Common Implementation Strategy

Ecostat Workshop

Hydromorphology

12 to13 June 2012

Conclusions and recommendations

1. Introduction

1.1 This paper summarises the main conclusions and recommendations from the Ecostat Hydromorphology Workshop held on 12 and 13 June 2012.

1.2 The aim of the workshop was to contribute to an understanding of the current state of play with respect to the assessment of hydromorphological impacts and the classification of ecological potential. It was organised on behalf of Ecostat by an adhoc group of experts on hydromorphology.

1.3 The workshop was hosted by the Representation of the Free State of Bavaria to the European Union in Brussels and attended by experts from around 23 Member states, Norway, Switzerland, Iceland, Turkey, Croatia, the European Commission, the EC Joint Research Centre and representatives of a number of stakeholder organisations, including representatives of the International Commissions for the Rhine and Danube; EURELCRIC, ESHA and the EU Reform project.

1.4 Copies of the workshop presentations, including a presentation on these conclusions, are available on CIRCA.

2. General conclusions and recommendations

2.1 It was clear that since the last Common Implementation Strategy workshop on this topic in 2009, there has been significant progress in the development of methods for assessing hydromorphological quality and biological assessment methods sensitive to hydromorphological alterations. However, it was also clear that some countries were further ahead than others. The workshop provided a valuable opportunity to share good practices.

2.2 The purpose of hydromorphological and biological assessment is to assist water management. Some countries have fully incorporated their assessment methods into all relevant aspects of water management. For others, incorporation is incomplete with some methods not yet used for water management.

Table 1: Roles of assessment methods in water management

	Controlling new development		Improving the status of waters			
Assessment method	Assess risk of deterioration	Define impact mitigation	Identify existing impacts (classification)	Identify likely cause of impacts (pressure)	Decide what/how much improvement is needed	Check whether objective achieved (classification)
Biological			✓	✓ Only if stressor specific		✓
Hydro-morph	✓	✓		✓	✓	

2.3 The workshop concluded that good practice involves fully incorporating methods for assessing the impact of hydromorphological alterations into water management decision-making. Full incorporation includes the use of methods for the purposes described in Table 1 above.

3. Hydromorphological methods

3.1 A range of different types of hydrological and morphological methods are used by different countries. Some focus on assessing the naturalness of the hydromorphology (eg how many natural features are present). Most of these look at natural structural features. Some also consider natural processes. Other types of methods focus on the extent and character of alterations (eg how much pressure is present). Water managers need methods that predict the change in ecological risk resulting from proposed increases or decreases (eg from reduced abstraction or morphological restoration measures) in hydromorphological pressures.

3.2 The workshop concluded that to develop good practice hydromorphology assessment methods:

(a) hydrological, morphological and ecological expertise should be used; and

(b) full account should be taken of what water managers need the method for.

3.3 Some hydromorphological assessment methods can require very detailed site-specific data collection. Where only a few water bodies are to be assessed, such methods do not pose significant implementation challenges. However, their application to large numbers of water bodies may be impracticable.

3.4 Good practice approaches to address this challenge involve using methods that can be applied to all water bodies without intensive field-based data collection. These methods make use of data collected using remote sensing or rely on modelling approaches. Typically, such methods can make use of detailed field data where necessary to help improve confidence in assessments. Such field data can be collected on a targeted basis, for example, where a decision to grant or refuse a permit, or a decision to make a significant investment in improvement measures, is dependent on the outcome of the hydromorphological assessment.

3.5 Hydromorphological assessment methods help water managers manage environmental risks. To do this, they have to describe whether hydromorphological conditions are likely to be sufficient to support biological quality elements at high, good, moderate or poor status. This can be done by defining hydromorphological thresholds or standards that correspond to the status class boundaries. A first step involves deciding what aspects of hydromorphological conditions are most likely to be important for the biological quality elements. These aspects should be the basis of assessments and of any standards or thresholds that are set.

3.6 The workshop concluded that the goal should be hydromorphological assessment methods based on empirically-derived relationships to biological status (eg pressure/response relationships). However, the scope for this approach is currently limited because of the lack

of suitable data sets and the difficulties in disentangling the effects of different pressures. Where an empirical approach cannot be used, the workshop recommended that methods should be based on expert judgement of the risk posed by hydromorphological alterations to ecological quality.

3.7 Most countries have separate methods for assessing hydrology and morphology. However, there is interaction between hydrology (eg river flow) and morphology (eg structure and condition of the river bed). Water plants and animals experience the combined effect. This means that pressure/response relationships are likely to be clearer when hydrological and morphological conditions are factored in. The workshop concluded that the potential for integrated hydrology and morphology methods should be considered in any future reviews that countries may undertake of their existing methods.

