

Water Framework Directive

Classification and Environmental Standards in the Water Framework Directive

Overview

Classification and Environmental Standards in the Water Framework Directive

The Water Framework Directive (WFD) asks us to classify waters in a different way, using new and revised environmental standards to assess whether environmental conditions are good enough to support biology. This briefing note outlines the process of classification and the development of environmental standards in the UK.

What is classification?

We use classification systems to assess the state of the environment at any point in time. They show us where the environment is of good quality and where it may require improvement. Classification systems therefore help us in planning what measures might be required for improvements, and will eventually show how our actions have benefited the environment.

Regulatory agencies in the UK already use classification systems such as the General Quality Assessment (GQA) scheme. The GQA has been a very useful tool for measuring the quality of our rivers and giving a snapshot of levels of pollution. This has proved useful in showing how river quality has improved as a result of investment. However, we now need to create a more detailed picture of the water environment.

The WFD asks us to look at the water environment as a whole, integrating water quality, quantity and physical habitat with ecological indicators.

Our assessments so far have concentrated mainly on a small number of chemical and biological indicators, but we must now look at the water environment as a whole. This is because the WFD changes the way in which we assess status. We are developing new classification systems for rivers, lakes, estuaries, coastal waters and groundwaters. The health of the animal and plant groups that live in surface waters will now be the main factor that describes the state of those waters. The new systems will help to provide a safer, cleaner and richer water environment.

The new classification systems

We will assess the status of waters by looking at ecological, chemical and physical elements using updated existing and new classification systems. The information gathered through our monitoring programmes will allow us to classify water bodies. The WFD requires surface water bodies to be classified into one of five ecological status classes, and one of two chemical status classes. In addition, there are two stages to groundwater classification, considering water quantity and chemical status.

One of the main objectives of the WFD is to achieve good ecological and chemical status. We need to define the boundaries between each status class and describe the extent to which human activities are adversely affecting the health of aquatic ecosystems. Water bodies of good ecological status should deviate only slightly from the biological, structural and chemical characteristics that you would expect under undisturbed conditions.

Environment and conservation agencies in the UK are working together to identify common class boundaries, including ‘good status’, based on our current technical knowledge. We will refine these boundaries when we have the results of a European exercise, which aims to ensure that biological class boundaries are consistent across Europe. This exercise is called ‘intercalibration’ and it will clarify the definition of ‘good status’ by mid 2007. It will focus initially on those biological elements that best relate to the most common pressures on the water environment (e.g. nutrient enrichment). Since groundwater status depends in part on surface water status and standards set in other legislation, there is no separate intercalibration exercise for groundwater.

Setting environmental objectives

In each River Basin Planning cycle, we will define objectives for each water body using the classification systems, considering social, environmental and economic factors. We will express these objectives in terms of status; for example the objective may be to ‘achieve good status’. The objectives will define the status we want the water body to achieve and by what time, and are set as part of the River Basin Planning process. Figure 1 illustrates this process for surface waters.

The WFD also allows us to set alternative objectives where we think we may not be able to achieve good status or it will be disproportionately expensive to do so¹. We will need to justify any alternative objectives on the basis of a full socio-economic and feasibility assessment. Methods for assessing alternative objectives on the basis of economic grounds are being developed in a Collaborative Research Programme².

