

Implementing the Water Environment and Water Services (Scotland) Act 2003:

Development of environmental standards and conditions

Policy Statement



March 2007

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1. INTRODUCTION

1.1 Background

Scotland's water environment is in a relatively good condition compared with that of many European countries. We also now have in place an integrated framework to protect and improve our water environment through the Water Environment and Water Services (Scotland) Act 2003 (the WEWS Act), which transposed the European Water Framework Directive (WFD), and the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR).

However, our water environment is under pressure from a variety of uses, with nearly 45 % of our water bodies identified in 2005 as being at risk. We need to ensure that water use is sustainable in order to protect aquatic life and to safeguard the water environment as a resource for the future. The framework provided by the WEWS Act and CAR will be vital in ensuring that we can protect the quality of the waters we have, and where necessary and practicable, improve the status of those that are under pressure.

GENERAL PURPOSE OF ENVIRONMENTAL STANDARDS

The key mechanism for delivering improvements to the water environment will be the river basin management planning process. This process will rely on the use of environmental standards and conditions to help us assess risks to the ecological quality of our water environment and to identify the scale of improvements which would be needed to bring those waters not in good condition back to good health. The development of environmental standards and conditions is therefore a key part of our implementation of the WEWS Act.

The standards define a range of environmental conditions needed to support healthy aquatic life. They include standards for oxygen levels, water flow conditions, concentrations of key chemicals and the physical structure of river banks and beds - all factors on which aquatic plants and animals depend. The standards have been developed on a UK basis by technical experts in the UK Technical Advisory Group for the WFD (UKTAG)

The standards will underpin our efforts to protect and, where necessary, improve the water environment by informing decisions made under CAR on the regulatory controls required for activities that could adversely affect the water environment. They will also help us identify what is needed to support the achievement of 'good ecological status' – the overall aim of the WFD for all surface water bodies - and so inform the setting of environmental objectives in the river basin management planning process. It is therefore important that the standards are based on sound science and set at levels which protect the varying needs of Scotland's aquatic ecosystems.

1.2 Aim of this Policy Statement

This paper provides information on the principles behind the environmental standards and conditions and the process of developing the standards across the UK. It explains how the standards will be introduced in phases, and how they will support the various aspects of the implementation of the WEWS Act. It also outlines the Scottish Executive's policy on how the standards will be used by SEPA and other regulators to protect, and where necessary to improve, our water environment.

This paper is supported by Directions to SEPA, which set out the first tranche of standards and instructs SEPA in their use.

2. LEGISLATIVE FRAMEWORK AND PRINCIPLES

2.1 Aims of the WEWS Act

The Scottish Executive's key aim in implementing the WEWS Act is to strike the right balance between **protecting and improving the water environment and supporting the social and economic needs of those who depend on it.**

The WEWS Act introduced two key systems for the protection of our water environment:

- water management through the development of River Basin Management Plans (RBMPs); and
- regulatory control under CAR of a range of activities that can impact on the water environment

RBMPs will be developed through a 6-year cyclical planning process. The process will identify appropriate environmental objectives for each water body in Scotland, and the measures that will be used to achieve them.¹

Regulatory control under CAR will be a key tool in securing the protection and improvement of our water environment. SEPA is tasked with regulating activities which pose a risk to the water environment, including abstractions, impoundments, discharges and engineering works in freshwater.

Activities controlled under CAR require an authorisation. SEPA may impose such authorisation conditions as it considers necessary to protect and improve the water environment. In making regulatory decisions, SEPA is expected to contribute to achieving the objectives of the WFD and other legislation, take account of the interests of other users of the water environment and help secure efficient and sustainable water use.

2.2 Contribution of the standards to WFD implementation

To implement the WFD, we need to identify the environmental standards that are necessary to support aquatic plants and animals at good ecological status and at high ecological status. This will enable us to assess whether waters at high status or good status are at risk of deterioration and what improvements would be needed to restore other waters to good ecological status, the principal objective of the WFD. **Table 1** in **Annex A** sets out the full list of elements listed in the WFD which require environmental standards to be set.

2.3 Relationship to standards established under other EU directives

A number of EU directives have established environmental standards relevant to the water environment. For example, environmental standards are already in place to protect areas designated under the Bathing Waters Directive, the Freshwater Fish Waters Directive and the Shellfish Waters Directive.

The standards required to comply with other directives will continue to apply. Where both a standard introduced under the WEWS Act and a standard required to comply with another directive apply, the most stringent will take precedence.

¹ The Executive's Policy statement "*Principles for Setting Objectives in the River Basin Management Plan*" is available from: <http://www.scotland.gov.uk/Publications/Recent>.

