Chapter 1

Introduction

This book is based on the results of the European Synthesis Project of thirty-four case studies on the identification and designation of Heavily Modified Water Bodies (HMWB) in the context of the EU Water Framework Directive (2000/60/EC)[1]. The European Synthesis Project on HMWB was part of the activities of the Working Group on HMWB of the Common Implementation Strategy (CIS) of the Water Framework Directive (WFD). To put this book into context, the following section briefly reviews the policy background to the European Synthesis Project on HMWB.

1.1 Policy Background

In accordance with Article 4(3) of the EU WFD, the Directive allows EU Member States to identify surface water bodies that have been physically altered by human activity as "heavily modified" under specific circumstances. Water bodies can be designated as "heavily modified" and Good Ecological Potential set as the environmental objective if

- The specified uses of such water bodies (e.g. navigation, hydropower, water supply or flood defense) or the "wider environment" would be significantly affected by the restoration measures required to achieve Good Ecological Status; and
- No other technically feasible, cost-effective and better environmental options exist that would maintain the benefits of the modified characteristics of the water body.

Under certain conditions, the WFD also permits EU Member States to identify and designate Artificial Water Bodies (AWB) in accordance with Article 2(8) of the EU WFD: "*artificial water body means a body of surface water created by human activity*".

1.1.1 The Common Implementation Strategy of the Water Framework Directive

The need for establishing a Common Implementation Strategy (CIS) for the Water Framework Directive was identified at an informal meeting of the EU Water Directors and the Norwegian Water Director in Paris on 23–24 October 2000.

[1] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000, establishing a framework for community action in the field of water policy, Official Journal 22 December 2000 L 327/1, European Commission, Brussels.

According to the strategic document developed for the CIS,[2] the implementation of the Water Framework Directive raises challenges, which are widely shared by Member States. The Directive sets a demanding timetable for EU Member States, especially during the nine preparatory years until the publication of the first river basin management plans in 2009. The aim of the CIS is therefore to contribute, as far as possible, to a timely, coherent and harmonious implementation.

The CIS focuses on methodological questions related to a common understanding of technical and scientific implications of the WFD. In this respect, the main elements of the CIS as identified at the meeting of the Water Directors on 23–24 October 2000 (in Paris) included the need to establish working groups that would develop guidance documents on key aspects of the WFD, illustrating several technical and scientific issues. The guidance documents of the CIS have an informal, legally non-binding character and are placed at the disposal of EU Member States who wish to use them on a voluntary basis.

The CIS additionally recognises that each Member State will undoubtedly face specific questions and challenges related to national, regional and/or local situations. The strategy was thereby developed in recognition and respect for these specific situations.[3]

Regarding the aspects of work of the CIS working groups, a limited number of key activities have been identified on which Member States and the European Commission have jointly worked. These activities are illustrated in Fig. 1.1, which is a schematic representation of the overall structure of the CIS. According to this modular structure, four key activities are identified: (1) information sharing, (2) developing guidance on technical issues, (3) information and data management and (4) application, testing and validation. These activities were set as priorities for the first important phase of the CIS. The first three activities have a more horizontal character and aim at developing a common understanding of the implementation of the WFD. Their results need to be integrated and made operational in the river basin management plans. The fourth activity has a more vertical character and includes the practical integration of the horizontal activities through testing in pilot river basins.[4]

In this context, working groups have been established for the different activities and projects. Working groups have generally been chaired by one or two lead countries or the European Commission with participants from interested EU Member States, future and new EU Member States and stakeholders. The established working groups correspond to the projects of the second activity (development of guidance) as well as to the third activity (development of a shared Geographical Information System). The work of the different working groups has been very strongly linked. The overall co-ordination of the different working groups and activities has been ensured by the Strategic Co-ordination Group of the WFD CIS (chaired by the European Commission). This coordination aimed at avoiding duplication of work and ensuring the necessary exchange of information.

The working groups have therefore produced guidance documents in a pragmatic way based on existing practices in Member States. In this context, the guidance documents aim to be practical, operational as well as policy and implementation oriented.

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[2] Strategic document: Common Strategy on the Implementation of the Water Framework Directive. 2 May 2001. Available online: http://forum.europa.eu.int/Public/irc/env/wfd/home.

