

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

Development of environmental standards and conditions limits – phase II

A Consultation

June 2008



FOREWORD

The Water Framework Directive (WFD) is changing the way we manage Scotland's water environment. We need to ensure that water use is sustainable, for this and future generations, and to this end the Directive requires us to protect and improve the health of aquatic plant and animal communities in Scotland's water environment. To help us do this, we are in the process of defining the environmental standards that are needed to secure healthy aquatic ecosystems.

The standards are being introduced in phases as the scientific work to identify them progresses. We consulted on the first phase of standards in October 2006. These first tranche standards are now set out in "[The Scotland River Basin District \(Surface Water Typology and Environmental Standards\) \(Scotland\) Directions 2007](#)" and "[The Solway Tweed River Basin District \(Surface Water Typology and Environmental Standards\) \(Scotland\) Directions 2007](#)" ("the 2007 Directions"). As well as setting out the standards, the 2007 Directions instruct SEPA on their use.

This consultation seeks your views on a **second tranche** of environmental standards and conditions for surface waters and groundwater. The consultation also sets out our proposals for amendments to the 2007 Directions to enable SEPA to better identify the likely causes of ecological impacts and pressures in order to prioritise further investigation, monitoring and remedial action.

In addition to the 2007 Directions, we also published two key policy statements in 2007. The first of these, "[Principles for setting objectives for the River Basin Management Plan](#)", set out our approach to setting **environmental objectives** for the water environment through the river basin management planning process. The second, "[Development of environmental standards and conditions](#)", described the application of **environmental standards** in helping achieve those objectives.

These policy statements were intended to provide stakeholders with a better understanding of the holistic approach to the protection of the water environment required by the Water Framework Directive and we suggest that you may wish to **read these in tandem with this consultation**.

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1. PURPOSE

This consultation provides information on a second set of standards and condition limits for healthy communities of aquatic plants and animals; as well as proposals to update the 2007 Directions to include standards and condition limits consistent with “moderate” and “poor” ecological quality. The proposed standards are based on the latest recommendations from the UK Technical Advisory Group (“UKTAG”) to the Scottish Government and the other UK administrations.

Following the completion of this consultation the agreed standards and condition limits will be set out in the form of updated Directions to SEPA made by the Scottish Ministers.

We welcome your comments on any aspect of this paper.

2. CONSULTATION ARRANGEMENTS

Please send your views and comments on the proposals set out in this document to:

Environmental Quality Directorate
Water Framework Directive Team
Scottish Government
Area 1-H North (Mail Point 15)
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Responses should reach us by 30/09/2008.

3. INTRODUCTION - ENVIRONMENTAL STANDARDS AND CONDITION LIMITS

Background

The principal 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 proposed environmental standards and condition limits set out in this paper are based on the best available scientific understanding of the needs of aquatic plant and animal communities. As far as available data and knowledge permit, UKTAG¹ has compared and aligned the standards with the corresponding biological standards (see Section 4.5). Consequently, a failure of a standard or condition limit indicates that there is a significant risk of adverse ecological impacts.

Before making its recommendations to the UK Administrations, UKTAG submitted its proposals for stakeholder review and, where relevant, peer review. Links to information on UKTAG's recommendations and the outcome of the stakeholder reviews can be found in Section 4.

Use of proposed standards

By comparing the current condition of the water environment with the appropriate standards, SEPA can:

- assess risks to the ecological and chemical quality of the surface water environment posed by proposed abstractions, discharges and engineering works;
- determine the capacity of surface waters to accommodate additional water uses before significant adverse ecological impacts result;
- classify the current ecological and chemical status of surface waters;
- identify the causes of adverse impacts on aquatic plants and animals;
- identify the scale of improvement needed to restore the ecological and chemical status of the water environment to good health;
- prioritise remedial action; and
- assess the effectiveness of measures taken to protect and improve the water environment.

The Fisheries Research Services (“FRS”), an agency of the Scottish Government’s Marine Directorate, will also adopt the relevant standards and condition limits in their regulatory activities under the Food and Environment Protection Act 1985 in respect of coastal and transitional waters.

It is important that we strike the right balance between the protection of the water environment and enabling its sustainable use. Among other things, the process of objective setting allows us to do this. For example, where it would be disproportionately expensive to achieve an environmental standard or condition limit needed to restore a water body to good ecological status or good surface water chemical status, an appropriate alternative objective may be set. Our paper [“Principles for setting objectives for the River Basin Management Plan”](#) describes this process in more detail.

¹ UKTAG is a partnership of the UK environment and conservation agencies, including the Scottish Environment Protection Agency and Scottish Natural Heritage, which was established to provide technical advice to the UK Administrations on the implementation of the WFD.

4. OVERVIEW OF DETAILED PROPOSALS

General surface water quality standards, water resource standards², morphological condition limits³ and environmental quality standards for specific pollutants and priority substances play a key role in the management of the surface water environment. They describe the environmental conditions needed to support a particular ecological quality in surface waters, for example "high", "good", "moderate" or "poor" status.

The following sections provide additional information on the standards and condition limits for:

1. a second tranche of water quality (chemical and physicochemical) standards for surface waters comprising standards for:
 - (i) temperature in rivers;
 - (ii) phosphorus in freshwater and brackish lochs; and
 - (iii) nitrogen in transitional and coastal waters;
2. a second tranche of water resource standards and morphological condition limits for surface waters comprising standards or condition limits for:
 - (i) condition limits for river flows;
 - (ii) condition limits for freshwater flows into estuaries;
 - (iii) morphological conditions for freshwater and brackish lochs; and
 - (iv) morphological conditions for transitional and coastal waters;
3. environmental quality standards for 19 toxic pollutants (called "specific pollutants") being discharged in significant quantities into surface waters;
4. surface water environmental quality standards for pollutants identified as "priority substances" at European level⁴;
5. biological standards for a range of plant and animal indicators of the status of surface water ecosystems;
6. threshold values for pollutants indicative of pressures placing bodies of groundwater at risk; and
7. an update to the 2007 Directions to include standards for "moderate" and "poor" to help differentiate the severity of adverse impacts where the standards and condition limits for "high" and "good" are not met.

² Water resource standards include standards for river flows, freshwater flows into estuaries, loch levels

³ The term "morphological conditions" refers to the physical structure of the bed, banks and shores of surface waters and the condition of the land immediately adjacent to the surface water.