Some of directives which set standards for the water environment will be repealed at the end of 2013. These include the Freshwater Fish Waters Directive and the Shellfish Waters Directive. The objectives of these directives will be carried forward through the WFD's network of Protected Areas. The environmental standards applying to areas established to protect economically significant aquatic species will be revised, where necessary, to reflect improvements in scientific understanding of the conditions needed to achieve this protection.

3. USING ENVIRONMENTAL STANDARDS IN IMPLEMENTING THE WEWS ACT

3.1 Introductory outline

The introduction of environmental standards is a key step in securing effective protection of Scotland's aquatic ecosystems. The new standards and conditions will help SEPA assess and control risks to the water environment, classify the status of water bodies, and determine what actions are needed to meet our environmental objectives. Environmental standards will underpin risk-based regulation and river basin management planning. The next sections discuss the roles of environmental standards in more detail:

- **Classification** of water bodies – assessing their status;
- **Monitoring** to assess progress towards our environmental objectives
- **Objective-setting** within the river basin management planning process; and
- **Regulation** of activities affecting the water environment, through CAR

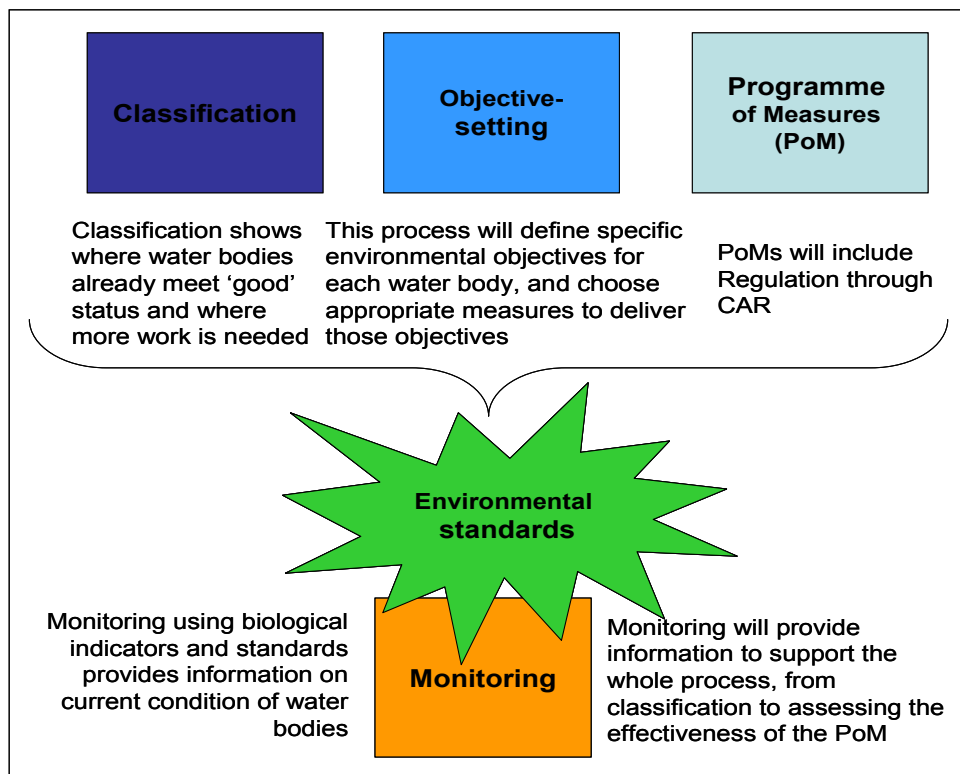


Figure 1: How environmental standards support river basin management planning

3.2 Classification of the water environment under the WFD

The WFD is much broader in scope than previous EU legislation. Whereas previous EU legislation tended to focus on the chemical quality of waters, the WFD requires us to describe both the **ecological** and **chemical** status of all surface water bodies and set ecologically-based objectives.

Ecological status describes the degree to which human uses of the water environment have altered the structure and functioning of aquatic plant and animal communities. The WFD requires us to assign water bodies to one of five ecological status classes: 'high', 'good', 'moderate', 'poor' and 'bad'. 'Good' ecological status means that human activities have had only slight impacts on the ecological characteristics of aquatic plants and animal communities.

Chemical status describes whether the water contains safe levels of certain toxic chemicals that have been identified as of particular concern across Europe because of their toxicity, persistence and ability to accumulate in the bodies of plants or animals. These include the chemicals known as 'priority substances' and include a sub-set called 'priority hazardous substances' as well as other toxic substances identified under the Dangerous Substances Directive. The chemical classification is simple: water which contains too high a concentration of the listed pollutants cannot be classified as 'good'. The WFD therefore has just two status classes: 'good' and 'failing to achieve good'. Standards for priority substances are expected to be established by the European Council and the European Parliament within the next year or so.

