



WFD Heavily Modified & Artificial Water Bodies Preliminary Identification Methodology

GUIDANCE ON THRESHOLDS AND METHODOLOGY TO BE APPLIED IN IRELAND'S RIVER BASIN DISTRICTS

Paper by the Working Group on Characterisation and Risk Assessment

Surface water guidance document

This is a guidance paper on the application of a proposed **Surface Water Heavily Modified & Artificial Water Body Preliminary Identification** methodology. It documents the principles to be adopted by River Basin Districts and authorities responsible for implementing the Water Framework Directive in Ireland. This is a working draft describing a method that will evolve as it is trialled, and will be amended accordingly.

REVISION CONTROL TABLE

Status	Approved by National Technical Coordination Group	WFD Requirement	Relevant EU Reporting sheets	Date
Final	12 th November 2004	Impacts and Pressures	SWB 3 – Provisional identification of artificial and heavily modified water bodies	November 2004

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Acronyms

AWB	Artificial Water Body
DCMNR	Department of Communications, Marine and Natural Resources
GEP	Good Ecological Potential
GES	Good Ecological Status
HMWB	Heavily Modified Water Body
IWAI	Inland Waterways Association of Ireland
MEP	Maximum Ecological Potential
OPW	Office of Public Works
RBMP	River Basin Management Plan
SERBD	South Eastern River Basin District
WB	Water Body
WFD	Water Framework Directive

1. Introduction

Background

The overall goal of the Water Framework Directive (WFD) (2000/60/EC) is for Member States to achieve “good ecological and chemical status” in all bodies of surface water by 2015. Some water bodies may not achieve this objective for various reasons. Article 4(3) of the WFD permits Member States to identify and designate Artificial Water Bodies (AWB) and Heavily Modified Water Bodies (HMWB) under certain conditions. Designation allows the assignment of less stringent objectives to these particular water bodies and an extension of the timing for achieving the objectives is possible under other particular circumstances.

Designation of HMWBs and/or AWBs by Member States is optional. Where undertaken, designation and the reason for shall be specifically mentioned in the River Basin Management Plans required under Article 13 of the Directive, and reviewed every six years.

Article 7(2) of the Water Policy Regulations (S.I. No. 722 of 2003) transposing the directive into Irish law assigns the function of designating HMWB and AWB to the EPA:

Article 7(2): *The EPA shall, not later than 22 December 2004, for the purposes of Article 5 of the Directive (Characterisation) following consultation with such persons as it considers appropriate-*

...(b) identify each surface water body as –

- (i) belonging to one of the following categories namely rivers, lakes, transitional waters or coastal waters, or*
- (ii) an Artificial surface water body or a Heavily Modified surface water body*

Artificial Water Body means a body of surface water created by human activity (Article 2(8)). The key word differentiating an AWB from a HMWB is the word ‘created’. The CIS Working Group Guidance Document interprets an AWB as “a surface water body which has been created in a location where no water body existed before and which has not been created by the direct physical alteration or movement or realignment of an existing water body”.

Article 2(8) defines a Heavily Modified Water Body as a “body of surface water which as a result of physical alterations by human activity is substantially changed in character, as designated by the Member State in accordance with the provisions of Annex II”. The concept of HMWB was introduced by the WFD in recognition of the fact that many water bodies in Europe have been subject to major physical alterations to allow for a range of water uses.

Instead of “good ecological Status”, the environmental objective for HMWB and AWB is good ecological potential (GEP) which has to be achieved by 2015. GEP is a separate classification scheme which recognises the ecological effects of alterations and therefore represents a more realistic, but not necessarily a less stringent, ecological standard. Designated water bodies must achieve the objective of good chemical status, which also has to be achieved by 2015.

HMWB designation is a special case of risk assessment, combining elements of the Hydrological and Morphological Risk Assessments which allocate surface water bodies to one of the four categories in the adopted risk classification scheme: 1a-at risk, 1b-probably at risk, 2a-probably not at risk and 2b-not at risk. The structure within which the HMWB assessment took place was therefore designed to be consistent with that of the Irish risk assessments for Hydrological and Morphological pressure. An assessment was undertaken for each surface water category: rivers, lakes, transitional and coastal waters.

Guidance

Guidance on the approach to identification and designation of AWB and HMWB is provided both at a European level and from individual Member States to ensure common purpose. The CIS Working Group 2.2 on “Heavily Modified Water Bodies”, jointly managed by the United Kingdom and Germany, produced the following documents which were reviewed in the development of the Irish approach:

- Guidance Document on identification and designation of Heavily Modified and Artificial Water Bodies
- Toolbox on identification and designation of Heavily Modified and Artificial Water Bodies
- Policy Summary to the HMWB & AWB Guidance Document

A revision of the structure and organisation of the CIS working groups set up four new working groups (WG2.A to 2.D), two of which encompass aspects pertaining to HMWB and AWB designation, as follows:

WG2.A: Ecological Status (in relation to HMWB & AWB addressing only part on high and good ecological potential)

WG2.B: Integrated River Basin Management (in relation to HMWB & AWB, issues except those regarding high and good ecological potential)

Publications produced by the new groups complemented previously published material and were incorporated into the designation exercise as it became available.