[3] Strategic Document: Common Strategy on the Implementation of the Water Framework Directive. 2 May 2001. Available online: http://forum.europa.eu.int/Public/irc/env/wfd/home.

[4] Ibid.

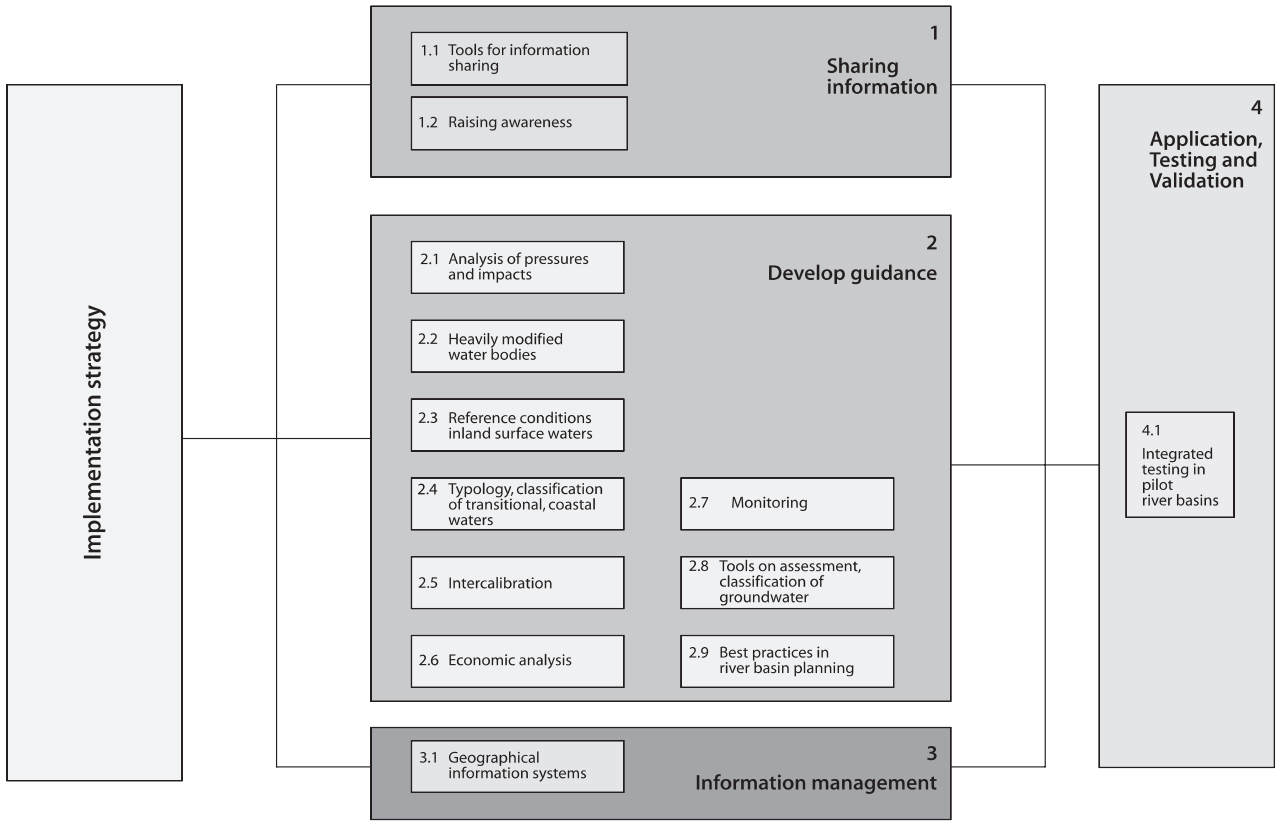


Fig. 1.1. Scheme of the activities and working groups of the Common Implementation Strategy. *Source:* Strategic Document. Common Strategy on the Implementation of the Water Framework Directive. 2 May 2001

Most of the CIS guidance documents had been agreed and made available to the public by mid-2003. The complete guidance documents thereby provided the basis for the integrated testing in pilot river basins of the CIS (fourth activity of the CIS presented in Fig. 1.1). The aim of the latter is to test these documents in selected pilot river basins in order to identify the technical and management problems that may arise in real cases of the implementation of the Water Framework Directive.