⁴ Decision No 2455/2001/EC of the European Parliament and of the Council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC.

4.1 SURFACE WATER QUALITY STANDARDS

This section deals with proposed standards for temperature in rivers, phosphorus in freshwater and brackish lochs and nitrogen in transitional and coastal waters.

Details of the technical work undertaken by UKTAG to develop the second tranche of water quality and water resource standards and conditions, and the results of the stakeholder review of this work can be found at:

http://www.wfduk.org/stakeholder_reviews/stakeholder_review_1-2007/LibraryPublicDocs/UKTAG_Report_Surface_Water_Standards_and_Conditions

TEMPERATURE STANDARDS FOR RIVERS

The proposed temperature standards for rivers are set out in **Annex 1**.

Ecological impacts

Temperature can affect the growth and development of aquatic species, how they tolerate and metabolise toxic substances, their success in reproduction, in resistance to disease and, ultimately, whether they survive or die. Temperature can also have an indirect effect on aquatic species by causing changes to water chemistry and by altering the solubility and metabolic consumption of oxygen.

Causes of temperature alterations

Temperature can be artificially elevated as a result of the discharge of cooling waters. It can sometimes be artificially lowered by releases of water from behind large dams. Temperature is also affected by climate change. However, this is not expected to cause failures of proposed standards in the short to medium term.

Implications of the proposed standards

More stringent temperature standards currently apply to the majority of rivers in Scotland under the Freshwater Fish Directive, which dates back to 1978. We have an obligation to apply these temperature standards for the purposes of the Freshwater Fish Directive until the repeal of that Directive in 2013. However, in terms of delivering WFD aims and objectives, SEPA will use the proposed new standards for assessing and protecting the ecological status and ecological potential of rivers. Because the proposed standards for "good" are less stringent than the existing standards, compliance with the new standards is not expected to require additional action by operators.

Lochs, transitional and coastal waters

For lochs, transitional waters and coastal waters, UKTAG's advice is that there is currently inadequate scientific understanding to propose new standards representing temperature increases or decreases likely to give rise to significant adverse ecological impacts in these waters. This is in part due to the complex thermal structure of these waters created by natural temperature gradients. Accordingly, we are not proposing to introduce new temperature standards for these waters at this time. The standards established in the Freshwater Fish Waters Directive and the Shellfish Waters Directive will continue to apply to the relevant Protected Areas for fish and shellfish.

PHOSPHORUS STANDARDS FOR FRESHWATER AND BRACKISH LOCHS

The proposed phosphorus standards for freshwater and brackish lochs are set out in **Annex 2**.

Ecological impacts

Increases in phosphorus concentrations can promote plant growth resulting in changes in composition and biomass of plant communities in the loch. This can then lead to reduced dissolved oxygen levels and lower water transparency. These and related changes can then adversely affect fish populations and invertebrate communities.

Causes of phosphorus enrichment

Phosphorus is contained in sewage effluent discharges, and run-off from land to which fertilisers have been applied. Phosphorus is also released into lochs from fish farms.

Implications of the proposed standards

The proposed standards for "high" and "good" have been derived so as to align with the results of the EU intercalibration exercise on biological standards for plants in lochs.

SEPA's initial estimates indicate that the standard for "good" is failed in approximately 20 % of Scottish freshwater lochs. This represents a small increase (around 5 or 6 additional lochs) compared to the number of lochs failing the management standards previously used by SEPA to control discharges into these waters.

The majority of freshwater lochs in Scotland are naturally nutrient poor ("oligotrophic"). These are also the lochs in which most of Scotland's freshwater aquaculture is based. The proposed standards for oligotrophic lochs are in the majority of cases slightly less stringent than the management standard previously applied by SEPA. In other cases, they are equivalent to the management standards previously applied by SEPA.

NITROGEN STANDARDS FOR TRANSITIONAL AND COASTAL WATERS

The proposed nitrogen standards for transitional and coastal waters are set out in **Annex 3**.

Ecological impacts

Increases in nitrogen concentrations can promote plant growth resulting in changes in composition and biomass of plant communities. This can then lead to reduced dissolved oxygen levels, lower water transparency and cause toxic algal blooms. These and related changes can then adversely affect fish and invertebrate communities.

Causes of nitrogen enrichment

Nitrogen is contained in sewage effluent discharges and in run-off from land to which fertilisers have been applied.

Implications of the proposed standards

The proposed standards for "good" in coastal waters and in "clear water" transitional waters are equivalent to the thresholds currently used for the purposes of identifying eutrophication problems as part of the UK obligations under the Oslo and Paris Convention (OSPAR).

The standards for transitional waters in which light availability is reduced because turbidity ("intermediate", "turbid" and "very turbid" waters) are more relaxed than the OSPAR threshold values. This is because plant growth in these estuaries responds less to nutrients than in clear water estuaries because of the relatively lower light availability.

Initial estimates are that no coastal waters and very few estuaries in Scotland fail the "good" standard.

SUSPENDED SOLIDS ALL SURFACE WATER BODIES

No new standards are proposed for suspended solids in surface water bodies.

Ecological impacts

Suspended solids occur naturally in waters. Some will be the result of natural erosion or exacerbated, for example, by deforestation. In areas of extensive urban development, inputs of suspended solids may be dominated by human impact. However, the range of types of solids, their origins, and their extreme variability in time makes it very difficult to derive standards that can be used helpfully and generally in the classification and management of water bodies. Given the state of current scientific understanding and taking account of the advice of UKTAG, we do not intend to propose numeric standards for suspended solids at this time. Instead, we expect SEPA to consider the need for action based on local evidence of ecological damage or a risk of such damage.

In Protected Areas for freshwater fish, the guideline standard established by the Freshwater Fish Waters Directive will apply in accordance with that Directive.

4.2 CONDITION LIMITS IN RESPECT OF WATER RESOURCES AND MORPHOLOGY IN SURFACE WATERS

This section deals with proposed condition limits for river flow; the proposed condition limits for freshwater flows into estuaries; and the proposed morphological condition limits for lochs, transitional waters and coastal waters.

Details of the technical work undertaken by UKTAG to develop the second tranche of water quality and water resource standards and conditions, and the results of the stakeholder review of this work can be found at:

http://www.wfduk.org/stakeholder_reviews/stakeholder_review_1-2007/LibraryPublicDocs/UKTAG_Report_Surface_Water_Standards_and_Conditions

CONDITION LIMITS FOR RIVER FLOWS

The proposed condition limits for river flows are set out in **Annex 4**.