In addition to European Guidance documents, the United Kingdom Technical Advisory Group produced a guidance document which was referenced in developing the Irish approach. “The Identification and Designation of Artificial and Heavily Modified Water Bodies under the Water Framework Directive (UK TAG, 2004)

Timelines

The CIS Guidance document proposed a Stepwise approach to the identification and designation of HMWB and AWB. This is an eleven-step process (Figure 1.1 below) concluding with the establishment of GEP for designated water bodies and the design of a programme of measures to ensure achievement of this objective by 2015. Whilst the designation of HMWB and AWB is not mandatory, if a Member State opts to undertake the process, the inclusion of designated water bodies requires meeting deadlines for the completion of various steps. These timelines are summarised in Table 1.1.

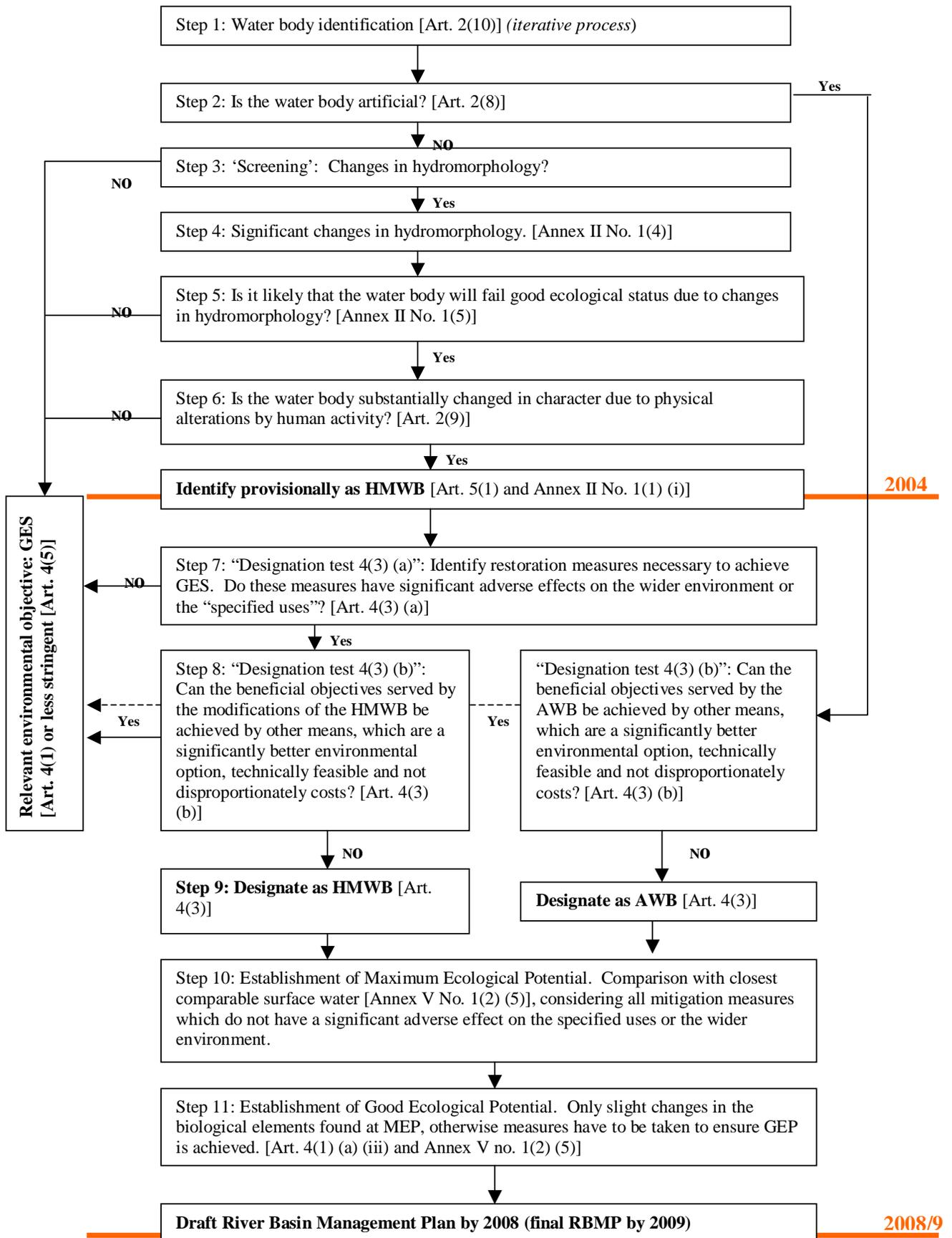
By When?	What major task?	What needs to be done?
2004	Characterisation of river basin district [Art. 5]	Steps 1-6 Including: identification of AWB (step 2); description of hydromorphological changes (step 3); description of significant changes in hydromorphology (step 4); likelihood of failing GES objective (step 5; non-AWB); and provisional HMWB identification (step 6).
2008/9	River basin management plan & public consultation [Art. 13 & 14]	Steps 7-11 Including designation tests (step 7 and 8), designation (step 9), identification of reference conditions (step 10) and environmental quality objective (step 11) for HMWB and AWB.

Table 1.1: Major WFD deadlines in the timetable for the Identification and Designation of HMWB and AWB in the first planning cycle. [Extracted CIS Policy Summary]

The full designation of water bodies and development of measures are to be included in the draft River Basin Management Plan (RBMP) in 2009 (final by 2009), however preliminary designation (Steps 1-6) was completed as part of the characterisation process.

