morphological_pressures_%28P2.v3-26.01.04%29/view)

### **3. Approach to Analysis of Data**

There is currently only a limited amount of data within Northern Ireland on the extent of morphological alterations to rivers, lakes, transitional and coastal waters. Techniques for describing and assessing surface water morphology are not well developed except for rivers where there is the River Habitat Survey (RHS). The overall approach is precautionary because of the limited amount of data available and the poor understanding of the relationships between morphology and ecology. The assessment used therefore was a rapid screening tool for morphological pressures. Each risk assessment includes an estimate of confidence as factors such as the age of data and coverage of sites affect the level of confidence in the assessment.

The following approach was used for rivers:

River Habitat Survey data at present cover approximately 50% of Northern Ireland river water bodies. Where RHS data are available, the Habitat Modification Score (HMS) in RHS was used to assess the risk, as this reflects the degree to which the natural stream channel and its banks have been altered. Where available, datasets of the location of impoundments, flood banks and culverts were used to assess the presence of impoundments or the proportion of the water body length affected. In the absence of these datasets, a map-based screening risk assessment was used as outlined in UKTAG guidelines. This approach is designed to assess the most obvious morphological alterations visible on data sets such as ordnance survey (OS) maps and land use maps. Those alterations not visible on the maps, or known of through expert knowledge, will not be considered in first pressure and impact assessment, but will be considered in ongoing assessments after 2004.

The map approach considered specific pressures of (a) river straightening, (b) bed and bank reinforcement, (c) presence and number of impoundments, weirs, sluices, fords and dams and (d) land-use.

Land Cover 2000 dataset was used to identify areas subject to land-use pressures. The four land-use categories considered as non-natural cover within Land Cover 2000 are urban, improved grassland, arable and coniferous woodland.

Techniques for assessing the morphology of lakes are not well developed. UKTAG guidelines propose two approaches to risk assessment for lakes. A combination of both approaches was used, using a map-based screening approach that includes threshold criteria against which to assess the pressures. The risk assessment considered the significant morphological pressures on each of the lake water bodies, and included for this initial level 1 screening are as follows:

The presence of an impoundment, dam, weir or sluice on a lake water body places the water body at risk. Land Cover 2000 dataset was used for identifying areas subject to land-use pressures. The four land-use categories considered as non-natural cover within Land Cover 2000 are urban, improved grassland, arable and coniferous. Built development on the lake shore was assessed using Ordnance Survey maps. Thresholds for risk assessment have been adopted from UKTAG guidelines. The measured attribute is the proportion of the lake shore affected. Alteration of feeder

stream habitat caused by straightening/channelisation, bed and bank reinforcement, intensive land-use and presence/absence of weirs was considered. These were assessed using OS maps and Land Cover 2000.

The above risk assessment plays a part in the wider process of identifying provisional Heavily Modified Water Bodies (pHMWB) and provisional artificial water bodies (pAWB).

#### **4. Data Gaps and Future Work**

Fishery pressures have not been assessed. WMU is awaiting datasets from the Fisheries Conservancy Board for Northern Ireland. DRD Water Service has been contacted regarding water level fluctuations in its reservoirs and impoundments. WMU is currently awaiting this information.

A new Lake Habitat Survey technique has been proposed and is being trialled at present. It is anticipated that this new technique will be approved in time for future assessments.

Further work and extension of the RHS sites will also be undertaken by WMU and Natural Heritage.