A follow-up of the Common Implementation Strategy (CIS) was also agreed at the meeting of the Water Directors in Copenhagen on 21–22 November 2002. The Water Directors' decision was to establish four new cluster working groups on the following issues: Ecological Status (Cluster Working Group 2.A), Integrated River Basin Management (Cluster Working Group 2.B), Groundwater (Cluster Working Group 2.C), and Reporting (Cluster Working Group 2.D). Therefore, the different working groups of the first phase of the CIS (Fig. 1.1) were dissolved and their activities were clustered into the new working groups on cross-cutting issues of the WFD.

1.1.2 CIS Working Group on Heavily Modified Water Bodies

As part of the WFD Common Implementation Strategy (CIS), a working group was established to develop guidance on the issue of Heavily Modified and Artificial Water Bodies (HMWB and AWB) identification and designation. This CIS Working Group on Heavily Modified Water Bodies (see Project 2.2 in Fig. 1.1) was jointly chaired by the United Kingdom and Germany. The Working Group (WG) was officially comprised of representatives from twelve EU Member States[5], Norway, some new and future EU Member States[6], and a number of stakeholders[7] (see list in Table 13.1 of Annex I, p. 177).

The CIS Working Group (WG) on HMWB decided to base the WG discussions and the development of the CIS guidance document on HMWB and AWB around a number of case studies conducted in the countries that participated in the Working Group. The case studies were to test a number of supporting guidance papers developed by the joint chair of the WG, which were reviewed and agreed by the WG members. This approach was unique in the Common Implementation Strategy, as the HMWB Working Group was the only CIS WG to initiate case studies in order to develop its final guidance document. This empirical approach was considered necessary because there was little, if any, experience of HMWB and AWB identification and designation in the Member States.

In this context, a number of distinct "subprojects" were developed by the HMWB WG in the framework of the Common Implementation Strategy:

[5] Austria, Belgium, Denmark, Spain, France, Germany, Greece, the Netherlands, Portugal, Sweden, Finland, and the UK.

[6] Hungary, Poland and Slovenia. Other future and new EU Member States were also members of the WG but did not attend the WG meetings.

[7] European Environmental Bureau (EEB), European Union of National Associations of Water Suppliers and Waste Water Services (EUREAU), Union of the Electricity Industry (Eurelectric) and World Wildlife Fund (WWF).

- Production of twelve guidance papers by the joint chair of the HMWB WG (as support material for conducting the case studies on Heavily Modified Water Bodies). The guidance papers were discussed at several Working Group meetings;
- Thirty-four case study projects carried out in the EU Member States and Norway that tested these "guidance papers";
- *A synthesis of the thirty-four case study project reports (European Synthesis Project, which is the basis of this book)*;
- Production of the CIS guidance document on HMWB and AWB;
- Production of a policy summary of the CIS guidance document on HMWB and AWB; and
- Production of a toolbox supporting the CIS guidance document on HMWB and AWB.

Ecologic (Institute for International and European Environmental Policy) was commissioned to provide conceptual and organisational support to the CIS Working Group on HMWB since the beginning of its activities. The support involved several tasks, which were mainly the following: production of the synthesis document of the thirty-four HMWB case studies, development of the CIS guidance document, policy summary and toolbox together with the joint chair and the members of the Working Group, conceptual and technical organisation of the Working Group meetings as well as facilitation of the flow of information and communication.

The distinct "subprojects" of the HMWB Working Group are described in more detail in the following paragraphs.

Production of Twelve Guidance Papers

The joint chair of the HMWB WG produced twelve guidance papers covering the key aspects of the HMWB and AWB identification and designation process. Four meetings were organised involving the Working Group members and the European Commission to discuss and agree these guidance papers and to exchange experiences. The meetings were held on 12 April 2000, 10 October 2000, 4 September 2001 and 18–19 June 2002 in Brussels. The guidance papers were developed to guide a series of case studies on Heavily Modified Water Bodies, which tested the approaches of the guidance papers. Together with the case study reports, the twelve guidance papers served partly as the basis for the production of the CIS guidance document on HMWB and AWB.

Case Studies

The twelve guidance papers on the identification and designation of Heavily Modified Water Bodies (HMWB) were tested in thirty-four case studies. The latter were carried out in eleven countries[8] participating in the WG on HMWB. In the case studies, ecological reference conditions (Maximum Ecological Potential) and objectives (Good Ecological Potential) for HMWB were also defined for the water bodies of the case study areas, as much as possible.