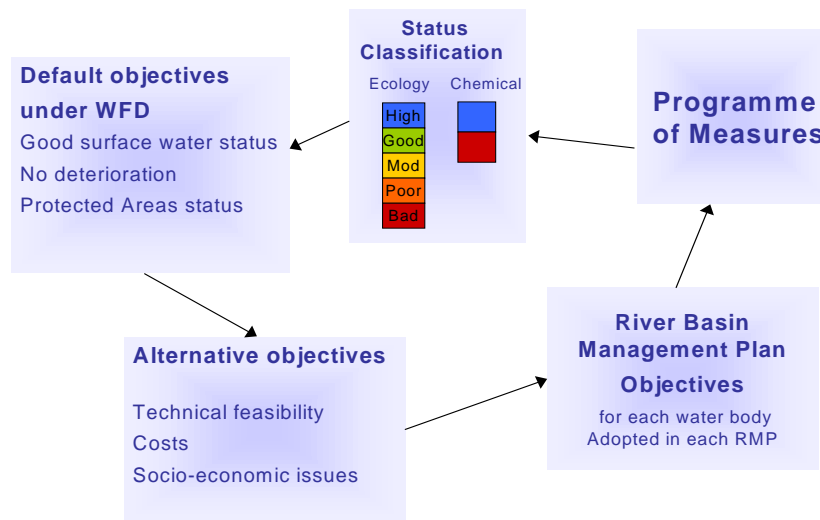


Figure 1: Objective setting in the River Basin Planning cycle

¹ The circumstances under which alternative objectives will be used is outlined in UKTAG guidance paper 13c – Draft principles for an objective setting framework for river basin management planning in accordance with the Water Framework Directive’

² For further details see www.defra.gov.uk/environment/water/wfd/economics/research.htm

In the first cycle, however, we will be reliant on risk assessment data, developed during River Basin Characterisation, and environmental standards to achieve this process. This is because we will not have the classification information for the new elements under the WFD such as morphology, or in new water categories such as lakes.

Classification in more detail³

We are developing new classification systems to include both surface waters and groundwaters. Although these schemes have differences in approach, we will use them for the same purpose: to judge current status and assess whether we achieve WFD objectives, including ‘good status’. Table 1 summarises these classification systems.

Surface waters

The status of each surface water body is judged using separate ‘Ecological classification’ and ‘Chemical classification’ systems. The overall status of the water body will be determined by whichever of these is the poorer. To achieve ‘good status’ overall, a water body must achieve both good ecological and good chemical status.

Ecological classification

The Ecological classification system has five classes, from high to bad, and uses biological, physico-chemical, hydromorphological and chemical assessments of status. Biological assessment uses numeric measures of communities of plants and animals (e.g. fish and rooted plants). Physico-chemical assessment looks at elements such as temperature and the level of nutrients, which support the biology. The hydromorphological assessment looks at water flow and physical habitat. The Directive only gives definitions for three classes for these quality elements (high, good and moderate status) but for the purposes of planning improvements and assessing deterioration, we need numeric values equivalent to all five biological classes. This is why Figure 2 only shows three classes for the supporting physico- chemical quality elements used in stage 2 of the classification.

The chemical assessment within Ecological classification refers to polluting substances that could adversely affect the ecology. These pollutant standards will be set by the UK according to the procedure outlined in Annex V of the WFD. They are considered less harmful than the ‘priority’ polluting substances referred to in the Chemical classification (below).

The overall ecological status of a water body is determined by whichever of these assessments is the poorer. So, a water body might pass ‘good status’ for chemical and physico-chemical assessments, but be classed as ‘moderate status’ for the biological assessment. In this case it would be classed overall as ‘moderate ecological status’. Figure 2 describes how overall classification is achieved using this process.

Chemical classification for priority substances and other pollutants

The Chemical classification system for surface waters, used for the most polluting substances, has only two classes, ‘good’ or ‘failing to achieve good’. We will assess status

³ UKTAG guidance note 11a) provides an overview of classification schemes in River Basin Planning

by checking whether the water meets Environmental Quality Standards (EQSs) for substances listed in Annex IX (Dangerous Substances Directive and associated daughter directives) and Annex X (WFD Priority List Substances). These standards are being set on a Europe-wide basis and are considered a priority because of their high potential for pollution.