We are required to aim to achieve good ecological status and good chemical status by 2015. This is described in more detail below.

The WFD also requires us to classify the status of all bodies of groundwater and aim to achieve good groundwater status in each body of groundwater by 2015. Groundwater classification and associated standards will be addressed in work on phase 2 of the environmental standards (see Section 4.2).

- **Heavily Modified and Artificial Water Bodies (HMWBs and AWBs)**

In some cases, substantial alterations made for activities like navigation, water storage, flood defence and land drainage may mean that a surface water body cannot reach 'good' ecological status. Where certain criteria are met, the WFD allows such water bodies to be designated as heavily modified water bodies (HMWBs). Other water bodies, such as canals, that have been created where no natural water body previously existed, will be designated as artificial. More information on how these water bodies will be identified is set out in our paper on objective setting.

Application of the environmental standards to HMWBs will vary depending on the nature of the standard. For example:

- a) **Water quality** – standards will usually be directly applicable to HMWBs. For example, environmental standards for toxic pollutants are not dependent on whether a water body is heavily modified or artificial.
- b) **Water flows and levels, physical structure** – depending on the modifications or the artificial characteristics on which the use of the water body depends, hydrological and morphological standards may not be directly applicable to HMWBs.

- **Standards and classification**

The WFD requires that monitoring and assessment methods are developed to enable the classification of surface water bodies.

The first step in this process is to decide, technically, how best to monitor and assess the condition of aquatic plants and animals in our rivers, lochs, estuaries and coastal waters and relate the results back to the WFD's descriptions of the ecological conditions expected for each status class. This means defining, for instance, the composition and abundance of fish, invertebrates and plant communities that would be found if the water environment was subject to no more than very minor human disturbance. These reference conditions provide the starting point for assessing the degree of change from those conditions that would equate to 'good' status, and as human impacts progressively increase, 'moderate', 'poor' and 'bad' status.

The second step is to look at the condition of the physical characteristics of the water environment associated with each of the ecological status classes. These characteristics include:

physico-chemical characteristics – e.g. oxygen levels, acidity, temperature, nutrients and the concentration of toxic chemicals, referred to by the WFD as 'specific pollutants' (see Table 1 in Annex A).

Hydrological characteristics – e.g. water flows and levels; and

Morphological characteristics – e.g. physical shape and characteristics of the bed and banks of rivers, including the structure and condition of bank vegetation.

The composition of plant and animal communities in our rivers, lochs, estuaries and coastal waters varies with the characteristics of those waters. Some of the necessary environmental standards will also vary with the natural characteristics of the water environment and the sensitivity of the aquatic plant and animal communities that have evolved and adapted to them. To avoid introducing environmental standards that would be over-protective in some places and under-protective in others, where necessary the environmental standards vary with the characteristics, or type, of the river, loch, estuary or coastal water concerned.

Each environmental standard has been set at the **minimum level that the available scientific evidence indicates is necessary to protect aquatic plants and animals**. This means, for example, that if the environmental standard for 'good' status oxygen levels was failed, there would be a significant risk of adverse impacts on the condition of aquatic animals or plants.

The UK environmental standards have been developed in conjunction with biological classification methods. This is to ensure that the standards describe the environmental conditions needed by aquatic plants and animals at 'high' and at 'good' status.

- **Risk assessments and classification**

In 2004, SEPA undertook an analysis of the characteristics of all water bodies. This characterisation exercise identified the pressures to which our water bodies are subject and the risk posed by those pressures to the achievement of good status.

The analysis was based on the information on pressures and impacts and used risk-criteria agreed across the UK. In recognition of the limitations of the available data, water bodies were classified in four risk categories, including 1a water bodies, which are water bodies that SEPA has high confidence are 'at significant risk' of failing to achieve good status by 2015 and 1b water bodies, which are considered 'probably at significant risk'.

Since the reports were published, SEPA has been working to refine its assessment of water bodies identified as probably at significant risk (1b). To do this it has been gathering better information on the pressures to which the relevant water bodies are subject and on the impacts of those pressures. It will also use the new environmental standards to refine the risk-criteria. Specifically:

- CAR has provided SEPA with greatly improved information about the pressures on the water environment, and particularly about abstraction volumes and impoundment compensation flows;

- SEPA has been using the results of the risk analysis to help target its monitoring work since 2005. From December 2006, SEPA introduced a comprehensive new monitoring programme for the water environment designed to provide the information required to implement the WFD and the WEWS Act.