Ecological impacts

The pattern of higher flows in rivers is important in maintaining the processes of sediment erosion, transport and deposition which maintain and refresh river habitats that in turn support biologically diverse river ecosystems. Such flows are also important for triggering and enabling fish migration and other ecological processes.

Causes of impacts on river flows

The condition limits for river flows included in the second tranche are designed to help assess the risks posed by changes to the river flow regime downstream of major dams. There are currently no equivalent limits in Scotland.

Implications of the proposed condition limits

Initial estimates by SEPA suggest that the majority of failures will be caused downstream of major public water supply or hydropower impoundments. These water bodies will typically be designated as heavily modified water bodies. This means that compliance with the condition limits is not required under the WFD if it would have a significant adverse impact on the use for which the water body is designated (e.g. public water supply). Instead, improvement targets for such heavily modified water bodies will be defined in terms of the practicable mitigation that could be taken to improve the affected river flows. The river flow condition limits would be used to help assess how far downstream of the impoundment the river flows recover to "good", for example, as a result of flow contributions from tributaries downstream of the impoundment and any mitigation that has been implemented.

CONDITION LIMITS FOR FRESHWATER FLOWS INTO TRANSITIONAL WATERS

The proposed condition limits for freshwater flows into transitional waters are set out in **Annex 5**.

Ecological impacts

Freshwater flows into estuaries maintain the characteristic salinity gradient and low water channel of an estuary which in turn creates different ecological niches in the estuary. The input to the estuary of plant material and other nutrients carried in the freshwater flows is also important to the food web supported by the estuary.

Causes of impacts on freshwater flows into estuaries

The condition limits for freshwater flows into estuaries are designed to help assess the risks posed by major changes to the river flow regime into estuaries, such as those caused by major transfers of water between river catchments or by the regulation of river flows by major reservoirs.

Implications of the proposed condition limits

There are currently no existing condition limits in Scotland for freshwater flow into transitional waters. However, no transitional waters have been identified as being at risk from changes to their freshwater flows and initial estimates by SEPA suggest that no estuaries are currently failing the "good" standard.

MORPHOLOGICAL CONDITION LIMITS FOR FRESHWATER AND BRACKISH LOCHS

The proposed morphological condition limits for freshwater and brackish lochs are set out in **Annex 6**.

Ecological impacts

The physical structure of lochs and their shore zones provides the diversity of habitats needed by different aquatic plant and animal species at different stages of their lifecycles. The shore zone also provides inputs of plant material and invertebrates which provide a source of food for aquatic animals, such as fish. Engineering works can result in a reduction in the diversity or extent of loch habitats. This can affect the condition of plants and animals which depend on those physical habitats.

Causes of impacts on loch morphological conditions

Engineering works on lochs are much less common than on rivers. Alterations are typically undertaken as part of transport infrastructure works; to enhance water storage for water supply or hydropower schemes; or to facilitate access to the lochs for recreation.

Implications of the proposed condition limits

These new morphological condition limits will provide a standardised and consistent means of assessing risks. As well as ensuring consistency, the use of the condition limits provides efficiencies by reducing the need for detailed site-specific studies and ensures that those studies that are required are properly targeted. This will simplify risk assessments.

The condition limits will also help identify waters affected by the legacy of past morphological alterations. SEPA will use this information to help prioritise restoration efforts.

MORPHOLOGICAL CONDITION LIMITS FOR TRANSITIONAL AND COASTAL WATERS

The proposed morphological condition limits for transitional and coastal waters are set out in **Annex 7**.

Ecological impacts

The physical structure of transitional and coastal waters, including their intertidal zones, provides the diversity of habitats used by different aquatic plant and animal species at different stages of their lifecycles.

Causes of impacts on transitional water and coastal water morphological conditions

Engineering works can result in a reduction in the diversity or extent of transitional water and coastal water habitats. For example, extensive intertidal zones can be lost to flood defence works. This can affect the condition of plants and animals which depend on those physical habitats.

Pressures on transitional and coastal waters include navigation activities focused around ports and harbours; coastal defence works to protect land from flooding and erosion; and land claim for waste disposal.

Implications of the proposed condition limits

The morphological condition limits provide a standardised and consistent means of assessing risks. As well as ensuring consistency, the use of the condition limits provides efficiencies by reducing the need for detailed site-specific studies and ensures that those studies that are required are properly targeted.

The condition limits will also help identify waters affected by the legacy of past morphological alterations. SEPA and FRS will use this information to help prioritise restoration efforts.

4.3 ENVIRONMENTAL QUALITY STANDARDS FOR SPECIFIC POLLUTANTS IN SURFACE WATERS

The WFD requires Member States to identify and develop standards/ thresholds for specific pollutants which, if exceeded, could result in adverse effects on aquatic ecosystems if discharged to water in 'significant quantities'. UKTAG have identified nineteen such pollutants and these are listed below:

List of specific pollutants	
1. 2,4-D	12. Chlorine
2. Chromium vi	13. Copper
3. Chromium iii	14. Cyanide
4. Cypermethrin	15. Permethrin
5. Diazinon	16. Iron
6. Dimethoate	17. Zinc
7. Linuron	18. 2,4-dichlorophenol
8. Mecoprop	19. Arsenic
9. Phenol	
10. Toluene	
11. Ammonia ⁵	

Further pollutants may be added to the list in future cycles. Pollutants may also be removed from the list if they cease to be discharged in significant quantities.

The proposed standards for specific pollutants in rivers and freshwater lochs and in transitional and coastal waters are set out in **Annex 8**.

Details of the technical work undertaken by UKTAG to develop these standards and the results of the stakeholder review of this work can be found at:

http://www.wfduk.org/stakeholder_reviews/stakeholder_review_1-2007/LibraryPublicDocs/final_specific_pollutants

Ecological impacts

Specific pollutants are toxic pollutants which can have lethal or sub-lethal effects on aquatic plants and animals if they are above a certain concentration. Where concentrations are at, or lower than, the proposed standards, the quality of the surface water concerned will be able to support an ecological quality of "good" or better than "good".

Implications of the proposed standards

The standards have been derived by UKTAG using a formal technical procedure specified in the WFD. This procedure includes a peer review process.