The Stepwise Approach guided the development of the Irish approach to the identification and designation of pHMWB and pAWB for the characterisation process. This process is summarised in Figure 1.2.

Figure 1.1: Stepwise Approach to Designation of HMWB and AWB [Source: CIS Working Group 2.2 Guidance Document]



The CIS Policy Summary to the HMWB and AWB Guidance Document provides the following summary on the steps involved:

Step 1: Distinct water bodies are to be identified and described according to the EC horizontal guidance on water body identification. Water body identification is an iterative procedure with possible adaptations in later stages of the designation process (mainly after step 6, the provisional identification of HMWB). The water body identification has to be done for all surface waters (natural, heavily modified and artificial waters), and is significant, because water bodies are the units for which status is being assessed, objectives established and achievement of objectives of the WFD checked.

Step 2: The WFD gives distinct definitions for AWB and HMWB [Art. 2(8) and Art. 2(9) respectively]. In this second step it should be identified whether the water body concerned has been "created by human activity". If this is the case, Member States will have the option to identify it as AWB and consider it for designation or, in some circumstances, identify it as a natural water body. Where the intention is to designate as AWB, the first designation test (step 7) is not relevant and AWB should continue directly with the second designation test (step 8).

Step 3: A screening process is proposed to reduce effort and time in identifying water bodies which should not be considered for the HMWB designation tests. This will include those water bodies that are likely to fail to achieve GES but which show no hydromorphological changes. This step is part of the Annex II (1.4) assessment of pressures.

Step 4: For those water bodies which have not been "screened out" in step 3, significant changes in hydromorphology and resulting impacts should be further investigated and described. This includes the description of hydromorphological changes and the assessment of resulting impacts. This step is part of the Annex II (1.4 & 1.5) assessment of pressures and impacts.

Step 5: Based on the information gathered in step 4 and an assessment of the ecological status of the water body, the likelihood of failing to achieve good ecological status should be determined. Within this step it has to be assessed whether the reasons for failing the GES are hydromorphological changes and not other pressures such as toxic substances or other quality problems. This step is part of the Annex II (1.5) assessment of impacts process to be completed by 22 December 2004. The guidance document of IMPRESS11 will give more explicit guidance for steps 3-5; in particular, guidance on the "risk assessment". The Monitoring Working Group will deal with the monitoring requirements for water bodies "at risk" as well as for all other water bodies.

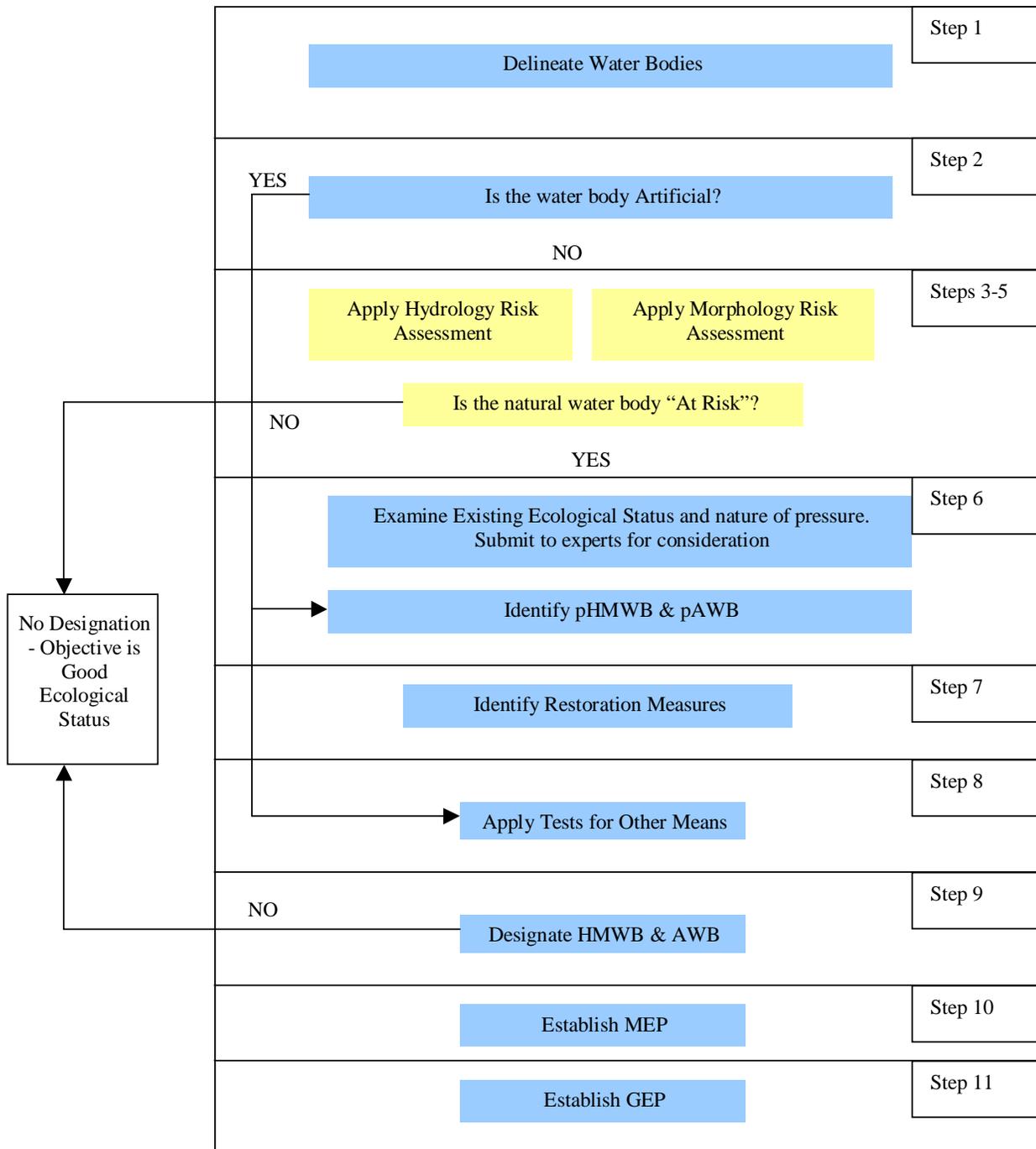
Step 6: The purpose of this step is to select those water bodies where the changes in hydromorphology result in the water body being substantially changed in character. Such water bodies can be provisionally identified as HMWB. The remaining water bodies likely to fail GES, which are not substantially changed in character, will be identified as natural water bodies. Environmental objectives for such water bodies will be GES or other less stringent environmental objectives. It is only necessary to collect sufficient information during steps 1, 3, 4 & 5 to demonstrate that pressures and impacts result in a failure to achieve good status (as described by the IMPRESS guidance document) and in step 6 (first step of the HMWB process) that the water body is substantially changed in character. These requirements can be satisfied in a simple descriptive manner in clear-cut cases. For example, if a water body has irreversibly and definitely changed category, then it is easy to demonstrate that pressures and impacts prevent the achievement of GES (of the original water body category) and that it is substantially changed in character.