The **Significant Water Management Issues report (SWMI)**, to be published later this year, will include an update on the work SEPA has been doing to refine its original risk assessments.

3.3 Monitoring and assessment

Classification decisions will take account of biological monitoring results as well as information on whether the environmental standards are being met.

SEPA established a new monitoring network in December 2006 to enable it to classify the status of all our water bodies. SEPA has ensured that adequate monitoring sites are in place to assess the state of the water environment over time, targeting and prioritising those water bodies that are at risk of failing to meet our environmental objectives.

Several years' data will be needed to fully classify the status of all Scotland's water bodies. SEPA will produce as accurate a picture as possible of the status of our water bodies by December 2009 and present this in the first River Basin Management Plan. The results of the monitoring programmes will help to identify whether actions taken to improve the water environment are effective, and to monitor achievement of our environmental objectives.

By monitoring a range of conditions (physico-chemical, hydrological and morphological) and comparing the results against the environmental standards, SEPA can identify the scale of improvements necessary to mitigate adverse impacts on the status of our aquatic ecosystems. Monitoring information will therefore support both the RBMP process and the regulation of water use in Scotland.

As information on the ecological status of our water bodies is gathered, the scientific understanding of the environmental conditions needed to support the achievement of 'good' status is likely to improve. Information provided by monitoring and classification or other sources may indicate that an environmental standard for a water body type could be too stringent or too lax. Where this is the case, we expect SEPA to coordinate a review of that standard and, if appropriate, to come forward with proposals for revisions.

Revisions to environmental standards will be taken into account during updates of the River Basin Management Plans. **However, we do not propose to introduce new or revised standards during a planning cycle.**

3.4 Objective setting and River Basin Management Plans

River basin management planning is a new process of water resource management in river basin districts introduced for the first time by the WFD and the WEWS Act. It will include defining specific environmental objectives for each water body and identifying and implementing a programme of measures to deliver those targets. The Executive's policy statement on 'Principles for setting objectives in the River Basin Management Plan' provides further information on this process.

Environmental standards underpin the objective-setting process, as they are fundamental in assessing risks to the status of the water environment and highlighting where action is needed, either to avoid deterioration or to achieve 'good' ecological status. The standards will help to indicate the type and extent of any problems, as well as the sort of actions that could be effective in delivering improvements or preventing deterioration. The effectiveness of the programmes of measures will be assessed through ongoing assessment of the ecological and chemical status of each water body.

SEPA will work with water users to develop a River Basin Management Plan for the Scotland River Basin District and for the Solway Tweed River Basin District (jointly with the Environment Agency) by December 2009. The programmes of measures that are designed in this process must be operational by December 2012.

3.5 Regulation through the Controlled Activities Regulations

Since 1 April 2006, activities in Scotland which pose a risk to the water environment, including abstractions, impoundments, discharges and engineering works in freshwater, must be authorised under the CAR. SEPA will use the environmental standards to support the setting of conditions for CAR licences and to assess the capacity of the water environment to accommodate new water use activities without harming its ecological quality. Among other things, we expect SEPA's regulatory activity to contribute to achieving our environmental objectives.

Early in 2007, SEPA will begin a prioritised review of licences issued under CAR. This review will consider the type of activity, its impact and the licence conditions that were initially applied. The review process will identify the extent to which it is feasible and not disproportionately expensive to avoid or to reduce the adverse impacts of those activities on the water environment, through varying the conditions of authorisations. Information from this review of licences will support the first cycle of basin planning in Scotland by helping to identify what improvements can be delivered by operators of controlled activities, and hence what objectives can be achieved through CAR.

3.6 Directions to SEPA

The Executive is in the process of issuing Directions to SEPA, specifying how SEPA should use these environmental standards when carrying out its functions under the WEWS Act and CAR. Separate Directions may be issued in respect of SEPA's functions in the Solway Tweed River Basin District, if appropriate. In implementing these Directions, the Executive expects SEPA's use of the standards to be guided by the principles set out at **section 5**.

The Directions will be published on the Executive website.

Table 2 in Annex 1 sets out the standards introduced in the first phase by means of these Directions.

4. DEVELOPING ENVIRONMENTAL STANDARDS IN THE UK: KEY PRINCIPLES

In January 2006, the UK administrations set out the key principles underpinning the approach to the introduction of environmental standards and conditions in the UK².

4.1 Separation of science and policy

The main work of developing environmental standards has been carried out by the UK Technical Advisory Group for the WFD (UKTAG). This is a partnership of technical experts from the UK environmental protection and conservation agencies, as well as some partners from the Republic of Ireland. Given its technical expertise, UKTAG is responsible for developing recommendations for standards and presenting these to the UK administrations for consideration.