The standards for ten of the specific pollutants (2,4 dichlorophenol, ammonia in salt water, arsenic, chlorine, copper, cyanide, iron, permethrin, zinc and the annual mean standards for toluene) are the same as the standards which are currently applied (e.g. under the Dangerous Substances Directive). This means that there are no additional requirements associated with the adoption of these standards.

The ammonia standard in freshwater lochs is the same standard as that for rivers set out in the 2007 Directions. SEPA's initial estimates indicate that there are no failures of this standard.

⁵ For rivers, the environmental quality standards for ammonia are set out in the 2007 Directions.

A detailed analysis of how the other nine specific pollutants compare with existing standards is provided in the UKTAG report. The standards for 2,4 D; chromium VI in salt water; linuron, phenol and mecoprop are significantly more stringent than the existing standards. Available monitoring data in Scotland is limited but initial estimates have not identified failures of these proposed standards.

4.4 SURFACE WATER ENVIRONMENTAL QUALITY STANDARDS FOR PRIORITY SUBSTANCES AND OTHER DANGEROUS SUBSTANCES IN SURFACE WATERS

'Priority substances and other dangerous substances' are substances identified at European level as posing a significant risk to or via the water environment. The associated environmental quality standards for priority and dangerous substances are also established at European level.

We are required to take account of the standards for priority substances and other dangerous substances in classifying the chemical status of surface water bodies.

Priority substances

Negotiations on a daughter directive, which will set out the environmental quality standards for priority substances, are currently ongoing. However, a common view was reached in June 2007 by the Environment Council of the 27 Member States on environmental quality standards for the priority substances. These standards are based on scientific studies commissioned and coordinated by the European Commission.

The common position of the Environment Council may be subject to change depending on the outcomes of further discussions with the European Parliament expected to be completed in 2008. However, it is unlikely that the standards themselves will change. We therefore believe it is important to include the proposals as they currently stand to provide the full picture.

The standards will help in preparing the first river basin management plans. For completeness and information, we have set out the relevant standards for priority substances in **Annex 9**.

Other dangerous substances

The 'other dangerous substances', relevant to Scotland's water environment, which are listed in the Dangerous Substances Directive, are also included in Annex 9. The environmental quality standards for these substances already apply to Scotland under that Directive and have been included as they are relevant to river basin management planning process.

4.5 BIOLOGICAL STANDARDS FOR SURFACE WATERS

Role of biological standards

The application of biological standards will play an important role in the river basin management planning process. They will be used alongside the standards and condition limits for water resources, water quality and morphological conditions to help:

- classify the ecological status of our rivers, lochs, transitional waters and coastal waters⁶;
- decide where improvements to the water environment are most needed; and
- evaluate the effectiveness of measures taken to protect and improve the ecological health of Scotland's waters.

Although biological standards help in identifying where action is most needed and whether action has been successful, they are not used to determine the level of action required (e.g. by how much an abstraction or discharge would have to be reduced to enable the achievement of good status). For this, the standards and condition limits for water resources, water quality and morphological conditions are used.

Comparability of standards across Europe

Many of the proposed biological standards have been compared and aligned with the corresponding standards for aquatic plant and animal groups developed by other Member States (See Table 1). This work has been part of a Europe-wide "intercalibration" exercise coordinated by the European Commission. Our proposals include the biological standards that have been agreed through this exercise and which will shortly to be published by the Commission. The use of these intercalibrated standards will help ensure comparability, and hence a level playing field, across Europe.

Table 1: Aquatic plant or animal groups for which the proposed biological standards have been fully or partially intercalibrated⁽ⁱ⁾ ("yes") and those that have not ("no")				
Plant or animal group	Transitional waters	Coastal waters	Rivers	Lochs
Aquatic angiosperms	Yes	Yes	Standards not applicable ⁽ⁱⁱ⁾	Standards not applicable ⁽ⁱⁱ⁾
Aquatic macroalgae	Yes	Yes	Standards not applicable ⁽ⁱⁱ⁾	Standards not applicable ⁽ⁱⁱ⁾
Phytoplankton – chlorophyll	Yes	Yes	Standards not applicable ⁽ⁱⁱ⁾	Yes
Phytobenthos	Standards not applicable ⁽ⁱⁱ⁾	Standards not applicable ⁽ⁱⁱ⁾	Yes	No
Aquatic macrophytes	Standards not applicable ⁽ⁱⁱ⁾	Standards not applicable ⁽ⁱⁱ⁾	No	Yes
Benthic invertebrates	No	Yes	Yes	No
Fish	No	n/a	Standards not being proposed ⁽ⁱⁱⁱ⁾	Standards not being proposed ⁽ⁱⁱⁱ⁾

⁶ Further information on the role of biological standards in classifying the ecological status of surface waters can be found at: http://www.wfduk.org/UKCLASSPUB/LibraryPublicDocs/sw_status_classification

Notes to Table 1

(i) Partial intercalibration means that at least one of the indicators used to assess the condition of the plant or animal group has been intercalibrated. For example, in lochs the main indicator, chlorophyll a, has been intercalibrated whereas the indicator of nuisance phytoplankton blooms has not.

(ii) Plant or animal group is not applicable for assessing the ecological status of the water category.

(iii) We are not proposing standards for fish in rivers or freshwater lochs at this time. UKTAG is currently developing standards for fish that will be applicable to fish in Scottish rivers. However, this work is not expected to be complete until 2009/10.

Comparability of the proposed intercalibrated and non-intercalibrated standards

The intercalibration exercise has not yet looked at a number of the biological standards that are required for the purposes of the WFD. A second round of intercalibration is expected to consider these standards before preparations for the first updates of the river basin management plans begin.

This means that a number of the standards we need for river basin management planning have not so far been intercalibrated. Some of these will be used to help assess the impacts of the same pressures as some of the intercalibrated standards (See Table 2).

Comparisons of the non-intercalibrated standards with the corresponding intercalibrated standards have been undertaken by UKTAG. This work indicates that, where there is a corresponding intercalibrated standard, the proposed non-intercalibrated standards are equivalent to, or slightly less stringent, than the intercalibrated standard.