4. Ecological methods

4.1 Hydromorphological alterations act in different ways to pollution. They can change the quality of ecologically important habitats, the spatial extent of different habitats and the ecological connectivity between them. There are many different alterations that can be made to a water body's hydromorphological characteristics. Each can have different effects on the different habitats that make up the water body's hydromorphological characteristics. The result is that the ecological significance of a particular alteration depends on its magnitude and on the hydromorphological and ecological characteristics of the affected water body.

4.2 The above differences have implications for the development of assessment methods and their application in monitoring. For example, when trying to use data to empirically identify pressure/response relationships, it may be important to separate out different types of alterations because ecological effects can be quite different. This requires careful definition of alterations. For monitoring, sites representative of the ecological effects of the pollution pressures on a water body may not be representative of the ecological effects of hydromorphological alterations. For the latter, what is monitored and where should be based on an understanding of the hydromorphological alterations to the water body, including their locations and likely ecological effects.

4.3 It seems that few countries have so far managed to develop biological assessment methods sensitive to the effects of all the different types of potentially significant hydromorphological alterations. However, a number of countries have managed to develop biological methods that are responsive to hydromorphological alterations. These include a small number of stressor-specific methods and a number of methods that appear to respond to a wide range of stressors, including hydromorphological alterations. The latter are sometimes referred to as general degradation methods.

4.4 The workshop concluded that stressor-specific methods provide the most useful information for water management. They also increase confidence that the specific effects of different types of hydromorphological alteration are reflected in environmental assessments. Where data and scientific understanding permit, countries should aim to develop stressor-specific methods.

4.5 Developing biological methods sensitive to the effects of hydromorphological stressors and capable of differentiating very minor, slight, moderate, major and severe ecological impacts takes time. If methods have not yet been developed, the workshop recommended that countries consider interim solutions aimed at minimising the impact of the delay on river basin management planning. Sophisticated assessment methods are needed to confidently detect and differentiate slight from moderate ecological impacts. However, the identification of major and severe ecological damage (ie poor and bad status) is possible using much simpler methods based on simple ecological indicators. In the extreme, very bad sites are so obvious that very little assessment is needed. A key purpose of biological assessment is to help water managers make informed decisions about where to target improvement efforts. Since poor and bad water bodies would be expected to be among priorities, information from interim solutions based on simple indicator systems would assist river basin management planning.

4.6 The existence of some good examples of biological methods responsive to hydromorphological pressures shows that such methods can be developed. However, one country's method may not be directly usable by other countries. This is because a method's effectiveness can be limited to particular hydromorphological pressures and water body characteristics. Nevertheless, the workshop concluded that an understanding of the principles and techniques used to develop the existing methods may help countries develop their own biological assessment methods.

5. Methods for assessing good ecological potential

5.1 The ecological status of a water body is intended to describe the extent to which its ecological quality deviates from what would be expected under near natural conditions. The classification of the ecological potential of heavily modified water bodies poses different challenges. This is because the reference point for ecological potential is the maximum ecological quality that could be achieved without a significant adverse impact on the designated activities (eg water storage for drinking water supply, etc) or wider environment interests that are reliant on the hydromorphological alterations.

5.2 A few countries now have well developed and implemented methods for assessing ecological potential. However, a majority of countries appear less well advanced. In some cases, methods have been developed but either not yet implemented or only partially implemented. For others, the methods are still being developed or refined.

5.3 There do not appear to be any fundamental differences among the most well developed methods. The methods are all used as drivers for improvement, helping to identify water bodies that are not at good ecological potential. All aim to ensure good ecological potential reflects what is possible by way of mitigation without significant adverse impacts on the designated activities or wider environment interests. All aim mitigation at improving impaired ecological quality by moving it closer to what would be expected at good ecological status in the closest comparable natural situation.

5.4 One difference between the well developed methods is that some quantify the expected biological effect of mitigation whereas others do not, describing it only in qualitative terms.

This means that classification using the latter methods cannot be based on assessments against numeric biological class limits. Instead, it is based on whether or not the required mitigation (eg for hydromorphological conditions) is in place. However, irrespective of whether a quantitative or qualitative biological target is specified, the ambition of all of the methods is to do what can be done for ecology without significant adverse impacts.

5.5 Accurately predicting the biological effects of mitigation in quantitative terms can pose significant scientific challenges. Nevertheless, the workshop concluded that, where possible, countries should work towards estimating the biological effects of mitigation in quantitative terms.

5.6 The workshop also reiterated previous Common Implementation Strategy guidance on factors that can be taken into account in defining good ecological potential. Significant adverse impacts on an activity (ie use) or wider environment interests for which the water body was designated as heavily modified should be taken into account in defining good ecological potential. Improvements that would have such impacts are not expected for good ecological potential. Other costs of improvements, such as the financial costs of implementing mitigation measures, should not affect the definition of good ecological potential. Such costs can be taken into account in objective setting, including consideration of whether or not an extended deadline for achieving good ecological potential is applicable.