Steps 7-8-9: Where Member States wish to designate a water body as heavily modified they must then consider them for the designation tests specified under Article 4(3) (a) & Article 4(3) (b). Artificial water bodies are only considered for the test under Article 4(3) (b). In the first "designation test" (**step 7**) necessary hydromorphological changes ("restoration measures") to achieve "good ecological status" should be identified. In the first test it has to be assessed whether these "measures" have significant adverse effects on either the "specified uses" or the "wider environment". If they do, then the second designation test (**step 8**) is to be carried out. The second designation test consists of several sub-tests. Firstly, "other means" to achieve the beneficial objective (e.g. replacement of surface water for drinking water supply with groundwater) are to be considered. Then, it has to be assessed whether the "other means" are a) technically feasible, b) a better environmental option and c) not disproportionately costly. If any of the sub-tests a), b) or c) are negative, the water bodies may be designated as heavily modified (**step 9**). If either the mitigation measures have no significant adverse effects (see step 7) or if "other means" can be found that fulfil the criteria a), b) or c) (see step 8), the water body must not be designated as heavily modified and the relevant environmental objective would be GES or a less stringent objective.

Steps 10-11: These steps are not part of the designation process. However, they are relevant to HMWB and AWB only and are therefore covered in this guidance document. They concern the definition of reference conditions and the setting of the environmental quality objectives for heavily modified and artificial water bodies. In **step 10** the reference condition for HMWB and AWB, the Maximum Ecological Potential (MEP), is defined. Based on the MEP, the environmental quality objective, the Good Ecological Potential (GEP), is defined (**step 11**).

The information gathered in the different steps (1-11) summarised above will contribute to the RBMP. The RBMP will contain programmes of measures [Art. 11] that are required to ensure the achievement of the environmental objectives for natural, heavily modified and artificial water bodies.

Figure 1.2: Risk Assessment and the Irish pHMWB and pAWB designation process



2. Aims and Scope

- The aim of this document is to describe the approach taken in Ireland for the identification and designation of Heavily Modified and Artificial Water ensuring a consistent approach across River Basin Districts. A list of provisional HMWB was required by the end of 2004. This report indicates the approach applied to arrive at this stage of the designation process.
- Drivers and associated pressures that present the potential for hydromorphological change have been outlined in the relevant Risk Assessment guidance documents. These methodologies provided information on dataset and information sources, measured attributes and threshold values for hydrological and morphological pressures. This document takes the 1a water body cases identified by the Morphological and Hydrological risk assessments and further examines them for potential HMWB designation. These water bodies were presented to the EPA for final decision on designation.
- The process is solely concerned with the designation of HMWB and AWB resulting from existing physical modifications. Implications from planned, new modifications are not considered in the current guidance document; the guidance focuses on the first River Basin Management Planning cycle (2008/9). [Source: CIS WG 2.2 Guidance Document p.21] Future or planned developments will be assessed in the RBMP review cycle.
- Designation is concerned only with water bodies where hydromorphological changes are a direct consequence of anthropogenic physical alterations which serve a specified use or the wider environment. [Source: CIS Guidance Document]

3. Drivers and Pressures (Specified Uses)

The CIS guidance indicates that Article 4(3) is intended to be applied to major infrastructure projects associated with the listed specified uses. The specified uses likely to result in a water body being designated as a HMWB listed in the Article are as follows:

1. navigation, including port facilities, or recreation;
2. activities for the purposes of which water is stored, such as drinking-water supply, power generation or irrigation;
3. water regulation, flood protection, land drainage, or
4. other equally important sustainable human development activities

Article 5 Characterisation of RBDs adopts the ‘DPSIR’ analytical framework, as identified in the CIS IMPRESS Guidance document, to describe drivers and pressures for Risk Assessments where:

D = Driver **P** = Pressure **S** = State **I** = Impact **R** = Response

The 'specified uses' identified in the directive were considered the 'drivers' in the examination of water bodies for potential designation. Each hydrological and morphological pressure was linked to the above specified uses in the pressure threshold tables. (Appendix I) Some morphological pressures also presented sufficient risk to lead to 1a: At Risk categorisation. These pressures are retained in the threshold tables in Appendix I for completeness.

4. Assumptions

The following assumptions were made in adopting this methodology for the identification and designation of Heavily Modified and Artificial Water Bodies:

- HMWB and AWB identification and designation refers only to surface waters and excludes ground waters.
- HMWB designation is intended to be applied to major infrastructure projects and must be associated with the listed specified uses. This intention was taken into account in the development of the approach with experts and stakeholders.
- The reasons for a water body failing Good Ecological Status must be hydromorphological changes and not other pressures such as severe pollution effects.
- The change in character of the water body must be permanent and not temporary or intermittent.
- Identification of AWB & HMWB is a special case of risk assessment- even if not designated HMWB it may still be identified as at hydrological or morphological risk. Many alterations that do not exceed the thresholds may nevertheless present risk to the achievement of good status and will be addressed by measures, guided by monitoring.
- Step 2 of the Stepwise approach, which asks *Is the water body artificial?*, can be completed at an early stage of the approach. The risk assessment screening thresholds apply only to potential HMWB. AWBs are not included in risk assessments.
- Whilst existing water quality rating schemes do not incorporate all of the quality elements that comprise Ecological Status they are utilised as a proxy to provide an indication of current water body status and to assess the likelihood of failure to achieve Good Ecological Status.
- Use was made of the best available information at the time of assessment. Thresholds used at the risk assessment screening stage were intended to interpret readily available national datasets relating to hydromorphological changes in surface water bodies.
- Within RBDs situations were identified where a water body has been modified in a unique manner not addressed by the screening rules documented in this report. Each RBD compiled relevant information on Special Cases for presentation to the EPA for consideration as HMWB.

Specific assumptions

- Regarding the difference between AWBs and HMWBs the Guidance Document states that “an AWB is a surface water body which has been created in a location where no water body existed before and which has not been created by the direct physical alteration, movement or realignment of an existing water body.” The EPA clarified this point so that in the Irish situation,
 - constructed canals were considered either artificial or natural water bodies
 - and
 - canalised or channelised rivers were considered either heavily modified or natural

5. Methodology

This document provides guidance on the designation of AWBs and HMWBs ensuring a consistent approach across RBDs. The process undertaken involved two distinct parts, concerned with:

- a) Artificial Water Bodies
- b) Heavily Modified Water Bodies

A) Artificial Water Bodies

Background

Artificial water bodies were identified at an early stage (Step 2) of the Stepwise approach. In Characterisation, they were not subject to the Risk Assessments. The CIS Guidance Document stated that only the designation test in Article 4(3) (b) applies to AWB i.e. no restoration test. (Step 8 of the Stepwise approach.) This test requires an assessment of the possibility of achieving the beneficial objectives of the AWB by other means which are a significantly better environmental option, technically feasible and not disproportionately costly. AWB identification does not, therefore, include the significant designation tests applicable to HMWB. Designation test 4(3) (a) (Step 7) is not relevant as no natural water body existed prior to the existence of the AWB.

AWBs serving a specified use were identified within the nearest comparable surface water categories as shown in Table 5.1.

Table 5.1: Artificial Water Bodies: types and data source examples

Category	AWB Type	Specified Use	Example: Dataset & Information Sources
Rivers	Canals	Navigation	<ul style="list-style-type: none"> ▪ OPW National Canals & Waterways Strategy Report ▪ Inland waterway Navigation Maps (IWAI, Duchas: The Heritage Service(now NPWS)) ▪ Mill races
Lakes	Reservoirs	Recreation, water storage	<ul style="list-style-type: none"> ▪ EPA :Lakes layer ▪ OSI AutoCAD Tiles isolating Reservoirs ▪ Local Authority Information ▪ ESB Power Generation
Transitional			RBD-specific examples
Coastal			RBD-specific examples

Methodology

- AWBs were identified within the surface water categories by the RBD projects.
- Information on the location, size and history and beneficial objectives served by the AWBs was compiled.
- This information proceeded to the ‘other means’ (Step 8) test for consideration at a national level for designation as AWB.
- A list of AWBs and the relevant compiled information was submitted to the EPA by each RBD.
- The EPA decided upon the final list for AWB designation based on best available information relating to the water body. Where it was considered by the experts that an AWB is capable of achieving GES, it was considered a natural water body and not be designated.
- CIS Toolbox stated that in circumstances where a multitude of small (<1km channel length) component reaches and artificial segments, such as mill races, are present grouping of water bodies could be chosen as a pragmatic solution (p12, CIS Toolbox) by the EPA in the setting of environmental quality objectives, i.e. GEP.

b) Heavily Modified Water Bodies

Background

These are water bodies which have been changed hydromorphologically to facilitate a specified use. Both designation tests (Article 4(3) (a) restoration and (b) alternative means) apply to HMWBs.