	Rivers	Lochs	Transitional waters
Pressure to which standards are sensitive	Standards sensitive to the effects of nutrient enrichment	Standards sensitive to the effects of nutrient enrichment	Standards sensitive to organic enrichment
Plant or animal group for which a non-intercalibrated standard sensitive to the pressure is proposed	Macrophyte	Phytobenthos Benthic invertebrates	Benthic invertebrates
Plant or animal group for which an intercalibrated standard sensitive to the pressure is proposed	Phytobenthos	Phytoplankton (chlorophyll)	Benthic invertebrates in coastal waters

Information on the proposed biological standards

A summary list of the proposed intercalibrated and non-intercalibrated biological standards is set out in:

- **Annex 10 for rivers;**
- **Annex 11 for freshwater lochs; and**
- **Annex 12 for transitional and coastal waters.**

Further technical details on the different biological standards can be found at:

http://www.wfduk.org/UKCLASSPUB/UKCLASSPUB/technical_reports/

4.6 THRESHOLD VALUES FOR GROUNDWATER

The Groundwater Directive⁷, a daughter directive of the WFD, requires Member States to establish threshold values for pollutants, groups of pollutants or indicators of pollution contributing to the identification of bodies of groundwater as being at risk of failing to achieve good groundwater chemical status. The threshold values have to be established by 22 December 2008.

The threshold values will be used in assessing the chemical status of groundwater. They do not represent the boundary between good and poor groundwater chemical status. A failure of a threshold value is used as a trigger for investigations aimed at determining whether the conditions for good groundwater chemical status are met. This may involve investigating whether pressures on bodies of groundwater are, or would compromise, the quality of drinking water sources, the quality of surface waters into which groundwater flows or the quality of wetlands connected to the groundwater.

Five separate criteria must be met for a body of groundwater to achieve good groundwater chemical status. These tests are described in detail in the UKTAG recommendations on groundwater classification. The recommendations are available at:

http://www.wfduk.org/stakeholder_reviews/stakeholder_review_1-2007/LibraryPublicDocs/final_gw_sr2007

Different threshold values for different pollutants or indicators of pollution may apply to different tests.

Threshold values have not been proposed in relation to the protection of groundwater dependent terrestrial ecosystems because at present there is insufficient data and understanding to enable appropriate generic threshold values to be derived. Until appropriate information becomes available, UKTAG recommends that site-specific investigations will be required where there are indications that a groundwater terrestrial ecosystem may be at risk because of groundwater pollution.

The threshold values are used for the purpose of assessing the chemical status of groundwater. As well as these values SEPA has to take into account other considerations when dealing with discharges to groundwater, for example, the Groundwater Directive requires Member States to prevent the entry of certain hazardous pollutants into groundwater and limit the entry of others so as to prevent pollution of groundwater. The achievement of this objective will be the principal consideration in the control of discharges.

The proposed threshold values for groundwater are set out in **Annex 13** and have been derived by SEPA using the methodology⁸ recommended by UKTAG. The methodology has been subject to a stakeholder review co-ordinated by UKTAG.

Implications of the proposed threshold values

The threshold values are used to trigger investigations aimed at determining whether the criteria for good groundwater chemical status are met or not. Consequently, they drive investigative action rather than environmental improvements.

⁷ Directive 2006/118/EC

⁸ http://www.wfduk.org/stakeholder_reviews/stakeholder_review_1-2007/LibraryPublicDocs/gw_chemical_classification_paper_final_draft

The threshold values proposed have been set at levels corresponding to other established risk-criteria. These include:

- surface water environmental standards for the tests relating to the impact of groundwater pollution on surface waters; and
- drinking water standards for the impact of groundwater pollution on drinking water sources.

Consequently, the threshold values are only expected to trigger investigations which are proportionate to the environmental risks involved.

4.7 PROPOSALS FOR UPDATING THE 2007 DIRECTIONS

In the main, the 2007 Directions set out environmental standards and condition limits consistent with "high" and "good" ecological quality. **Annexes 14 to 16** below set out proposals for updating the 2007 Directions to include standards and condition limits consistent with "moderate" and "poor" ecological quality.

The extended standards will help SEPA prioritise action to improve the water environment by helping to assess the relative severity of adverse impacts. It will also help with the determination of the likely causes of ecological impacts where biological standards are found to be failed.

We are also proposing amendments to the morphological condition limits for rivers. The amendments, which are set out in Annex 16, bring the conditions limits into line with the latest advice from UKTAG and correct minor technical drafting errors in their original Report.

Implications of the proposed updates

The principal objective of the WFD is to restore water bodies to good ecological status. The proposed standards for moderate and poor will help assess how far away we are from this objective.

They will also help SEPA make judgements about the capacity of the environment to accommodate proposals for abstractions, discharges and engineering works before there is a significant risk of deterioration of status. We believe this will facilitate the sustainable use of the water environment and ensure a consistent approach to assessing environmental risks.

5. CONCLUSIONS

Our latest proposals for standards, condition limits and threshold values complete the work we started with the 2007 Directions. We now have the tools we need to identify where we need to take action to protect / improve the water environment and assess how successful we have been in achieving the objectives that will be established through the river basin management planning process.

For the first time, the same standards will be used to classify waters right across the UK. Many of the biological standards have been developed as part of the EU intercalibration exercise. Their application will provide an unprecedented level of comparability not only within the UK but right across Europe.

We also think that the parallel development of biological, water quality, water resource and morphological standards and condition limits is important. It has provided us with the strongest basis ever for protecting the structure and functioning of our river, loch, transitional water and coastal water ecosystems.

A number of the proposed water quality standards for surface waters are very similar to existing standards (See Table 3). However, we think it is important to have reviewed the latest scientific evidence to give us confidence that the standards we use for river basin management planning are the most effective available to help achieve our objectives for the water environment. Such reviews are important to make sure we incorporate up-to-date scientific knowledge. A few of the existing standards from the 1970s now appear more stringent than the latest science suggests is necessary to protect aquatic plants and animals. Our proposals take account of these findings and will thus help us better target our efforts to protect and improve the water environment.

In the case of the proposed surface water quality standards, initial estimates by SEPA indicate that there are relatively few failures of the new 'good' standards. In part, this reflects our past success in preventing and reducing pollution. Having the new standards is important in helping us maintain this enviable situation.

In contrast, we are expecting a significant number of water bodies to fail the proposed morphological condition limits and the proposed condition limits for river flows. We have only recently started to appreciate the impact of morphological alterations and changes to river flow regimes on aquatic ecosystems. These pressures have not so far had the same level of attention as our efforts to control pollution. Our proposals will help us evaluate such impacts and prioritise efforts to address them.

