UK TECHNICAL ADVISORY GROUP ON THE WATER FRAMEWORK DIRECTIVE

River Morphology High Status Features and Criteria- Assessing Consistency Across the UK

This Guidance Paper is a working draft defined by the UKTAG. It documents the principles to be adopted by agencies responsible for implementing the Water Framework Directive (WFD) in the UK. This method will evolve as it is tested, with this working draft amended accordingly.			
Working Paper Version:	4	**Status:**	Final
WFD Requirement:	Environmental objectives, high status, classification	**UKTAG Review:**	RTT 7/8/08
		Author:	

Background

A key aspect of Water Framework Classification is the determination of hydrological and morphological High Status of water bodies. The UKTAG Classification Report has identified that different parts of the UK may have to take somewhat different methodological approaches to classification but that the overall policy aims are very similar. This paper sets out some consistent principles for a UK national framework for the assessment of morphological, and associated catchment, characteristics of rivers in order to identify riverine water bodies at High morphological status. The purpose of this framework is to achieve consistency despite the considerably different availabilities of relevant data and assessment tools across the UK.

It is also important to be able to demonstrate consistency, as far as possible, with other aspects of WFD implementation including intercalibration of biological quality element classification in the Common Implementation Strategy.

Accounting for uncertainty in assessment methods

The UK national methods in use in England and Wales, Scotland and Northern Ireland all include assessment criteria for in-channel, riparian zone, catchment and infrastructure pressures that can adversely affect the morphological condition of river water-bodies. It is our common view that the assessment of in-channel; riparian zone and infrastructure features through well-developed morphological condition survey methods (eg. River Habitat Survey, Morphological Impact Assessment System & Rapid Assessment Technique) can provide reasonable certainty in the assessment of pressures and impacts. These assessments can be used directly in the classification of water bodies at High Status.

The UK methods also acknowledge the broad linkage between low-intensity agriculture adjacent to a water body and the likelihood of increased transport of fine sediments. This relationship is, however, imperfectly understood and so this pressure is used to provide an uncertainty estimate to the high status assessment. This concept has been used widely in UK implementation of the WFD. Where uncertainty is high it will be necessary to validate a high status assessment with the collection of more specific data. In the current context, adjacent can refer to land uses within, or abutting, the floodplain.

Discussions associated with the preparation of this paper have identified that the same land-use type in different parts of the UK can be subject to different management regimes. This can place different levels of pressure on the aquatic environment and it is important that this is reflected in the application of criteria across the UK. The varying intensity in the use of rough grazing land provides a clear illustration of these differences. In the Lake District high animal stocking levels on

rough grazing land can lead to measurable changes in the flow and sediment transport regimes in associated rivers. In Scotland where animal stocking rates are generally much lower on this land type, the risk of damage to rivers is much less. If land-use LCM 2000 data is used for this purpose regional variability should be taken account of by editing the LCM types. It is recognised that other national data sets can also be used to assess the risk of land use pressures affecting the morphological condition of rivers, and if this information is available it can also be used to adjust the LCM assessments. In Scotland such data exists in a diffuse pollution screening tool which was developed to support Characterisation, and it is likely that information from this tool will be used for this purpose. In Northern Ireland catchment pressures adjacent to the river will be recorded through the RAT procedure.

Land Cover Categories

As outlined above there is scope in this process to reflect regional variations in land use when making land cover assessments. The table below describes the LCM2000 sub-classes that will be used to make Artificial/Intensive and Low Intensity land use assessments.

Table 1 The land-use sub-classes associated with Artificial/Intensive & Low Intensity Agriculture categories in England & Wales, Scotland & Northern Ireland.