In turn the UK administrations consider these recommendations, and produce proposals for introducing any standards and conditions. Cost considerations are taken into account at this stage. However, it is the objective-setting process which determines where, when and if action should be taken to achieve environmental standards. This process will take into account the costs and benefits of achieving the standards and set objectives accordingly. Producing accurate and reliable estimates of the costs associated with the standards ahead of the objective-setting process is not possible.

This clear separation of science and policy has been adopted to emphasise that the flexibility to set less stringent objectives on grounds of disproportionate costs or technical infeasibility is an integral part of implementing the WFD and the WEWS Act.

4.2 Phased introduction of environmental standards and conditions

Environmental standards will be introduced in a series of phases:

- **First phase:** The standards developed in the first phase have now been introduced in Scotland by Directions to SEPA.
- **Second phase:** Proposals for the second set of standards will be published in 2007. UKTAG plan to publish their methodology for an initial technical review in late spring and then make recommendations to the UK governments. The Executive plans to publish its proposals for consultation later in 2007. This phase is likely to include more of the water quality and water resources standards that were not included in the first phase, as well as proposals for groundwater and for some of the chemicals that are significant issues in UK surface waters – classed as ‘specific pollutants’.
- **Later phases:** The first two phases of standards will be used for basin planning in the first cycle. Further standards will be developed as scientific data becomes available from monitoring and from work at a European level. These later standards are unlikely to be available in time for effective introduction in the first cycle of RBMP, but many may be available for the second cycle. All proposals for standards will be published for consultation before they are introduced.
- **Classes below ‘good’:** The initial priority in developing standards was to define the environmental standards needed to protect the water environment from significant damage and thus help identify what we would need to do to restore water bodies to good ecological status. However, we also need to protect water bodies that are worse than good status from further

² Statement available from <http://www.scotland.gov.uk/Resource/Doc/1057/0021699.pdf>

deterioration. UKTAG is now developing environmental standards that correspond to the boundary between moderate and major damage to aquatic plants and animals and between major and severe damage. This will also help us assess what we would need to do to improve a water body from one class to another.

This phased approach reflects our desire to ensure that all available scientific evidence is considered in developing the standards. For some standards more data is needed either from monitoring or new research before a robust standard can be proposed.

Equally, it is important that standards are proposed and introduced as early as possible where we have sufficient information and understanding. Timely introduction will give businesses sufficient time and certainty to plan for the future.

Introducing the standards in phases does not mean that there will be any increased risk to the water environment. The standards augment the protection provided by the standards and controls already in place under existing legislation. Until new standards are developed and introduced, SEPA will continue to use existing standards, such as those already used in the Scottish Rivers Classification Scheme or under the Dangerous Substances Directive.

4.3 Compatible approach across Europe

As outlined in Section 3.2, the environmental standards have been set at levels to protect aquatic plants and animals from significant impacts. They will therefore help us assess the risk to the achievement of good ecological status.

The standards have been developed in parallel with an EU intercalibration exercise so that we could ensure that the protection they provide is consistent with other Member States' understanding of good ecological status.

The intercalibration exercise has been coordinated by the European Commission with the aim of ensuring that the biological standards identified by Member States for good ecological status are comparable across Europe. The first phase of the exercise is due to report shortly. Experts from the UK have been, and will continue to be, involved in the exercise.

5. HOW STANDARDS WILL BE USED IN SCOTLAND

5.1 General framework

The WEWS Act and CAR set out a framework for SEPA and other regulators to follow in carrying out their functions. Regulators have a duty to protect the water environment, but at the same time are required to consider a number of other issues, including the social and economic impact of their actions, and to ensure that they act in the way best calculated to contribute to the achievement of sustainable development.

It is the responsibility of SEPA to regulate most activities affecting the water environment under CAR. Other regulators also control certain activities that can have a significant impact on the water environment. For example, the Fisheries Research Services are the competent authority for granting licences for engineering activities in coastal waters. All regulators will be expected to apply the same approach to implementing the relevant standards in carrying out their regulatory functions.

Assessing current conditions against the environmental standards – for water quality, water resources and morphological conditions – will determine **the available capacity** of each water body to accommodate further activities or developments without significant harm to the ecological quality of the water environment.

Where there is significant remaining capacity, this means that, for instance, part of a river could accommodate some changes such as reduced water flow or alterations to the banks without posing significant risks to the quality of the aquatic ecosystem it supports.

The environmental standards are intended to help define the environmental capacity of surface waters to accommodate alterations to their characteristics, without those alterations posing a significant risk to the plant and animal communities they support.