Many of the failures of the morphological condition limits and condition limits for river flows are likely to result from alterations necessary to support uses for which water bodies have been designated as artificial or heavily modified waters. In these cases, the standards will not be applied if their achievement would be incompatible with those uses. Many other failures are likely to be as a result of the legacy of past engineering works. To address these, the Scottish Government is developing a policy statement for consultation later this year.

Table 3: Implications of the proposed standards, condition limits and threshold values

Summary of implications	Standard, condition limit or threshold value
Equivalent to, or in some cases less stringent than, old standards that currently apply for other purposes	<ul style="list-style-type: none">• temperature in rivers;• nitrogen in transitional and coastal waters;• specific pollutants: 2-4 dichlorophenol; ammonia in salt water; arsenic; chlorine; copper; cyanide; iron; permethrin; zinc; annual mean standards for toluene
Initial estimates indicate no or only a very small number of failures	<ul style="list-style-type: none">• phosphorus in freshwater lochs;• freshwater flows into estuaries;• ammonia in freshwater lochs;• specific pollutants: 2,4 D; chromium VI in salt water; linuron; phenol
Not used directly to determine the level of action required to protect or improve the environment	<ul style="list-style-type: none">• biological standards for surface waters• groundwater threshold values
Application has limited implications for operators	<ul style="list-style-type: none">• morphological condition limits for freshwater lochs• morphological condition limits for transitional waters and coastal waters• condition limits for river flows

6. NEXT STEPS

The 2008 Directions

Following this consultation, the agreed standards and condition limits will be introduced in the autumn. They will be set out in the form of Directions to SEPA, made by the Scottish Ministers.

The Directions are intended to provide SEPA with the necessary degree of legal certainty to ensure consistency of application in the objective setting process for river basin management planning across Scotland.

We also intend to combine the Phase 1 and Phase 2 standards into one set of Directions (“the 2008 Directions”) to provide a ‘one-stop-shop’ for environmental standards and condition limits introduced under the WFD.

The Directions will be published on the Scottish Government’s website and notice of their publication will be made via the Edinburgh Gazette once they have been finalised.

Following the outcome of this consultation, the Fisheries Research Services, an agency of the Scottish Government Marine Directorate, will also adopt the relevant standards and condition limits for their regulatory activities under the Food and Environment Protection Act 1985 in respect of coastal and transitional waters.

Classification consultation

UKTAG has also made recommendations on the use of the standards and condition limits in classifying the ecological and chemical status of surface waters and on how the standards and condition limits are intended to inform decisions on whether action to improve the water environment would be appropriate⁹. These latter practical recommendations complement the position set out by Scottish Government in its policy statement on environmental standards¹⁰.

We are currently considering the UKTAG’s recommendations on how the status of surface waters and groundwater should be classified for the purposes of the WFD and intend to consult on our proposals in this respect shortly.

Economic implications

It is important that the economic implications of implementing these standards and the proposed classification of water bodies are considered as far as possible at this time. However, until specific objectives have been set for each water body through the draft River Basin Management Plans (“RBMPs”) it is not possible to properly assess the costs and benefits of the measures necessary to deliver ‘good status’ for Scotland’s water environment by 2015.

To address this, the Scottish Government is currently developing an Impact Assessment to assess the likely range of costs, benefits and implications arising from the implementation of the river basin management plan. We intend to publish this in December 2008 to coincide with the launch of the six month consultation on the draft RBMPs for the Scotland and Solway Tweed River Basin Districts.

⁹ http://www.wfduk.org/UKCLASSPUB/LibraryPublicDocs/sw_status_classification

¹⁰ [Development of environmental standards and conditions](#)

ANNEX 1

SURFACE WATER QUALITY - PROPOSED STANDARDS FOR TEMPERATURE IN RIVERS

1. SEPA shall classify any river or part thereof designated as a cyprinid water under Directive 2006/44/EC as being of the Type "cyprinid" for the purpose of determining which of the standards for temperature specified in Table A below apply.
2. SEPA shall classify all rivers or parts thereof not classified as being of the Type "cyprinid" in accordance with paragraph 1 above as being of the Type "non-cyprinid" for the purpose of determining which of the standards for temperature specified in Table A apply.
3. Once SEPA has classified, in accordance with paragraphs 1 and 2 above, a river or part thereof as being of a Type specified in Row 2 of Table A below, it shall apply to that river or part, as applicable and subject to paragraph 4 below, the "high", "good", "moderate" or "poor" temperature standards specified in Row 3; Columns 2, 3, 4 and 5, respectively, and the "high" and "good" temperature standards specified in Row 4; Columns 2 and 3, respectively, of that Table.

	Column 1	Column 2		Column 3		Column 4		Column 5	
Row 1		High		Good		Moderate		Poor	
Row 2	River temperature type	Non-cyprinid	Cyprinid	Non-cyprinid	Cyprinid	Non-cyprinid	Cyprinid	Non-cyprinid	Cyprinid
Row 3	River temperature (°C) as an annual 98-percentile standard	20	25	23	28	28	30	30	32
Row 4	Increase or decrease in temperature (°C) in relation to the ambient river temperature, as an annual 98-percentile standard	2	2	3	3	-	-	-	-

Note to Table A

The standards specified for temperature in Row 4; Columns 2 and 3 of Table A shall not be used for the purpose of classifying the status of bodies of surface water.

New definitions:

"Ambient river temperature" means the river temperature in degrees centigrade of a river or part thereof in the absence of any discharge or artificial recharge that would affect the river temperature of that river or part thereof.

"98-percentile standard" means a standard that is failed if the environmental quality metric to which the standard applies is greater than the standard for 2 % or more of the time.

"Environmental quality metric" means the concentration of a substance; the pH of water; the temperature of water; or a change in temperature in relation to ambient river temperature.