	EA	SEPA	EHS
Artificial or Intensive	*Arable Cereals; Arable Horticulture; Arable Non Rotational; Improved Grassland; Suburban/Urban Development; Continuous Urban, Coniferous Woodland*	*Arable Cereals; Arable Horticulture; Arable Non Rotational; Improved Grassland; Suburban/Urban Development; Continuous Urban, Coniferous Woodland*	*Arable Non Rotational; Improved Grassland; Suburban/Urban Development; Continuous Urban, Coniferous Woodland*
Low Intensity Agriculture	*Fen, Marsh, Swamp; Bog (deep peat); Setaside Grass; Neutral Grass; Calcareous Grass; Acid Grassland; Bracken; Dense Dwarf Shrub Heath; Open Dwarf Shrub Heath; Inland Bare Ground*	*Setaside Grass; Inland Bare Ground*	*Fen, Marsh, Swamp; Bog (deep peat); Neutral Grass; Calcareous Grass; Acid Grassland; Bracken; Dense Dwarf Shrub Heath; Open Dwarf Shrub Heath; Inland Bare Ground*

Generalised High Status Morphology Assessment Model

Figure 1 below illustrates the generalised model that SEPA, the EA and EHS will follow when making high status morphology assessments. Each country will decide whether it runs the channel and catchment assessments in series or parallel, and this will be determined by data set availability.

Figure 1 The UK Morphology High Status Consistency Framework

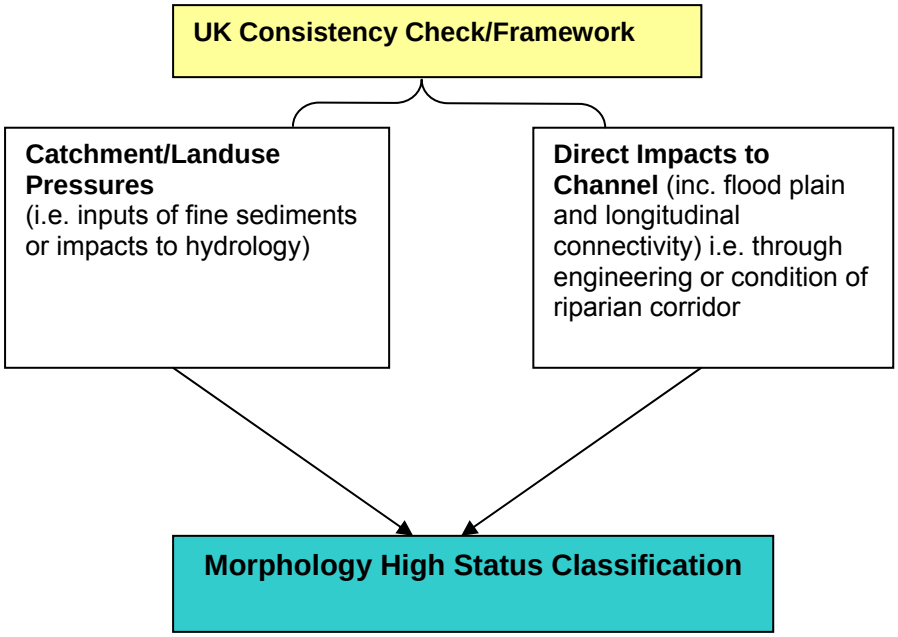


Table 2 describes the data sets and procedures that will be used across the UK for channel and wider catchment pressure assessments.

Table 2 Procedures and Data Sets to be used for UK High Status Morphology River Classifications.

Assessment	EA	SEPA	EHS
High Status for all other WFD classification assessments	WFD Classification Data	WFD Classification Data	WFD Classification Data
High Status for Hydrology	Water Resource-Environmental Standards	Water Resource-Environmental Standards	Water Resource-Environmental Standards
In-stream morphological condition	RHS, National Flood and Coastal Defence Database, aerial photography	Morphological Pressures Database/MImAS	RAT/RHS
Riparian Zone	Review aerial photographs to assess whether water bodies have adjacent natural vegetation appropriate to the and geographical location of the river	Morphological Pressures Database/MImAS	RAT/RHS- Desk top and field survey for Riparian Assessment
Infrastructure survey	GIS interrogation. Railway within the 100yr floodplain and within 250m of the river for 20% of its length- High Status Low	Morphological Pressures Database/MImAS	RAT/RHS- Flood Plain Assessments, desk top and site visits