There will be cases where more than one pressure contributes to the risk of failing an objective. The relative contributions of different pressures will need to be considered in developing the River Basin Management Plan and designing measures to tackle the problems. SEPA will need to assess the most cost-effective way to reduce the pressures responsible for such risks. This issue is discussed in more detail in the Executive's paper on objective-setting.

5.2 Guiding principles

The Executive is introducing the first phase of standards in Scotland by means of Directions instructing SEPA how to apply these standards in carrying out its functions under the WEWS Act and CAR.

For clarity and transparency, this paper sets out guiding principles for the application of the environmental standards in Scotland. These bring together many of the existing requirements of regulators but relate them explicitly to the use of the new standards. The Executive expects SEPA and other regulators to have regard to these principles in their implementation of the environmental standards set out in the Directions.

Guiding principles for applying WFD environmental standards in Scotland

SEPA and other regulators will normally be expected to use their powers to prevent controlled activities from causing a failure of an environmental standard.

This will include:

- refusing to grant applications to undertake controlled activities that would result in failure of an environmental standard;
- granting authorisations subject to such conditions as they consider necessary to ensure controlled activities do not cause a failure of an environmental standard; and
- taking enforcement action where necessary to secure compliance with authorisation conditions that have been set to ensure an environmental standard is met.

Such action will help protect Scotland's water environment and the interests of other users of the water environment; and contribute to achieving the WFD's objective of preventing deterioration of status of any water body

Under certain circumstances, SEPA and other regulators may grant an application for authorisation even though they expect that the proposed activity will cause an environmental standard to be failed

SEPA and other regulators are required to have regard to the social and economic costs and benefits of their regulatory decisions and will be expected to strike the right balance between the protection of the water environment and the social, economic and environmental benefits we gain from its sustainable use. This means that SEPA and other regulators may decide it is appropriate to authorise an activity which would cause a failure of environmental standard where they consider the benefits to sustainable development, human health or human safety of so doing would outweigh the adverse social, economic and environmental consequences. Any such decisions must be consistent with relevant legislative and policy requirements:

Where the authorisation of a proposed activity would threaten the status of a water body, SEPA may only grant authorisation if the WFD's provisions for exemption from its objective of preventing deterioration of status are satisfied.

SEPA and other regulators will normally be expected to grant authorisation for activities that would not individually or in combination with other pressures cause an environmental standard to be failed.

However regulators should be satisfied that granting such authorisations would not:

- result in the achievement of environmental objectives, including those for Protected Areas, such as Natura 2000 sites or areas identified to protect drinking water sources, being compromised;
- unnecessarily limit opportunities for future sustainable development by authorising inefficient use of the water environment; or
- have unacceptable adverse impacts on the interests of other users of the water environment

SEPA and other regulators will normally be expected to seek action to improve the water environment only where they are confident that the condition of the water environment is such that there is a significant risk that an environmental objective will not be achieved.

SEPA and other regulators will take action to deliver improvements where:

- monitoring or modelling data provide a high level of confidence that an environmental standard or condition necessary for the achievement of the environmental objective is being failed; or
- biological monitoring results provide a high level of confidence that the ecological quality of the water environment is worse than that required to achieve the relevant objective; or
- the weight of evidence overall provides a high level of confidence that there is a significant risk that an environmental objective will not be achieved unless appropriate improvement action is taken.

SEPA and other regulators are also expected to ensure that the improvements they seek are also sufficient to:

- prevent the environmental standard subsequently being failed again as a result of fluctuations in environmental quality that cannot readily be controlled; and
- provide environmental capacity for future development where development is currently constrained because of the lack of such capacity by securing good environmental practice in terms of efficient and sustainable water use.

Environmental capacity is defined as the capacity of the water environment to accommodate changes resulting from human activities without significant risk to plants and animals it supports. Environmental standards define the point at which the capacity of the water environment is exceeded and hence at which there is a significant risk of adverse effects.

SEPA and other regulators will not normally require improvements for the purposes of achieving the WFD's objectives for the status of water bodies where making the necessary improvements would be technically infeasible or disproportionately expensive.

Where an operator considers that making an improvement to the water environment would be disproportionately expensive, SEPA or the relevant regulator will be expected to take into account relevant information provided by the operator and interested third parties before determining whether to require that improvement and to explain the reasons for the determination.