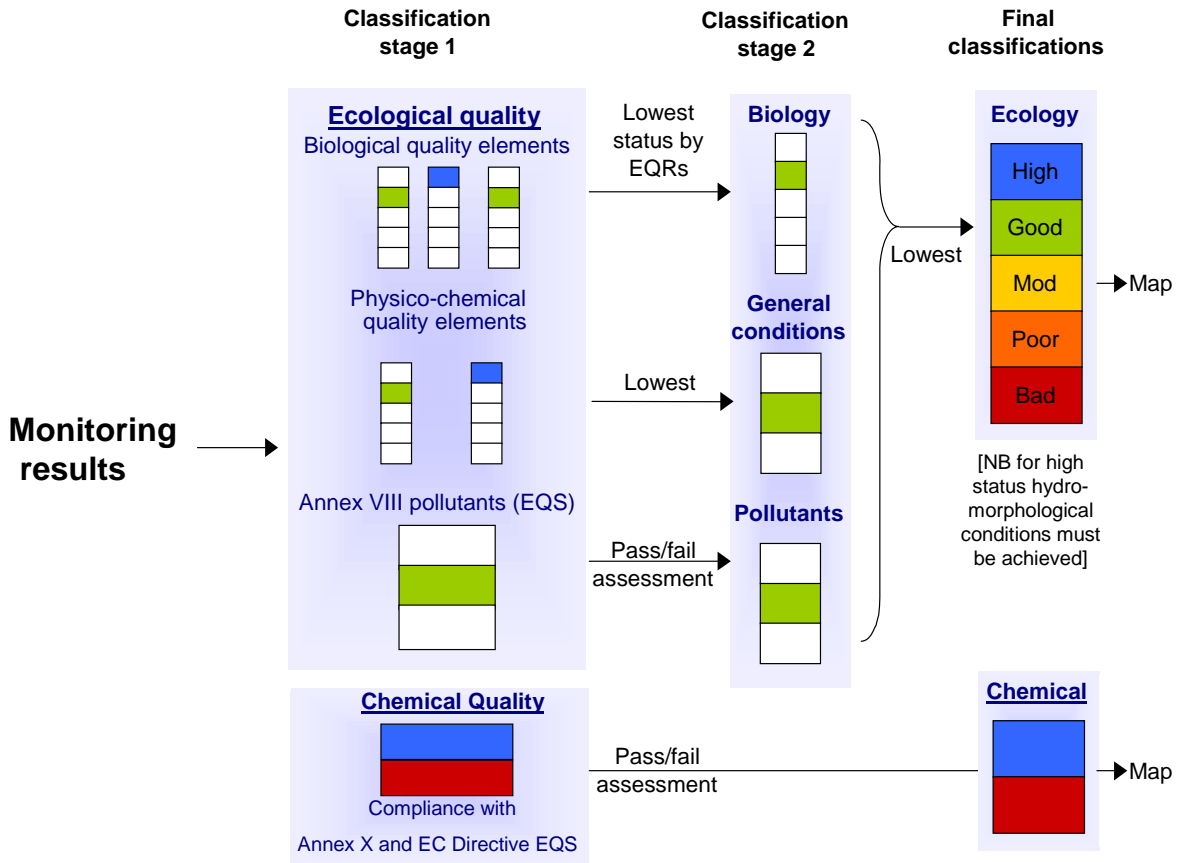


Figure 2: Classification of surface water bodies

Groundwaters

Groundwater classification uses two systems: ‘Groundwater quantitative’ status, which assesses whether there is sufficient water to maintain the health of the ecosystems it feeds, and ‘Groundwater chemical status’, which assesses the chemical quality against certain criteria. The Groundwater Daughter Directive will detail the criteria for chemical status.

The WFD looks at the way groundwaters and surface waters interact, so a groundwater body cannot be at good status if it causes an associated surface water body to fail its ecological or chemical status objective, or causes significant damage to a groundwater dependant wetland ecosystem. As with surface waters each groundwater body has to be classified. We will use two status classes, good and poor, and both quantitative and chemical status must be good before we can classify the groundwater body as good.

What are environmental standards?

Environmental standards are the values for water quality, water quantity and habitat structure defined to ensure that the right environmental conditions are created to support the biology. The standards will relate to and define the class boundaries for ecological and chemical classification schemes, and help us to decide what measures need to be taken to protect the water environment. For example, water quality standards tell us the quantity of a pollutant that can safely be present in the water environment without causing harm to the ecology. We assess our success in protecting ecology by monitoring animals and plants that tell us whether the ecosystem is healthy or not.

We already use this approach to protect the water environment from pollution and for licensing water abstraction. To implement the WFD, we need to identify environmental standards to use in protecting the ecology from other pressures, such as over-abstraction and damaging engineering works.

In the first River Basin Planning cycle we will use environmental standards to refine the risk assessments of the impact of human activity on the water environment. This will help us to target future monitoring at places of most risk and plan the Programme of Measures. These measures are the actions required to meet the objectives of the WFD. This will include permits to control the activities that affect whether a water body meets its objectives, such as discharge consents, abstraction licences and Codes of Practice. We will use the environmental standards to set permit limits.

We will review the environmental standards to check that they are effective in achieving the objectives of the WFD. Where required, we will produce new standards that meet the WFD and other legislative requirements.