Assessment	EA	SEPA	EHS
	Confidence Supported by review of aerial photographs		
Intensive land-use in catchment	≤10% Intensive land-use in the water body catchment	≤10% Intensive land-use in the water body catchment. Where a water-body fails this test, apply Diffuse Pollution Screening Tool Criteria to further assess the risk, and if it passes re-instate as High status with medium confidence.	Landuse being assessed using LCM in Riparian strip along sides of stream back to 20m
Low-intensity land-use adjacent to water body	High Status < 30% high certainty 30 – 60% mod certainty >60% low certainty. This assessment is made by assessing the land use that is immediately adjacent to the river water body. Supported by review of aerial photography	High Status < 30% high certainty: 30 – 60% mod certainty; >60% low certainty Where a water-body has high status with moderate or low confidence, apply Diffuse Pollution Tool Screening Tool Criteria to further assess the risk, and if it passes re-instate as High status with high confidence.	Landuse being assessed using LCM in Riparian strip along sides of stream back to 20m

In all cases where remote data such as land-use is used to infer channel condition and waterbody status, and data describing channel condition is also available then this can be used to over-ride land-use inferred assessments.

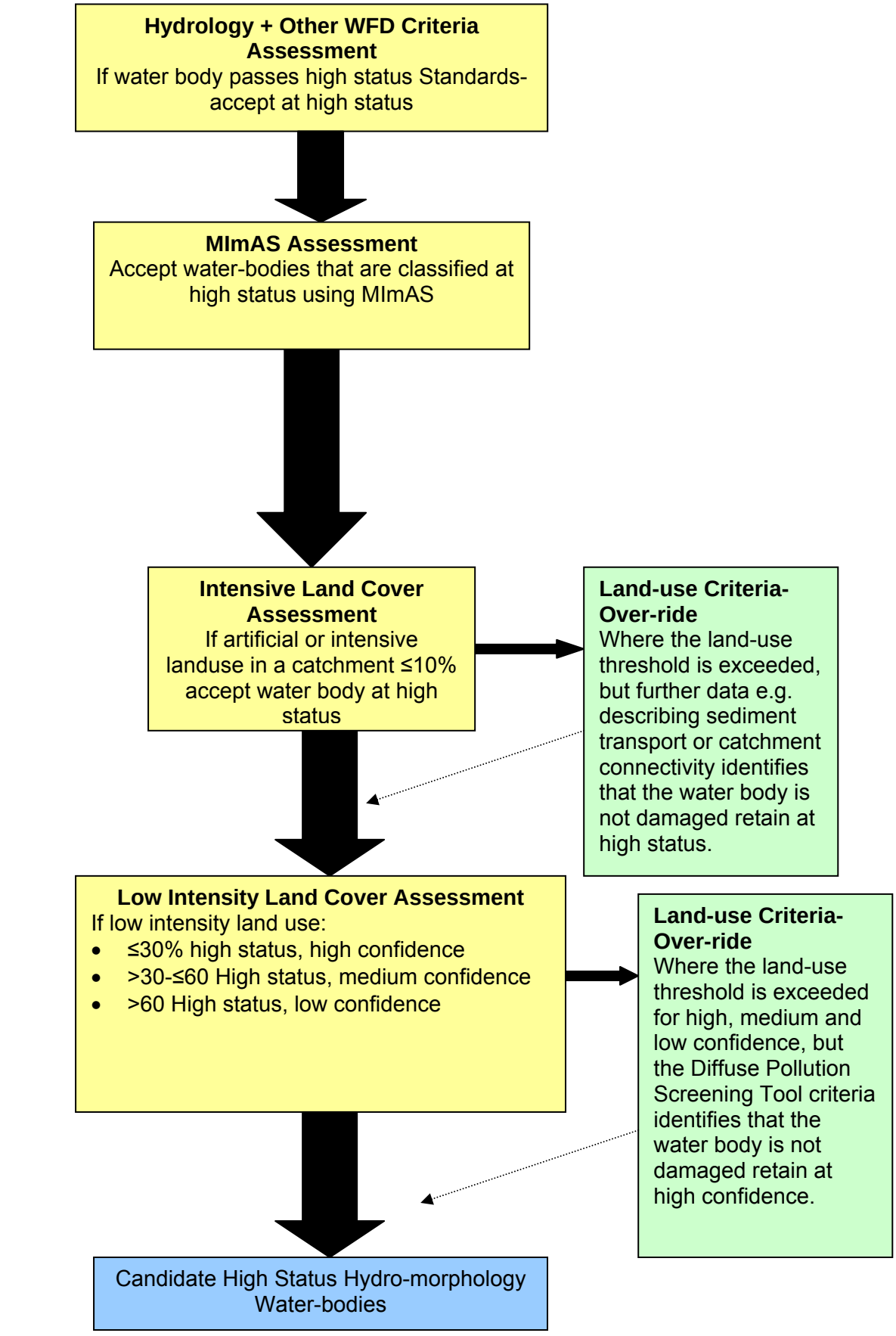
In Scotland and Northern Ireland MImAS and RAT respectively make a significant contribution to the overall high status morphology assessments, and initial comparisons indicate that they produce broadly similar results. The absence of suitable data prevents the EA taking either of these approaches; however, it is believed that the criteria it will use are broadly comparable with those being used in Scotland and Northern Ireland.