The Morphological and Hydrological risk assessments informed the screening steps (Steps 3 to 5 of the stepwise approach) of the Stepwise approach, as illustrated in Figure 1.2 above. The Risk Assessment working group in Ireland agreed to the adoption of a four-category risk classification scheme:

1a	at risk
1b	probably at risk
2a	probably not at risk
2b	not at risk

Water bodies identified as being At Risk (1a) proceeded to be further considered under HMWB designation. In developing the approach to HMWB designation, it was noted that it is intended to be applied to major infrastructure projects associated with the listed specified uses. (CIS Guidance Document)

The EPA Hosted a HMWB Workshop for Stakeholder in October 2004 to discuss this statement in the context of Irish water body uses. It was considered that some of the Morphological pressure categories, due to their nature, do not constitute ‘a significant change in character which would result in failure to achieve GES’ and therefore do not merit HMWB designation of the water body. For these pressures it was the expert opinion that, even in situations where 1a: At Risk thresholds are exceeded, GES can be achieved by the inclusion of appropriate mitigation measures and therefore the water

bodies were not designated as HMWB. The pressures that were judged to generate significant changes in the character of a water body and therefore warrant further consideration for HMWB designation are summarised as follows:

Table 5.2 Summary of Hydrological & Morphological Pressures leading to pHMWB designation

Hydrological & Morphological Risk Assessment Pressures	Does the pressure 'substantially change' WB character and warrant further pHMWB consideration?	
<u>Rivers & Lakes</u> Channelisation & Dredging Flood Protection & Embankments Impounding (dams) Water Regulation (locks & weirs) Intensive Land Use Abstractions	No Yes Yes No No Yes	Note Urban flood relief schemes (derogation for peatlands)
<u>Coastal & Transitional</u> Dredging Dumping of Dredge Spoil Coastal Defence & Embankments Built Structures (ports, industrial intakes) Intensive Land Use Abstractions	Combined effect of marine pressures to be considered for designation on a case by case basis.	

- Channelisation & dredging - river and lake water bodies affected by channelisation and dredging pressures require further monitoring and investigation, however they were considered to be capable of achieving GES and were therefore not retained for pHMWB designation.
- Flood protection & embankments - river and lake water bodies affected by rural flood defence schemes were considered to be capable of achieving GES and were therefore not retained for pHMWB designation, river and lake water bodies affected by major urban flood defence schemes were further considered on a case by case basis and recommended for pHMWB designation depending on the details of the individual scheme.
- Impounding (dams) - river and lake water bodies affected by major impoundments such as hydro-electric power facilities were recommended for pHMWB designation.
- Water Regulation (locks & weirs) - river and lake water bodies affected by water regulation pressures were considered to be capable of achieving GES and were therefore not retained for pHMWB designation.
- Intensive Land Use - river and lake water bodies affected by land use change were considered to be capable of achieving GES and were therefore not retained for pHMWB designation. A special case was noted for water bodies affected by peat exploitation, these water bodies will be returned to 'wet/dry wilderness' habitat once peat harvesting ceases. Consequently in future they probably will be able to achieve GES but not until after 2015. In this case it was proposed to prepare a derogation case so that the objectives could be achieved in later RBMPs.

- Abstractions - river and lake water bodies affected by abstraction pressures were considered on a case by case basis and recommended for pHMWB designation depending on the details of the individual scheme.
- Dredging, dumping of dredge spoil, coastal defence & embankments and built structures (ports, industrial intakes) – transitional and coastal water bodies affected by these pressures were considered on a case by case basis and recommended for pHMWB designation depending on the details of the combined effects of the pressures on the individual water body.

Provision was made in the methodology for pressures with a clustered distribution within a water body in the identification and delineation of small water bodies. This suited circumstances where significant pressures or groups of pressures were not highlighted due to water body scale effects. The subdivision of water bodies was proposed, at certain urban centres that had been subjected to flood relief schemes and around large ports for example, as was considered appropriate by the experts. Reapplication of risk assessment thresholds to the identified sections, in some cases, indicated 1a stretches that are suitable for progression to designation. Their case for designation, or just 1a: At Risk categorisation, was examined on a case by case basis.

Hydrological and morphological 1a: At Risk thresholds for each of the surface water categories are presented in Appendix I. The consideration of 1a: At Risk water was executed as follows:

Methodology

- A list of water bodies At Risk (1a) from hydrological and morphological pressures was compiled. (Morphological and Hydrological thresholds are included in Appendix I)
- Specific pressure(s) placing the water body in the 1a category were identified.
- Those water bodies in 1a due to pressures considered by Stakeholder Workshop not of a nature to warrant HMWB designation were screened off the list. (Table 5.2)
- Information on ecological status of these water bodies was gathered by utilising the latest available water quality information (Q-value, fish population information, trophic status) for each water body. For rivers, Q-values were used as a proxy for ecological status.
- River water bodies with Q4, Q4-5 or Q5 were screened out and not considered further as they were not failing or likely to fail good ecological status. (Step 5) River water bodies with Q3-4 or lower proceeded for further consideration as HMWB as they were likely to fail good ecological status. (Step 5)
- For each river water body of Q3-4 or lower, historical water quality records were be compiled in order to examine the correlation between water body status and hydrological/morphological change. An observed status of less than Q4 attributable to factors other than hydromorphological change was flagged for interpretation by the experts.
- 1a: At Risk lake, transitional and coastal water bodies were assessed against impact information available for these water categories.