5.7 For countries with large numbers of heavily modified water bodies, very data-demanding approaches to assessing ecological potential would make completing classification a very slow process. Good practice in these cases has been to undertake an initial, national assessment using existing or readily assembled data. These initial assessments are used to prioritise follow-up site-specific assessments. The follow-up assessments allow more detailed information to be taken into account and site-specific improvement plans to be developed.

5.8 The workshop concluded that good practice entails ensuring transparency in the assessments and in the decisions that they underpin at national and water body scales. In particular, engagement of each country's water users and other interested parties in the development and implementation of its method for defining good ecological potential was recommended. Transparency will increase confidence among stakeholders in the robustness of the approach used.

6. Options for intercalibrating good ecological potential

6.1 The workshop concluded that the uneven state of play with respect to the development and implementation of methods for assessing ecological potential is likely to constrain options for intercalibration and/or the timetable for intercalibration. The workshop discussed a number of options.

6.2 Few countries have so far set numeric biological standards (eg ecological quality ratios) for good ecological potential. Biological methods sensitive to hydromorphological pressures are also at different stages of development. The workshop concluded that an intercalibration exercise based on comparing ecological quality ratios could not be successfully undertaken

at this time across a sufficient number of countries.

6.3 Some form of hydromorphological assessment method has been developed by many countries. However, the uses made of, and the basis of, the different methods appear very variable.

6.4 CEN has published two hydromorphology standards for rivers. The first (EN 14614:2004: Assessing Hydromorphological Features of Rivers) is a guidance standard providing a framework of general principles and setting out which aspects of river hydromorphology should be assessed, how to plan and conduct field surveys, how results should be interpreted and presented, and ways of applying quality assurance procedures. The second (EN 15843:2010: Determining the Degree of Modification of River Hydromorphology) provides a framework for assessing river hydromorphological attributes, including using simple scoring systems to enable the extent of hydromorphological modification to river channels, banks, riparian zones and floodplains to be recorded and assessed consistently. CEN has also published one standard for lakes. A second standard for lakes is under development as is a standard for transitional and coastal waters.

6.5 The workshop concluded that an intercalibration based on comparing the results of countries' hydromorphological assessment methods could prove difficult in practice because of the wide variety of methodological approaches.

6.6 The workshop agreed that an intercalibration exercise based on comparing mitigation measures was likely to be the best option at this time. This would need to focus on quantified mitigation requirements rather than qualitative and generic mitigation descriptions. Mitigation has to be quantified at the time of detailed mitigation planning for a water body. The workshop concluded that this "project level" quantitative mitigation should form the basis for the comparisons needed for an intercalibration exercise.

6.7 The workshop also concluded that it was important to keep any intercalibration exercise relatively simple if it was to be successful. In this respect, the recommendations included focusing on:

(a) the most common combinations of activity (use) and water body type; and
(b) water bodies whose hydromorphological characteristics have been substantially altered by one activity rather than multiple activities.

7. Recommended follow up actions

7.1 It appears that many countries are at different stages of development and refinement of assessment methods. Some countries have well developed methods for some assessment purposes but not for others. Only a few countries have anything approaching a comprehensive set of assessment methods. This situation increases the value of information exchange. Many countries should be able to borrow and adapt the approaches of the few well developed methods.

7.2 Promoting exchange of information about methods may also increase the commonality between methods. If this happens, it would facilitate any future intercalibration as it is easier

to compare similar methods rather than disparate methods.

Recommended actions
ECOSTAT to develop a resource on CIRCA that identifies:
(a) what assessment methods and mitigation measure libraries are available in different countries;
(b) the key features of those methods/libraries; and
(c) how to access technical details about the methods/libraries.

Some of the above information has already been provided by members of the adhoc group of experts on hydromorphology. Ecostat will organise the collection of information from other countries using a simple questionnaire to other participants at the workshop.

7.3 A number of national research and development projects appear to be focused on similar topics, such as environmental flows and hydropeaking. The workshop concluded that it would be valuable to establish contacts between those national programmes working on similar areas.

Recommended actions
Ecostat to invite country representatives to:
(a) identify relevant topic areas being addressed in their national research programmes;
(b) provide contact details for information about those research topic areas; and
(c) confirm whether or not they would like Ecostat to pass on contact information for any research on those topic areas being carried out by other countries.

7.4 The EU funded research project, REFORM, outlined its work programme for the benefit of workshop participants. Among other things, the project is aiming to review hydromorphological assessment methods and identify biological indicators for assessing the ecological impact of hydromorphological alterations.

7.5 Both the representatives of REFORM and the other workshop participants recognised the potential mutual benefits of maintaining good links between REFORM and Ecostat. This would help REFORM keep in touch with the needs of key users of its research findings. For countries seeking to develop or refine methods, it would facilitate information exchange about good practice approaches.

Recommended actions
Ecostat and REFORM to explore the potential for organising a back-to-back meeting in early 2013; Ecostat to continue to be represented on the REFORM Advisory Board.