[8] Norway (NO) and ten EU Member States: Austria (A), Belgium (B), Spain (E), France (F), Germany (D), Greece (GR), Netherlands (NL), Sweden (S), Finland (SF) and UK.

The case studies focused on the main specified water uses (navigation, flood/coastal protection, hydropower generation, agriculture, forestry, urbanisation, recreation, and water supply) that result in physical alterations. Member States participating in the WG on HMWB were given the flexibility to choose their own case study location(s). The sites that were chosen tended to be those for which Member States had available data. The case study projects started in October 2000 and were finalised in June 2002. The WG on HMWB did not necessarily endorse the approach taken by any individual case study. It should be noted that the case studies do not strictly follow the approach of the CIS guidance document on HMWB and AWB, since most of them were completed before the publication of the final approved version of the guidance document (published in January 2003).

Based on the main water uses within the case studies, two case study subgroups were also established on navigation and on hydropower (see Table 14.1 in Annex II). The HMWB Working Group members and/or case study contractors exchanged their experiences during their work in extra subgroup meetings and via email discussions.

European Synthesis Project

The European Synthesis Project on HMWB performed an analysis and synthesis of the approaches taken in the individual HMWB case studies, identifying commonalities and differences. The analysis started in February 2002, and a first draft synthesis document was distributed to the HMWB WG by the end of April 2002. The first draft of the synthesis document formed the basis for the production of the HMWB and AWB guidance document (WFD CIS Guidance Document No. 4 2003) as well as the toolbox supporting the guidance document (WFD CIS Working Group 2.2 on HMWB 2003a).

This book is based on the final results of the European Synthesis Project of the HMWB case studies, being an evaluation of all thirty-four HMWB case study reports. For the production of the final synthesis, the terminology used in the first draft of the synthesis document (dated April 2002) was adjusted to the glossary agreed in the final HMWB and AWB guidance document (WFD CIS Guidance Document No. 4 2003).

The CIS Guidance Document on HMWB and AWB

Based on the draft synthesis document and on the twelve guidance papers of the HMWB CIS Working Group, a first draft guidance document on the identification and designation of HMWB and AWB[9] was produced on 27 May 2002. A workshop was held on the 30–31 May 2002 in Berlin for Working Group members, case study contractors, and members of other CIS working groups[10] to discuss a number of outstanding is-

[9] Guidance document on identification and designation of Heavily Modified Water Bodies, first draft, CIS Working Group 2.2 on Heavily Modified Water Bodies, 27 May 2002.

[10] There are important links between the HMWB and other CIS working groups. These included the Working Group 2.1 on pressures and impacts, Working Group 2.3 on freshwater reference conditions, Working Group 2.4 on coastal water typology, reference and classification, Working Group 2.5 on intercalibration, Working Group 2.6 on economic analysis, Working Group 2.7 on monitoring, Working Group 2.9 on best practices in river basin planning and Working Group 3.0 on Geographical Information Systems (GIS).

sues with regard to the draft guidance on HMWB and AWB. The discussions during the workshop served as a basis for the revision of the draft guidance document. A second draft[11] was discussed at the last HMWB WG meeting in June 2002. A third draft[12] was produced and circulated to the WG for comments in August 2002. A final version of the HMWB and AWB guidance document[13] was produced and submitted to the WFD CIS strategic co-ordination group meeting on 30 September 2002. It was then revised and presented to the WFD CIS strategic co-ordination group meeting on 7–8 November 2002. The final version of the HMWB and AWB guidance document was agreed at the Water Directors' meeting on 21–22 November 2002 and published on 14 January 2003 (WFD CIS Guidance Document No. 4 2003). The HMWB and AWB guidance document represents a consensus view of the EU Member States represented in the HMWB WG, Norway, the participating future and new EU Member States and stakeholders.

The Policy Summary

The policy summary is an executive summary of the HMWB and AWB guidance document addressed to the Water Directors. The document summarises the main issues of the HMWB and AWB designation process and is derived directly from the HMWB and AWB guidance document. It was presented and agreed at the Water Directors' meeting together with the guidance document on 21–22 November 2002.[14]

The Toolbox

To support the HMWB and AWB guidance document, a toolbox was produced, illustrating the different steps of the HMWB and AWB designation process with practical examples from the HMWB case studies and the synthesis document. The HMWB Working Group members also provided additional examples that helped illustrate certain steps of the guidance document. A first draft was produced for the HMWB WG meeting in June 2002. A second draft was sent out for comments in October 2002 and a final toolbox was issued in January 2003 (WFD CIS Working Group 2.2 on HMWB 2003a). The toolbox does not constitute part of the HMWB and AWB guidance document and was hence not subject to the agreement of the HMWB Working Group.