ANNEX 2

SURFACE WATER QUALITY - PROPOSED STANDARDS FOR PHOSPHORUS IN FRESHWATER AND BRACKISH LOCHS

1. To determine the appropriate total phosphorus standard to apply to a freshwater or brackish loch or any part thereof and subject to paragraphs 2, 3 and 5, SEPA shall classify—
 - (i) all brackish lochs as being of the geological category; "high alkalinity";
 - (ii) a freshwater lochs as being of the geological category specified in Column 1 of Table A which corresponds with the annual mean alkalinity range specified in Column 2 of that Table which is applicable to the loch; and
 - (iii) the depth characteristics of the loch as being of the depth category specified in Column 1 of Table B which corresponds with the depth range specified in Column 2 of that Table which is applicable to the loch.
2. For freshwater lochs with an annual mean alkalinity of greater than 1000 micro-equivalents per litre, SEPA shall classify the loch as being of the geological category specified in Column 1 of Table A which corresponds with the description of the solid geology of the catchment of the loch specified in Column 4 of that Table which is applicable to the loch.
3. Subject to paragraph 4, where SEPA has insufficient data to classify the geological characteristics of a freshwater loch in accordance with the procedure set out in subparagraph (ii) of paragraph 1, it shall classify the geological characteristics of the loch as being of the geological category specified in Column 1 of Table A which corresponds with the annual mean conductivity range specified in Column 3 of that Table which is applicable to the loch.
4. For freshwater lochs with an annual mean conductivity of > 250 - 1,000 micro Siemens per centimetre, SEPA shall classify the loch as being of the geological category specified in Column 1 of Table A which corresponds with the description of the solid geology of the catchment of the loch specified in Column 4 of that Table which is applicable to the loch.
5. Where SEPA has insufficient data to classify the geological characteristics of a freshwater loch using the criteria set out in paragraphs 1 to 4 above, it shall classify the geological characteristics of the loch as being of the geological category specified in Column 1 of Table A which corresponds with the description of the solid geology of the catchment of the loch specified in Column 4 of that Table which is applicable to the loch.

Table A: Geological characteristics used to identify geological categories to which the loch total phosphorus standards apply			
Column 1	Column 2	Column 3	Column 4
Geological category	Annual mean alkalinity	Annual mean conductivity	Solid geology of the catchment of the [lake]
	<i>Micro-equivalents per litre</i>	<i>Micro Siemens per centimetre</i>	<i>% of catchment</i>
Low alkalinity	< 200	≤ 70	> 90 % siliceous
Moderate alkalinity	200 - 1000	> 70 - 250	> 50 % siliceous and ≤ 90 % siliceous
High alkalinity	> 1000	> 250 - 1000	≥ 50 % calcareous
Marl			> 65 % limestone

Table B: Depth characteristics used to identify depth categories to which the loch phosphorus standards apply	
Column 1	Column 2
Depth category	Mean depth (metres)
Very shallow	< 3
Shallow	3 - 15
Deep	> 15

Environmental standards for total phosphorus in [lakes]

6. Subject to paragraphs 7, 8 and 9, SEPA shall apply, as applicable to the loch or part thereof, the "high", "good", "moderate" or "poor" total phosphorus standard calculated in accordance with the formulae specified in Columns 1, 2, 3 and 4, respectively, of Table C, where in relation to those formulae:

"R" represents the annual mean total phosphorus concentration expected for the loch in the absence of more than very minor phosphorus inputs to the loch resulting from human activities and, where a reliable estimate of 'C' is available, shall have the value given by the formula; $\text{Antilog}_{10} [1.36 - (0.09 \times A) + (0.24 \times B)]$; or 35, whichever is the smaller value;

"A" = Log_{10} of the altitude in metres above mean sea level of the loch;

"B" = $\text{Log}_{10}(C \div D)$;

"C" = the mean alkalinity of the loch in milli-equivalents per litre estimated for the loch when:

- (i) in accordance with paragraphs 7 and 8 of Part B of Schedule 1 of the Scotland River Basin District (Surface Water Typology and Environmental Standards) (Scotland) Directions 2007, its acid neutralising capacity is at least good; and

- (ii) its alkalinity has not been otherwise altered as a result of point or diffuse pollution;
- "D" = the mean depth of the loch in metres;
- "H" = $0.755 + (0.012 \times C) - (0.001 \times D)$; or 0.7, whichever is the larger value; and
- "G" = $0.506 + (0.023 \times C) - (0.002 \times D)$; or 0.46, whichever is the larger value.
7. If, in accordance with paragraphs 1 to 5, SEPA has classified the geological characteristics of a loch as being of the geological category "Marl", it shall apply, as applicable to the loch or part thereof, the "high", "good", "moderate" or "poor" total phosphorus standard specified in Columns 2, 3, 4 and 5, respectively, of Table D which corresponds with the combination of geological and depth categories specified in Column 1 of that Table that is applicable to the loch in accordance with paragraphs 1 to 5.
8. If the value of "C" in paragraph 6 cannot be reliably estimated for the purpose of calculating the value "R" in accordance with that paragraph, SEPA shall:
- (i) use an alternative method for estimating the value "R", provided that, for other lochs for which the value "C" can be reliably estimated, that alternative method produces an equivalently unbiased estimate of the value "R" to that produced by the application of the formula specified in paragraph 6; or
- (ii) apply the procedure specified in paragraph 9 below.
9. If SEPA does not have the necessary data to calculate the total phosphorus standard applicable to a loch or part in accordance with paragraph 6 or sub-paragraph (i) of paragraph 8, as applicable, it shall apply, as applicable to the loch or part, the "high", "good", "moderate" or "poor" total phosphorus standard specified in Columns 2, 3, 4 and 5, respectively, of Table D which corresponds with the combination of geological and depth categories specified in Column 1 of that Table that is applicable to the loch in accordance with paragraphs 1 to 5.

Table C: Total phosphorus standards for freshwater and brackish lochs			
Annual mean total phosphorus concentration ($\mu\text{g/l}$)			
Column 1	Column 2	Column 3	Column 4
High	Good	Moderate	Poor
$R \div H$; or 5, whichever is the larger value	$R \div G$; or 8, whichever is the larger value	$(R \div G) \div 0.5$	$(R \div G) \div 0.25$

Table D: Type-specific total phosphorus standards for freshwater and brackish lochs where the standards specified in Table C do not apply				
Type	Annual mean concentration of total phosphorus ($\mu\text{g/l}$)			
Column 1	Column 2	Column 3	Column 4	Column 5
Geological and depth category	High	Good	Moderate	Poor
High alkalinity; shallow	16	23	46	92
High alkalinity; very shallow	23	31	62	124

Moderate alkalinity; deep	8	12	24	48
Moderate alkalinity; shallow	11	16	32	64
Moderate alkalinity; very shallow	15	22	44	88
Low alkalinity; deep	5	8	16	32
Low alkalinity; shallow	7	10	20	40
Low alkalinity; very shallow	9	14	28	56
Marl; shallow	9	20	40	80
Marl; very shallow	10	24	48	96

New Definitions:

"Brackish loch" means lochs with an annual mean conductivity of > 1,000 micro Siemens per centimetre.