Q5, Q4-5	High	←	Not likely to Fail GES		
Q4	Good		←		
Q 3-4,	Moderate			←	
Q3, Q2-3	Poor				←
Q2, Q1-2, Q1	Bad				
		Likely to Fail GES			

Figure 5.1 Relating Q value to WFD status boundaries by. *

* Finalisation is dependent on the results of intercalibration exercises & Article 21 Regulatory Committee deliberations.

- Water bodies at 1a that were likely to fail GES comprised the pHMWB list and were submitted to the EPA for HMWB consideration.
- Following case by case consideration by the experts an observed river water body status of less than Q4, for example, that was directly attributable to hydromorphological alterations satisfied the criteria for provisional identification as a HMWB (required by 2004) and proceeded to the designation tests in Step 7 [4(3)(a)] and Step 8 [4(3)(b)].

6. Establishment of GEP for AWBs and HMWBs

For provisionally designated water bodies, determination of GEP and an assessment if the risk of failing to meet the GEP objective must be complete by December 2008. European guidance recommended that assessment against GEP classification systems be extended beyond 2004. The assessment will require expert judgement and will be undertaken by the EPA supported by relevant authorities. If a designated HMWB or AWB does not meet the GEP objective, then a programme of measures or a case for derogation has to be developed for the draft RBMP which allows one year for consultation on the draft RBMP before its publication in 2009.

Heavily Modified Water Bodies

APPENDIX I

HMWB Rivers

	Hydromorphological Change	Specified Use	Datasets & Info sources	Measured Attribute	(1a)	For HMWB Consideration Y/N
1	Channelisation & Dredging	Navigation	<ul style="list-style-type: none"> ▪ OPW Channels 	Proportion of water body stretch length affected by channelisation work within 500m of stretch.	-	N
2	Flood Protection & Embankments	Flood Protection	<ul style="list-style-type: none"> ▪ OPW Embankments 	Proportion of water body stretch bank length affected	>60%	N: (embankments) Y (urban schemes identified by OPW)
3	Impounding (major dams)	Water Storage for power generation or water supply.	<ul style="list-style-type: none"> ▪ <i>ESB Impoundments for power generation</i> ▪ <i>Local Authority Information</i> 	Presence or absence of major dams. Assessment refers to lake WB containing the dam plus the WB immediately downstream of the impoundment.	Dam(s) present- WB the dam plus the WB downstream are at risk.	Y
4	Water regulation (locks & weirs)	Navigation	<ul style="list-style-type: none"> ▪ OPW Weirs layer ▪ OPW Sluices layer ▪ CFB Impassable Barriers (man-made) ▪ <i>JWAI navigation maps</i> ▪ <i>RBD Mill weirs-from local information</i> ▪ <i>RBD Locks layer-from OS maps</i> ▪ <i>Fisheries board input.</i> 	Number of artificially placed structures per km per water body	>5	N
5	Intensive Land Use	Land Drainage and alteration of riparian zone characteristics	<ul style="list-style-type: none"> ▪ CORINE Urban fabric and industrial, commercial and transport units (1.1, 1.2) ▪ CORINE Peat Extraction Areas (exploited raised & blanket bog) ▪ CORINE Coniferous forests ▪ CORINE arable land 	Proportion of water body stretch length with intensive land use cover.	>70%	N
6	Abstraction	Drinking water supply Inland Fish Farms Industry.	<ul style="list-style-type: none"> ▪ <i>RBD Surface Water Abstraction Register compiled from LA information</i> ▪ <i>WWTP discharges</i> ▪ <i>Industrial, power plant and fish farm discharges</i> 	Percentage of 95%ile flow abstracted of from rivers	>40% From hydrological RA	Y

HMWB Lakes

Hydromorphological Change	Specified Use	Datasets & Info Sources	Measured Attribute	(1a)	For HMWB Consideration Y/N
1 Channelisation & dredging	Navigation Land drainage	<ul style="list-style-type: none"> OPW Channels 	Proportion of inflowing (MMG to confirm) stream length within 500m affected (lakes >50ha: 500m buffer, lakes <50ha: 30m (drinking water))	-	N
2 Flood Protection & embankments	Flood Protection	<ul style="list-style-type: none"> OPW Embankments 	Proportion of lake shoreline length affected by embankments.	>30%	N: (embankments) Y (urban schemes identified by OPW)
3 Impounding (major dams)	Water Storage for Power Generation or water Supply	<ul style="list-style-type: none"> ESB Impoundments for power generation Local Authority Information 	Presence or absence of significant dams on lake outlet. Assessment refers to lake WB containing the dam plus the WB immediately downstream of the impoundment.	Dam(s) present- WB containing the dam at the dam at risk.	Y
4 Intensive Land Use	Land Drainage, Urbanisation	<ul style="list-style-type: none"> CORINE Urban fabric and industrial, commercial and transport units (1.1, 1.2) CORINE Peat Extraction Areas (exploited raised & blanket bog) CORINE Coniferous forests CORINE arable land 	Proportion of lake shore length within 50m with intensive land-use.	>50%	N
5 Abstraction	Drinking water supply, industry	<ul style="list-style-type: none"> RBD Surface Water Abstraction Register compiled from LA information WWTP discharges Industrial, power plant and fish farm discharges 	Percentage of 95%ile flow abstracted of from lakes	>40% from hydrological RA	Y