The principles set out above relate most specifically to the application of standards in **regulation**. In applying the above principles in practice we would expect SEPA to take the following steps:

- 1) Identify the activity or activities responsible for causing the significant adverse impacts on a water body;
- 2) Seek the necessary improvements from by initiating a variation of the relevant authorisation or authorisations designed to achieve the relevant river flow standards;
- 3) If an operator considers that the necessary improvements would be disproportionately expensive:
 - Require the proposed variation or variations to be advertised to enable third parties to express their views on the case to SEPA;
 - Check that the operator or operators have identified the most cost-effective option for achieving the relevant flow standard; and
 - Determine whether the necessary improvements would be disproportionately expensive;

- 4) If achieving the good status flow standards by 2015 would be disproportionately expensive or technically infeasible, identify what improvements would be technically feasible and proportionate and over what timescale; and
- 5) Issue a variation to the authorisation for the activity or activities.

The application of these standards in respect of **classification schemes** will require further development, and this will be taken forward in the coming months. In due course, rules will be developed for applying the environmental standards to water bodies. This will require SEPA to define the appropriate scale over which a standard would have to be failed in a water body for the failure to affect the status of the water body.

6. CONCLUSIONS

Scotland water environment is in a relatively good condition. We need to ensure we maintain this position in the face of increasing demand and the uncertainty of climate change. The introduction of the WEWS Act and CAR allows us to develop an integrated approach to managing activities that can adversely affect our water environment, so that current and future generations can enjoy and use it in a sustainable and responsible way.

The effective, risk-based protection of the water environment and the process of setting appropriate environmental objectives rely on a sound scientific understanding of the conditions needed by our aquatic ecosystems. It is therefore important that environmental standards are based on sound science and set at levels which protect the varying needs of aquatic plants and animals in our diverse water environment. This is why we are introducing standards based on up-to-date work by UK experts at this time.

This paper explains how the standards have been developed, how they will support the implementation of the WEWS Act and hence the WFD, and the Executive's policy on how the standards will be used by SEPA and other regulators to protect, and where necessary to improve, our water environment. The paper is supported by Directions to SEPA, which instruct the agency in the use of new environmental standards.

It is important that we get the balance right between the protection of the water environment and enabling its sustainable use. We believe that we have built the appropriate checks and balances into the WEWS Act, CAR and the policy framework we have set for SEPA so as to ensure that this balance can be found and that we plan for the long term, environmentally, socially and economically. The Executive has also published a policy statement on objective-setting in the River Basin Management Plan, which provides more information on basin planning and the process of setting appropriate environmental objectives for Scottish water bodies. This paper is available from the Executive's website.

ENVIRONMENTAL STANDARDS REQUIRED BY THE WFD

Table 1 below lists the elements for which standards are required by the WFD. Elements in **bold** are introduced in the first phase of standards. Other elements are likely to be included in future phases of proposals, the second of which UKTAG will issue for technical review in during 2007.

Table 1: Environmental standards – supporting elements listed in the WFD * (bold – included in phase 1)		
Surface Water		
1 – Chemical and physico-chemical elements		
Rivers	Thermal conditions	
	Oxygenation conditions (dissolved oxygen, biochemical oxygen demand)	
	Salinity	
	Acidification status (pH)	
	Nutrient conditions (phosphorus , other nutrients)	
Lochs	Transparency [‡]	
	Thermal conditions	
	Oxygenation conditions (dissolved oxygen)	
	Salinity	
	Acidification status (Acid Neutralising Capacity)	
Transitional coastal waters # and	Nutrient conditions (phosphorus, other nutrients)	
	Transparency [‡]	
	Thermal conditions	
	Oxygenation conditions (dissolved oxygen)	
	Salinity	
2 – Hydrological elements	Nutrient conditions (nitrogen, other nutrients)	
	Rivers	Quantity and dynamics of water flow (change from natural flow conditions , compensation flows)
		Connection to groundwater body
	Lochs	Quantity and dynamics of water flow (change in natural outflow)
		Residence time
Transitional coastal waters # and coastal waters # (tidal regime)		Connection to groundwater body
		Freshwater flow [transitional waters only]
		Wave exposure
		Direction of dominant currents [coastal waters only]
3 – Morphological elements		
Rivers	River depth and width variation	As decision-supporting framework
	Structure and substrate of the river bed	
	Structure of the riparian zone	
Lochs	Loch depth variation	As decision-supporting framework
	Quantity, structure and substrate of the loch bed	
	Structure of the loch shore	
Transitional coastal waters # and	Depth variation	As decision-supporting framework
	Quantity, structure and substrate of the bed	
	Structure of the intertidal zone	

4 – Chemical pollutants	
All surface water bodies	Pollution by all priority substances [†]
	Pollution by other substances identified as being discharged in significant quantities into the body of water [“specific pollutants”] [‡]

Artificial and Heavily Modified water bodies
Quality elements applicable to whichever of the four natural surface water categories most closely resembles the AWB or HMWB concerned.