Links to other CIS Working Groups

It is important to consider this book as well as the HMWB and AWB guidance document (WFD CIS Guidance Document No. 4 2003) and toolbox (WFD CIS Working

[11] Guidance document on identification and designation of (Artificial and) Heavily Modified Water Bodies, second draft, CIS Working Group 2.2 on Heavily Modified Water Bodies, 15 June 2002. Directly after the WG meeting in June, a second draft dated 20 June was sent to the WG, including a different version of Chap. 6.

[12] Guidance Document on identification and designation of Artificial and Heavily Modified Water Bodies, third draft, CIS Working Group 2.2 on Heavily Modified Water Bodies, 2 August 2002.

[13] Guidance document on identification and designation of Artificial and Heavily Modified Water Bodies, final draft, CIS Working Group 2.2 on Heavily Modified Water Bodies, 13 September 2002.

[14] WFD CIS Working Group 2.2 on HMWB (Jan 2003b).

Group 2.2 on HMWB 2003a) in the context of the guidance documents produced by other working groups of the WFD CIS. Important links exist between the HMWB Working Group and other CIS working groups such as the CIS Working Group 2.1 on pressures and impacts (IMPRESS), Working Group 2.3 on freshwater reference conditions (REFCOND), Working Group 2.4 on transitional and coastal water typology, reference and classification (COAST), Working Group 2.5 on intercalibration, Working Group 2.6 on economic analysis (WATECO), Working Group 2.7 on monitoring, Working Group 2.9 on the best practices in river basin planning and Working Group 3.0 on Geographical Information Systems (GIS).

As far as possible, links, feedback and common areas of work have been identified throughout this book. The HMWB and AWB guidance document (WFD CIS Guidance Document No. 4 2003) provides more details on the links to other CIS workinggroups.

1.2 Objectives

As part of the activities of the Working Group on HMWB of the WFD Common Implementation Strategy, this book aims to identify commonalities and differences in the approaches of thirty-four case studies on the process of identification and designation of HMWB and AWB (European Synthesis Project on HMWB). The analysis of the thirty-four case studies aims to provide examples of how the HMWB designation process was approached and to illustrate the variance of country-specific approaches on the technical implications of the WFD for HMWB and AWB. The initial policy objective of the HMWB European Synthesis Project was to synthesise the experience of the HMWB case studies and to form an empirical basis for the production of the CIS guidance on HMWB and AWB. This policy objective was fulfilled with the publication of the guidance document on HMWB and AWB in January 2003 as part of the Common Implementation Strategy of the EU Water Framework Directive.

In the long term, this book aims to serve as a first reference and empirical basis for future research and management of Heavily Modified and Artificial Water Bodies. The implementation of the WFD continues after the publication of the CIS guidance documents through integrated testing in pilot river basins throughout Europe and other nationally-based research projects. This book therefore aims to assist authorities, researchers and consultants involved in the implementation of the WFD and specifically with the identification and designation of HMWB and AWB as described in the respective CIS guidance document.

1.3 Methodology

An in-depth comparative analysis of the thirty-four HMWB case studies was carried out starting in February 2002. The results and main conclusions of the case studies have been synthesised with focus on the steps of the identification and designation process for HMWB and AWB (see Fig. 2.1).

The comparative evaluation of the HMWB case studies has been assisted by the fact that their authors followed a standard reporting outline agreed within the HMWB Working Group. This reporting outline included information on

- The case study area;
- Physical alterations;
- Ecological status;
- (Provisional) identification and designation of Heavily Modified Water Bodies;
- Definition of Maximum Ecological Potential (MEP);
- Definition of Good Ecological Potential (GEP);
- Conclusions, options and recommendations.

Evaluation tables were developed to extract and compile the main results, conclusions and encountered problems from the thirty-four case studies. The information provided by the case studies was analysed and synthesised on both a case-by-case basis and according to the different issues of the HMWB identification and designation process.