In addition a comprehensive and detailed comparison of these criteria would take a significant amount of time to deliver, and it is felt that the risks of serious inconsistencies are so low, that further investigations are not merited.

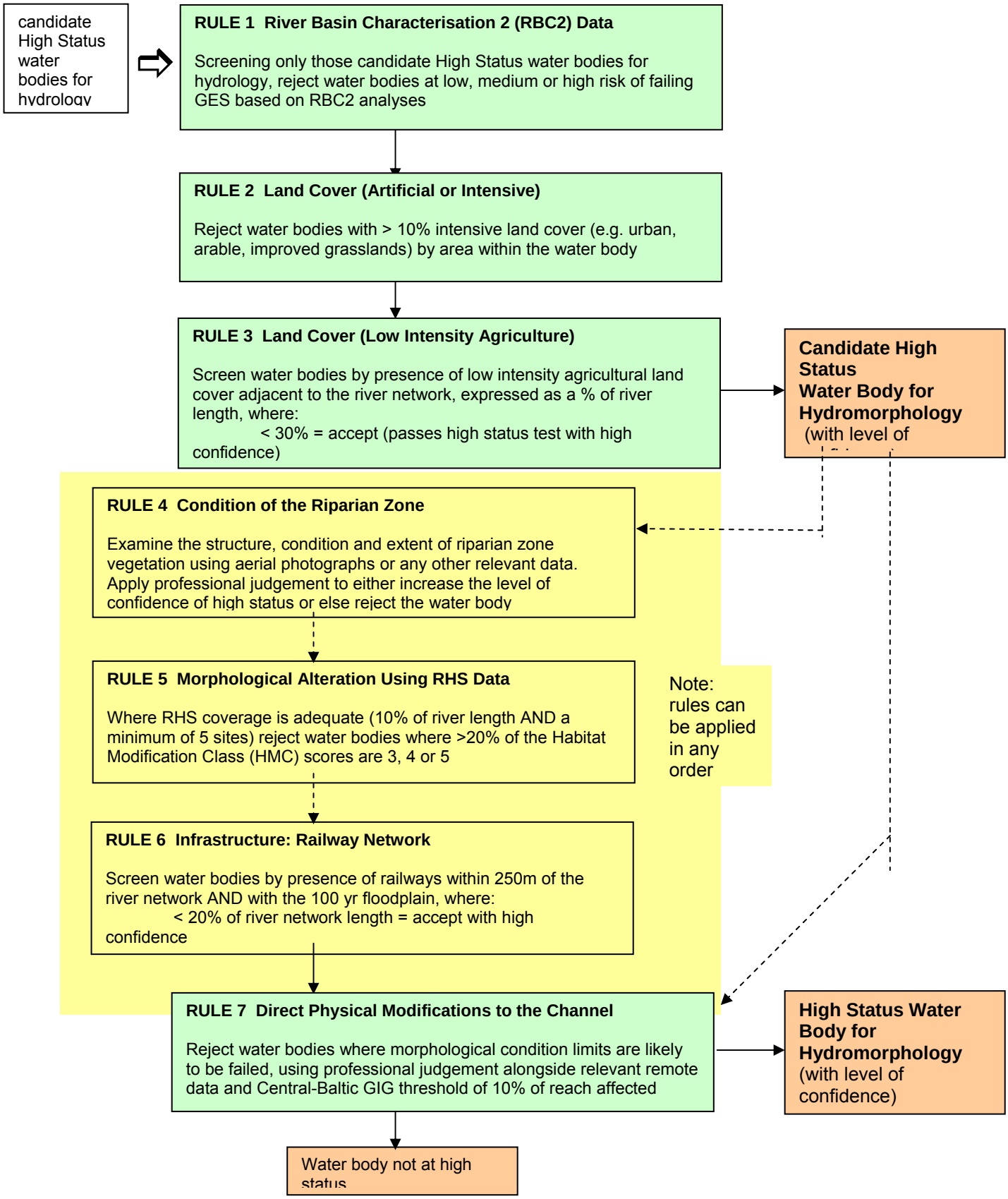
After applying the above largely automated approaches SEPA, EA & EHS should consider using local staff to validate the outcomes.