Ground Water
1 – Quantitative status
Groundwater level regime
1 – Chemical status
Conductivity
Concentrations of pollutants
<p>* Annex V of the WFD lists biological elements for each group of water bodies (rivers, lochs, transitional waters, coastal waters and groundwaters), and describes the elements in this table as supporting those biological elements in each case.</p> <p>[‡]A statement on how suspended solids will be managed under WFD is anticipated to be included in the next UKTAG technical review on standards and conditions for surface waters.</p> <p># Listed separately in the WFD – grouped here for simplicity</p> <p>[†] Standards to be developed by the European Commission for use in all Member States</p> <p>[‡] Not all specific pollutants will be included in phase 2.</p>

ENVIRONMENTAL STANDARDS – PHASE 1

Table 2: Environmental standards – Phase 1			
1 – Water Quality			
Indicator	Water body	More information	Main pressures
Dissolved oxygen	Rivers, lochs, transitional, coastal waters	Low levels of dissolved oxygen can result in death of many species.	Discharges of organic material, e.g. from sewage treatment works, storm overflows, agricultural slurry, silage liquor.
Biochemical Oxygen Demand (BOD)	Rivers only	BOD is a measure of the amount of dissolved oxygen used up in a sample of water or effluent over a set period of time. Oxygen is used up when micro-organisms break down organic material in the water. BOD can reflect pollution by organic compounds – high BOD discharges cause a lot of oxygen to be removed from water.	Enrichment by nutrients results in lower oxygen levels through <i>eutrophication</i> (see below).
Ammonia	Rivers only	Ammonia is toxic to many forms of aquatic life. Ammonia is formed during the decay of organic wastes containing nitrogen, including vegetable and animal wastes.	Discharges of organic material, e.g. from sewage treatment works, storm overflows, agricultural slurry, silage liquor.
Acid Conditions	Rivers (pH) Freshwater lochs (ANC)	Acidic water can be toxic to many forms of aquatic life. pH is a measure of the concentration of hydrogen ions (H^+) in the water, formed when an acid dissolves. Acidic water has a low pH (lot of H^+ ions). pH 7 is defined as neutral. Acid Neutralising Capacity (ANC) is an indicator of acidity that also considers a loch's <u>sensitivity</u> to acidity (based on the geology) and its <u>ability to cope</u> with additions of acid (due to the presence of organic acids that can soak up some of the H^+ ions).	Acidic rainfall, caused by air pollution.
Salinity	Freshwater lochs only	Many freshwater plants and animals are sensitive to increased salt levels.	It is unlikely that significant pressures, risking failure of the standard, will occur in the foreseeable future.

Nutrients – Phosphorus	Rivers only	<p>High nutrient concentrations affect the biological balance in water, and can contribute to <i>eutrophication</i> – very high plant and algal production. Eutrophication causes a number of problems including:</p> <ul style="list-style-type: none"> • ‘Blooms’ of blue-green algae which can be toxic. • Major reductions in dissolved oxygen, harming other aquatic life. <p>Nitrogen and phosphorus are the main nutrients needed by plants. In freshwater, the natural ratio of phosphorus to nitrogen is generally low, so plant growth is limited by the amount of phosphorus available. Any increase in phosphorus concentrations causes rapid plant growth.</p>	<p>Point source and diffuse discharges containing phosphorus, including: agricultural and forestry runoff, particularly including fertilisers; waste water treatment plants; aquaculture.</p>
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2 – Water Resources

Indicator	Water body	More information	Main pressures
% change from natural flow	Rivers	<p>Minimum water levels are needed for aquatic life all year round. Additional protection is particularly important at key times – spring and early summer for aquatic plants; late summer and early autumn for invertebrates and fish.</p> <p>Where abstraction takes place from a loch, the ecological impact in the outflow watercourse (downstream) is often larger than in the loch itself.</p>	<p>Abstractions, e.g. for public water supply, industry, energy generation and agriculture.</p> <p>Impoundment of water behind dams and weirs that reduce downstream flows.</p>
% change from natural inflow	Freshwater lochs		

3 – Morphology

Indicator	Water body	More information	Main pressures
% change from natural conditions	Rivers only	<p>Ecology can be affected significantly by changes in the physical structure or shape of a water body. Engineering and development works can affect water bodies directly, e.g. by destruction of habitats on river banks or beds, and more indirectly by altering flow patterns and water levels.</p>	<p>Engineering and construction works, e.g. dredging, strengthening of banks, straightening channels, building structures (such as bridges and piers) with in-channel supports.</p>