A first draft synthesis document was prepared by the end of April 2002. For the further development and revision of the draft synthesis document which was ready in April 2002, an interactive approach was followed by distributing the document to the HMWB WG and the case study authors for comments. The discussions during the workshop on HMWB, held on 30–31 May 2002 in Berlin, as well as written feedback and comments served as a basis for the revision and further development of the draft synthesis document. The final version of the synthesis document of the HMWB case studies was prepared by March 2003. This book is based on the final synthesis but has been enriched with reference to the overall CIS process as well as the CIS guidance document on HMWB and AWB in order to be of use to a broader audience.

1.4 Scope and Structure

This book concentrates on the identification and designation of water bodies as heavily modified according to the requirements of the WFD. The issue of differentiation of Artificial Water Bodies (AWB) from Heavily Modified Water Bodies (HMWB) is only briefly dealt within Sect. 4.4 of the book, summarising the main findings of the case studies. This is because AWB were not extensively dealt with in the first drafts of the guidance document of the HMWB WG. However, the final guidance document on HMWB and AWB deals much more explicitly with AWB.

In this book, reference is also made to several technical and scientific issues of the WFD such as "water body identification", the concept of "pressures and impacts" and "reference conditions". Nevertheless, extensive discussions on these issues are not within the scope of this document. The reader should refer to the related CIS guidance documents prepared by the European Commission and the respective CIS working groups on these issues for more explicit guidance and definitions (see Sect. 1.1.1

of this book).[15] Work on the HMWB case studies actually started earlier than most of other CIS projects. Consequently, there were no defined approaches to some of the technical terms of the WFD which are precursors to the identification of HMWB in the river basin management planning process of the WFD. An example of such a requirement is the development of approaches to identify typologies and water bodies. This difference in the timing of the CIS activities led to numerous assumptions and simplifications in carrying out the HMWB case studies.

For the purpose of reporting the results and conclusions from the HMWB case studies, the authors summarised the approaches mostly according to the different water categories (rivers, lakes, transitional and coastal waters) and where possible, according to different categories of specified water uses.

The structure of the book, which follows the structure of the case study reporting outline to a great extent, is as follows:

Chapter 1 is an introduction to the policy background, the objectives, methodology and structure. Chapter 2 is dedicated to the final CIS guidance document on HMWB and AWB, illustrating the steps of the approved process for the identification and designation of HMWB and AWB. For the reader who is not familiar with the CIS guidance document on HMWB and AWB, it is recommended that this chapter is read first in order to understand later reference in the book to steps of the identification and designation process. Chapter 3 introduces the thirty-four HMWB case studies. Chapters 4 through 10 are dedicated to the synthesis of results and conclusions of the thirty-four case studies on the distinct issues and steps of the identification and designation process: Chapter 4 on the identification of water bodies, Chap. 5 on the description of specified uses, physical alterations and impacts on hydromorphology, Chap. 6 on the assessment of ecological status (and failure to achieve it), Chap. 7 on the provisional identification of HMWB, Chap. 8 on the designation of HMWB, Chap. 9 on the definition of Maximum Ecological Potential and Chap. 10 on the definition of Good Ecological Potential. Finally, Chap. 11 provides concluding remarks from the synthesis of the thirty-four HMWB case studies and an outlook in view of future research and policy developments relevant to the Water Framework Directive and the issue of Heavily Modified and Artificial Water Bodies.

Annex I includes lists of the contributing authors (HMWB WG members and authors of the case study reports). Annex II includes the case study evaluation tables that were used to extract and collate the results and conclusions of the case studies as well as tables on several case study methods.

Tables, boxes and figures originate either from the HMWB case study reports (as references to sources indicate) or they have been compiled from the case studies by the authors of this book. Reference to the different case studies is made according to the name of the case study and country of origin and not according to the authors of the respective case studies. This has been considered appropriate in the context of this document in order to show the differences between national approaches and methodologies.

[15] WFD CIS Guidance Document No. 2 (2002) Identification of Water Bodies. December 2002.
WFD CIS Guidance Document No. 3 (2002) Analysis of Pressures and Impacts. December 2002.
WFD CIS Guidance Document No. 10 (2003) Rivers and Lakes – Typology, Reference Conditions and Classification Systems. March 2003.