HMWB Transitional Waters

Hydromorphological Change	Specified Use	Datasets & Info Sources	Measured attribute	(1a)	For HMWB Consideration Y/N
1 Channelisation & Dredging	Navigation Drainage works	<ul style="list-style-type: none"> OPW Drainage Channels DCMNR dredging location information from Applications to Dump at Sea. BIM Aquaculture Licensed areas (bottom culture shellfish dredging) 	Proportion of water body area affected by dredging activity. For OPW works, assume full channel width affected plus full channel width 500m beyond of remains. Pointline dredge sites – assume full channel width affected or apply 500m buffer in estuaries > 1km in width.	>60%	
2 Deposition of Dredge Spoil	Navigation	<ul style="list-style-type: none"> DCMNR Permits to Dump at Sea Applications for Permits to dump at sea. Marine Institute OSPAR reported dumping locations. 	Proportion of water body area affected by dumping. Pointline sites – apply 500 m buffer.	>60%	
3 Coastal defence, Flood Protection & Embankments	Flood protection.	<ul style="list-style-type: none"> OPW Embankments Coastal defence information from DCMNR 	Proportion of water body bank/shoreline length affected.	>60%	
4 Impounding	Flood Protection: Tidal barrages.	<ul style="list-style-type: none"> National Coastline Survey images Local Authority Information & local knowledge re: tidal barrages. CFB Impassable Barriers (man made) 	Presence or absence of impoundments.	Impoundment(s) present	Pressures to be mapped, submitted to marine experts for small water body delineation.
5 Built Structures	Navigation	<ul style="list-style-type: none"> Structural information from DCMNR National Coastline Survey images CSO port and harbour statistics (cargo tonnage) Coastwatch Ireland INTERREG Clean Seas Project Report (SERBD only) 	Gross annual tonnage of port or harbour facilities present. (of individual facilities, not cumulative)	>13,500 tonnes	consider case for designation or just 1a on a case by case basis.
6 Intensive land use	Power generation & Industry Urbanisation, Forestry, Arable farming, Peat extraction	<ul style="list-style-type: none"> EPA IPC Register RBD characterisation abstraction register & info gathered from Local Authorities, Power Stations. CORINE Urban fabric and industrial, commercial and transport units (1.1, 1.2) CORINE Peat Extraction (exploited raised & blanket bog). CORINE Coniferous forest CORINE arable land 	Presence of Industrial or Power Station intake.		
7 Abstraction	Drinking water supply, Industry, power generation	<ul style="list-style-type: none"> RBD Surface Water Abstraction Register compiled from LA information WWTP discharges Industrial, power plant and fish farm discharges 	Proportion of water body bank/shoreline with intensive use. Percentage of 95%ile flow abstracted of from transitional waters	>50%	

HMWB Coastal Waters

Hydromorphological Change	Specified Use	Datasets & Info Sources	Measured attribute	(1a)	For HMWB Consideration Y/N
1 Dredging	Navigation	<ul style="list-style-type: none"> ▪ DCMNR dredging location information from Applications to Dump at Sea. ▪ BIM Aquaculture Licensed areas (for bottom culture shellfish dredging) 	Proportion of water body seabed area affected Point/line sites – apply 50m buffer.	>60%	Pressures to be mapped, submitted to marine experts for small water body delineation. & consider case for designation or just Ia on a case by case basis.
2 Deposition of dredge spoil	Navigation	<ul style="list-style-type: none"> ▪ DCMNR Permits to Dump at Sea ▪ Applications for Permits to dump at sea. ▪ Marine Institute OSPAR reported dumping locations. 	Proportion of water body seabed area affected. Point/line sites – apply 50m buffer.	>60%	
3 Coastal defence, Flood Protection & Embankments.	Flood Protection & drainage	<ul style="list-style-type: none"> ▪ OPW Embankments ▪ Coastal defence information from DCMNR National Coastline Survey images 	Proportion of water body coast line affected	>60	
4 Built Structures	Port Structures/Facilities	<ul style="list-style-type: none"> ▪ Structural information from DCMNR National Coastline Survey images ▪ CSO port and harbour statistics (cargo tonnage) ▪ Coastwatch Ireland INTERREG Clean Seas Project Report (SERBD only) 	Gross annual tonnage of port or harbour facilities present.	>13,500 tonnes	
	Urbanisation	<ul style="list-style-type: none"> ▪ CORINE Urban fabric and industrial, commercial and transport units (1.1, 1.2). 	Proportion of water body coast line affected	>60%	
	Industrial or Power Station Intake	<ul style="list-style-type: none"> ▪ EPA IPC Register ▪ RBD characterisation abstraction register & info gathered from Local Authorities, Power Stations. 	Presence of industrial or power Station intake		