The approaches followed by EHS, EA & SEPA are provided in the Annex to this paper.

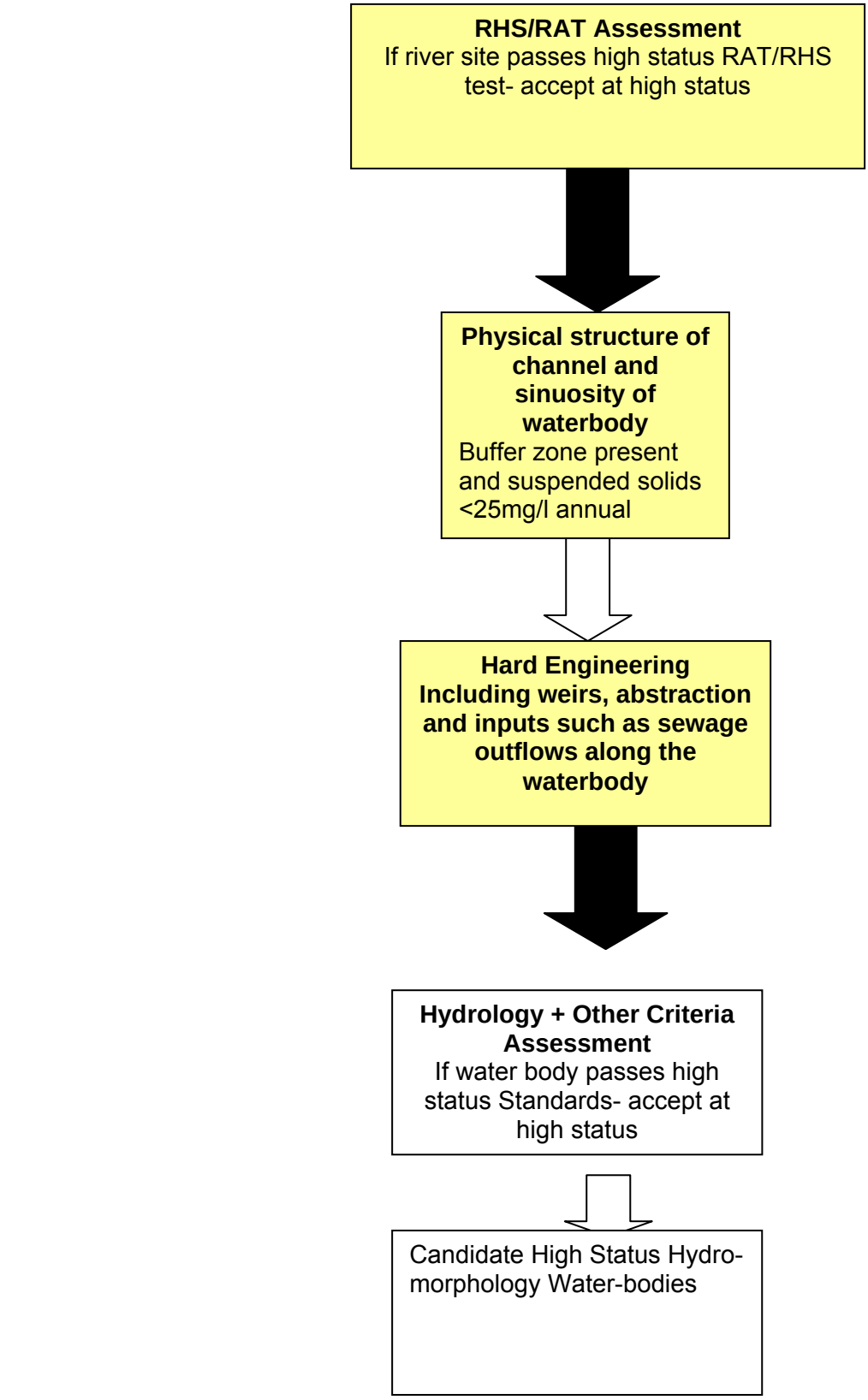
ANNEX


Hydrology + Other WFD Criteria Assessment
If water body passes high status Standards- accept at high status
MImAS Assessment
Accept water-bodies that are classified at high status using MImAS
Intensive Land Cover Assessment
If artificial or intensive landuse in a catchment ≤10% accept water body at high status
Land-use Criteria-Over-ride
Where the land-use threshold is exceeded, but further data e.g. describing sediment transport or catchment connectivity identifies that the water body is not damaged retain at high status.
Low Intensity Land Cover Assessment
If low intensity land use:
• ≤30% high status, high confidence
• >30-≤60 High status, medium confidence
• >60 High status, low confidence
Land-use Criteria-Over-ride
Where the land-use threshold is exceeded for high, medium and low confidence, but the Diffuse Pollution Screening Tool criteria identifies that the water body is not damaged retain at high confidence.
Candidate High Status Hydro-morphology Water-bodies

SEPA Method


candidate High Status water bodies for hydrology
RULE 1 River Basin Characterisation 2 (RBC2) Data
Screening only those candidate High Status water bodies for hydrology, reject water bodies at low, medium or high risk of failing GES based on RBC2 analyses
RULE 2 Land Cover (Artificial or Intensive)
Reject water bodies with > 10% intensive land cover (e.g. urban, arable, improved grasslands) by area within the water body