Chapter 2

Guidance on Heavily Modified and Artificial Water Bodies

This chapter describes the identification and designation process for HMWB and AWB as agreed in the CIS guidance document on HMWB and AWB (WFD CIS Guidance Document No. 4 2003). Figure 2.1 illustrates the overall stepwise approach as developed and agreed by the HMWB Working Group followed by an explanation of the individual steps.

We would like to draw the attention of the reader to the fact that the HWMB case studies actually tested an earlier draft version of this process as proposed in the support material (guidance papers) of the HMWB WG for conducting the case studies. This early draft version of the process is presented in Fig. 2.2, and the main differences to the final agreed process of Fig. 2.1 are pointed out in the end of this chapter. Through the process of drafting and finalising the CIS guidance document on HMWB and AWB, the process of identification and designation was significantly revised on the basis of the experience from the HMWB case studies and the discussions within the HMWB Working Group.

According to the final CIS guidance document on HMWB and AWB, the following steps should be taken in the HMWB and AWB identification and designation process (WFD CIS Guidance Document No. 4 2003):

- Step 1: Distinct water bodies are to be identified and described according to the EC horizontal guidance on water body identification.[1] Water body identification is an iterative procedure with possible adaptations in later stages of the designation process (mainly after the provisional identification of HMWB, Step 6). The water body identification has to be done for all surface waters (natural, HMWB and AWB) 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, EU 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).

[1] WFD CIS Guidance Document No. 2 (December 2002).

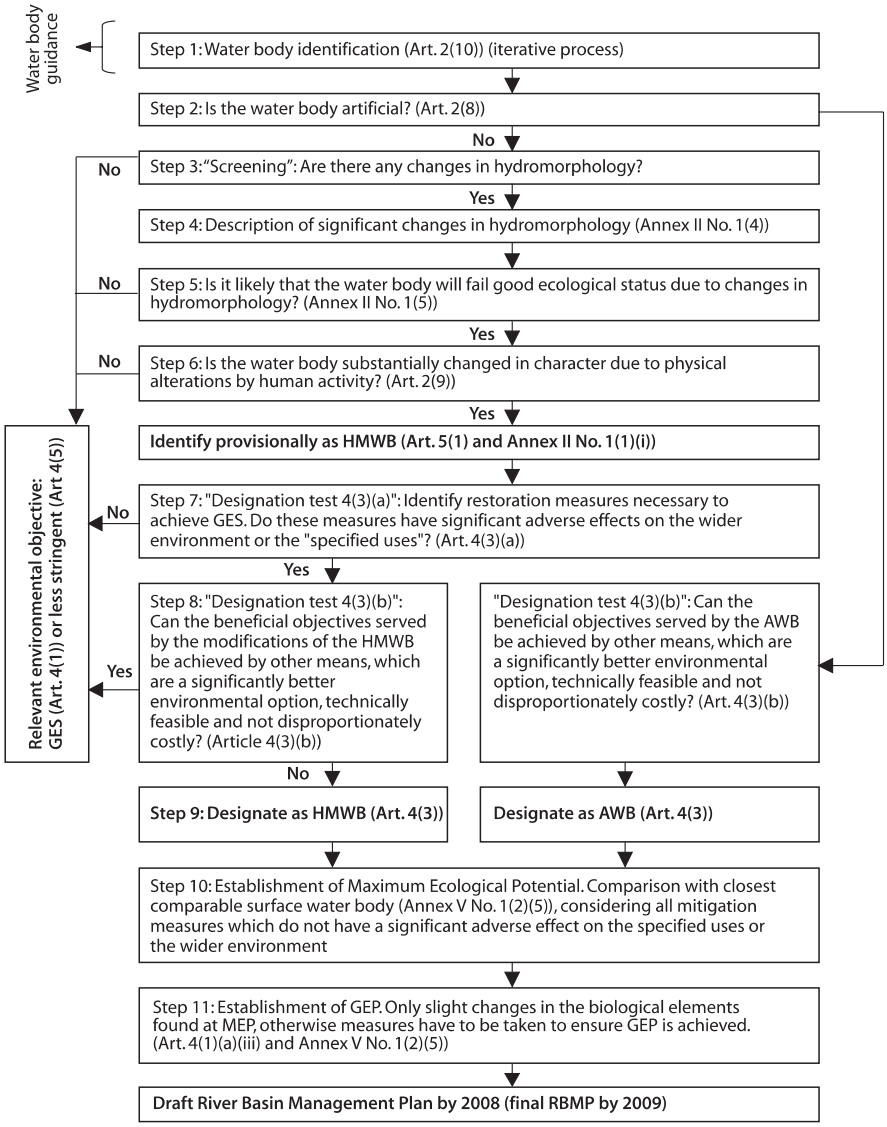


Fig. 2.1. HMWB and AWB identification and designation process (January 2003). *Source:* WFD CIS Guidance Document No. 4, 2003 (final agreed version of January 2003)