Environmental standards in more detail⁴

Environmental standards will be set for surface waters to support Ecological and Chemical classification, and for groundwater Chemical and Quantitative classification.

Surface waters

- Surface water environmental standards will support biology and will cover:
 - morphology (physical structure) and hydrology (flow and water level) standards for each of the class boundaries (high/good/moderate/poor/bad);
 - levels for general physico-chemical elements for each of the class boundaries (high/good/moderate/poor/bad);
 - environmental quality standards for those chemical pollutants (Annex VIII) that pose a current and high level of risk in the UK.

These are being derived within the UK in a phased approach.

- Surface water chemical environmental standards for use in the Chemical classification are the EQSs in existing EU legislation such as the Dangerous Substances Directive, and the new Priority Substances and Priority Hazardous Substances. These standards are being agreed at EU level for a Priority Substances Daughter Directive.

⁴ UKTAG guidance note 14e) provides an overview of Environmental standards for use in classification and the Programme of Measures for the Water Framework Directive

Groundwaters

Groundwater environmental standards will include:

- limits for saline or other chemical intrusions from other water sources into groundwater bodies, including values for conductivity;
- levels (and associated limits) expressing the water balance in the groundwater body;
- thresholds of impact on ecology or status of dependent surface waters and terrestrial ecosystems;
- chemical standards defined under Article 17 of the WFD (proposed Groundwater Daughter Directive). Early indications are that these are likely to include common EU standards for nitrates and pesticides, together with threshold values, defined at Member State level (down to groundwater body level), to protect ecosystems dependent on groundwater.

There will be a high level of confidence in some of the environmental standards as they are being developed from existing standards, classification systems and regulatory regimes. For other substances, standards will be entirely new with limited monitoring data to support them. The environmental standards will be based on the best scientific understanding of what is needed to protect the water environment.

How do I find out more?

More detail on classification schemes and environmental standards can be found in two UK Technical Advisory Group (TAG) papers: 11a) *Overview of classification schemes in River Basin Planning*, and 14e) *Environmental standards for use in classification and the Programme of Measures for the Water Framework Directive*. See <http://www.wfduk.org/> for more details.

This note was written in collaboration with the UK Technical Advisory Group, Scottish Environment Protection Agency (SEPA) and the Department of the Environment (Northern Ireland) - Environment and Heritage Service. For more information on the implementation of the WFD, please see our website at <http://www.ehsni.gov.uk/environment/waterManage/wfd/wfd.shtml>

Table 1 WFD Classification Schemes

Category	Classification Schemes	
Surface water (rivers, lakes, estuaries, coastal waters)	Ecology, including: <ul style="list-style-type: none"> • Biology quality elements • Physico-chemical quality elements • Hydromorphological quality elements • EQSs for synthetic and non-synthetic pollutants (from Annex VIII) 	Chemical <ul style="list-style-type: none"> • EQSs for Annex IX and X substances including Priority List Substances.
Classes	High, Good, Moderate, Poor, Bad	Good, Failing to achieve good
HMWB and AWB	Ecological potential, including: <ul style="list-style-type: none"> • Biology quality elements • Physico-chemical quality elements • Hydromorphological quality elements • EQSs for synthetic and non-synthetic pollutants (from Annex VIII) 	Chemical <ul style="list-style-type: none"> • EQSs for Priority Hazardous Substances and other EQSs set at EU level
Classes	Good, Moderate, Poor, Bad	Good, Failing to achieve good
Groundwater	Quantitative, including the effect of groundwater abstraction on the following: <ul style="list-style-type: none"> • Saline or other intrusions • Surface water ecological status • Groundwater dependent wetlands • Groundwater abstraction as a percentage of recharge • Groundwater level 	Chemical, including the effect of groundwater chemistry on the following: <ul style="list-style-type: none"> • Saline or other intrusions • Surface water Ecological Status • Surface water Chemical Status • Groundwater dependent wetlands Plus <ul style="list-style-type: none"> • Article 17 Groundwater Daughter Directive Criteria
Classes	Good, Poor	Good, Poor
<p>Note: In cases where failure of environmental objectives for surface water status or significant damage to groundwater dependant terrestrial ecosystems is due to groundwater, then the groundwater body automatically fails Good Groundwater Status.</p>		