RULE 3 Land Cover (Low Intensity Agriculture)
Screen water bodies by presence of low intensity agricultural land cover adjacent to the river network, expressed as a % of river length, where:
< 30% = accept (passes high status test with high confidence)
Candidate High Status Water Body for Hydromorphology (with level of
RULE 4 Condition of the Riparian Zone
Examine the structure, condition and extent of riparian zone vegetation using aerial photographs or any other relevant data. Apply professional judgement to either increase the level of confidence of high status or else reject the water body
RULE 5 Morphological Alteration Using RHS Data
Where RHS coverage is adequate (10% of river length AND a minimum of 5 sites) reject water bodies where >20% of the Habitat Modification Class (HMC) scores are 3, 4 or 5
Note: rules can be applied in any order
RULE 6 Infrastructure: Railway Network
Screen water bodies by presence of railways within 250m of the river network AND with the 100 yr floodplain, where:
< 20% of river network length = accept with high confidence
RULE 7 Direct Physical Modifications to the Channel
Reject water bodies where morphological condition limits are likely to be failed, using professional judgement alongside relevant remote data and Central-Baltic GIG threshold of 10% of reach affected
High Status Water Body for Hydromorphology (with level of confidence)
Water body not at high status

EA Method



Northern Ireland Method (although this flow chart is linear no one element is more important than any other)