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

- Step 4: For those water bodies that 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 WFD Annex II (1.4 and 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 (GES) (or an estimate of what GES may be, based on current knowledge) should be assessed. 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 WFD Annex II (1.5) assessment of impacts process to be completed by 22 December 2004.
- 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.
- Steps 7-8-9: Where Member States wish to designate a water body as heavily modified they must consider them for the designation tests specified under Article 4(3)(a) and 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 AWB and HMWB only. They concern the definition of reference conditions and the setting of the environmental quality objectives for HMWB and AWB. 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 contributes to the River Basin Management Plan (RBMP). The RBMP will contain programmes of measures (WFD Art. 11) that are required to ensure the achievement of the environmental objectives for natural, HMWB and AWB. According to the CIS guidance

document on HMWB and AWB, in following the process of Fig. 2.1, it is clearly important to avoid unnecessary and superfluous administrative actions. For example, it will not always be necessary to undertake the assessment for each individual water body. Indeed in many situations, it may be more effective to apply the tests to a group of water bodies where the environmental concerns and specified uses are similar. For example, for a river modified for navigation it may not be helpful to apply the process to individual water bodies. A larger scale assessment may produce a more effective and more complete assessment (WFD CIS Guidance Document No. 4 2003).

There are some distinct differences between the final agreed process on the HMWB and AWB identification and designation of Fig. 2.1 and the earlier draft process of Fig. 2.2:

First, the final process of identification and designation, as included in the CIS guidance document on HMWB and AWB, entails an additional step for screening out early in the process those water bodies that may fail to achieve GES but show no hydromorphological changes (Step 3 of Fig. 2.1).

Secondly, the steps leading to the provisional identification of HMWB are more explicitly described than in the draft process of Fig. 2.2.

Thirdly, the final process of Fig. 2.1 provides a revised timetable for the identification and designation of HMWB and AWB as compared to the draft process of Fig. 2.2. Actually, it became obvious from the results of the HMWB case studies that the timetable of Fig. 2.2 would clearly not match the requirements for the RBMPs when it comes to assessing measures and their costs. In the drafting process of the CIS guidance document on HMWB and AWB, a revised timetable was therefore considered essential to achieving stronger integration of the HMWB and AWB process with the (first cycle of) production of the RBMPs until 2009. Provisional identification of HMWB and AWB should be complete by December 2004 (WFD CIS Guidance Document No. 4 2003). As a general rule for provisionally identified HMWB, Steps 7–11 (of Fig. 2.1) and the assessment of the risk of failing the GEP objective should occur as soon as possible before December 2008 (WFD CIS Guidance Document No. 4 2003). 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 by December 2008. This allows one year for consultation of the draft RBMP before publication of the final plan in 2009 (WFD CIS Guidance Document No. 4 2003).

Finally, in the final process of identification and designation of Fig. 2.1, specific steps have been included regarding the operation of the process for AWB (Sect. 5.8 of the CIS final guidance on HMWB and AWB deals explicitly with this issue, WFD CIS Guidance Document No. 4 2003). It is clear from the text of the Directive that the designation tests of Article 4(3) apply to AWB as well as to HMWB. However, the CIS guidance document recognised that the interpretation of Article 4(3)(a) in relation to AWB is problematic. In order to undertake the Article 4(3)(a) designation test, the restoration measures necessary to deliver GES must be identified. This is not possible for AWB because they were created in a location where no significant water existed before, and therefore the High Ecological Status (HES) natural condition would be "dry land" and a sensible GES could not be derived. Consequently, it should be assumed that test 4(3)(a) does not apply to AWB. The second "designation test 4(3)(b)" does not impose interpretation difficulties when applied to most AWB and should be used as a designation test. Consequently, when designating AWB, it should be considered whether

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