ANNEX 3

SURFACE WATER QUALITY - PROPOSED STANDARDS FOR NITROGEN IN TRANSITIONAL WATERS AND COASTAL WATERS

Dissolved inorganic nitrogen standards for coastal waters

1. For coastal waters, or parts thereof, with mean salinities for the period 1st November to 28th February of > 34.5 , SEPA shall apply, as applicable, the 'high', 'good', 'moderate' or 'poor' dissolved inorganic nitrogen standards specified in Columns 2, 3, 4 and 5 of Table A, respectively, for coastal waters with mean salinities > 34.5 .
2. For a coastal water, or part thereof, with a mean salinity for the period 1st November to 28th February in the range 30 - 34.5, SEPA shall calculate, as applicable in accordance with paragraph 3:
 - (i) the equation for the linear regression line, $y = mx + c$, describing the relationship between the variables dissolved inorganic nitrogen concentration and salinity for such periods; or
 - (ii) the series of equations for the linear regression lines, $(y = mx + c)_n$, describing the relationship between the variables dissolved inorganic nitrogen concentration and salinity for each set of relevant sampling data collected during such periods

where:

"y" is dissolved inorganic nitrogen concentration in micromoles per litre;

"x" is salinity;

"m" is the slope of the regression line;

"c" is the value of "y" when "x" = 0; and

"n" is the number of sets of sampling data from which linear regression lines are calculated.

3. SEPA may use either of the methodologies specified in points (i) and (ii) of paragraph 2 provided that, given the available sampling data, the methodology used ensures that the estimate of the mean dissolved inorganic nitrogen concentration calculated in accordance with paragraph 4 is a reliable estimate.
4. SEPA shall use the equation or the series of equations calculated in accordance with paragraph 2 above to estimate the mean dissolved inorganic nitrogen concentration for the period 1st November to 28th February, as if the mean salinity in the coastal water, or part thereof, were 32.
5. SEPA shall compare the value for the mean dissolved inorganic nitrogen concentration estimated for a salinity of 32 in accordance with paragraph 4 with, as applicable, the 'high', 'good', 'moderate' or 'poor' dissolved inorganic nitrogen standard specified in Columns 2, 3, 4 and 5 of Table A, respectively, for coastal waters with mean salinities in the range of 30 - 34.5.

Table A: Dissolved inorganic nitrogen standards for coastal waters				
	Mean dissolved inorganic nitrogen concentration (micromoles per litre) during the period 1st November to 28th February			
Column 1	Column 2	Column 3	Column 4	Column 5
Mean salinity of for the period 1st November to 28th February	High	Good	Moderate	Poor
> 34.5	10	15	22.5	33.75
30 - 34.5	12 ⁽ⁱ⁾	18 ⁽ⁱ⁾	27 ⁽ⁱ⁾	40.5 ⁽ⁱ⁾

Note to Table A:

⁽ⁱ⁾The standard refers to the concentration of dissolved inorganic nitrogen at a mean salinity for the period 1st November to 28th February of 32.

Dissolved inorganic nitrogen standards for transitional waters

6. To determine the dissolved inorganic nitrogen standards applicable to a transitional water, or part thereof, SEPA shall classify the transitional water or part as being of the Type specified in Column 1 of Table B which corresponds with the applicable description of the transitional water or part thereof in Column 2 of that Table.

Table B: Criteria for identifying types of transitional water to which the dissolved inorganic nitrogen standards for transitional waters apply	
Column 1	Column 2
Type	Annual mean concentration of suspended particulate matter (mg/l)
Very turbid	> 300
Medium turbidity	100 - 300
Intermediate	10 < 100
Clear	< 10

7. To apply, as applicable, the dissolved inorganic nitrogen standard for:
- (i) 'high' specified in Column 2 of Table C for transitional waters of any type listed in Column 1 of that Table; or
 - (ii) 'good', 'moderate' or 'poor' specified in Columns 3, 4 and 5 of Table C, respectively, for transitional waters classified in accordance with paragraph 6 as being of the Type 'clear',

SEPA shall calculate, as applicable in accordance with paragraphs 8:

- (iii) the equation for the linear regression line, $y = mx + c$, describing the relationship between the variables dissolved inorganic nitrogen concentration and salinity for the period 1st November to 28th February and resulting from the increasing dilution of dissolved inorganic nitrogen inputs in the transitional water; or
- (iv) the series of equations for the linear regression lines, $(y = mx + c)_n$, describing the relationship between the variables dissolved inorganic nitrogen concentration and

salinity for each set of relevant sampling data collected during such periods and resulting from the increasing dilution of dissolved inorganic nitrogen inputs in the transitional water

where:

"y" is dissolved inorganic nitrogen concentration in micromoles per litre;

"x" is salinity;

"m" is the slope of the regression line;

"c" is the value of "y" when "x" = 0;

"n" is the number of sets of sampling data from which linear regression lines are calculated.

8. SEPA may use either of the methodologies specified in points (i) and (ii) of paragraph 7 provided that, given the available sampling data, the methodology used ensures that the estimate of the mean dissolved inorganic nitrogen concentration calculated in accordance with paragraph 9 is a reliable estimate.
9. SEPA shall use the equation or equations determined in accordance with paragraph 7 above to estimate the mean dissolved inorganic nitrogen concentration for the period 1st November to 28th February, as if the mean salinity in the transitional water, or part thereof, for that period, were 25.
10. SEPA shall then compare the value for the mean dissolved inorganic nitrogen concentration estimated for a salinity of 25 in accordance with paragraph 9 with, as applicable,
 - (i) the 'high' dissolved inorganic nitrogen standard specified in Column 2 of Table C; or
 - (ii) the 'good', 'moderate' or 'poor' dissolved inorganic nitrogen standard specified in Columns 3, 4 and 5 of Table C, respectively, for transitional waters or parts thereof classified as being of the Type 'clear' in accordance with paragraph 6.
11. For transitional waters, or parts thereof, classified in accordance with paragraph 6 as being of one of the Types 'intermediate', 'turbid' or 'very turbid' specified in Column 1 of Table C, SEPA shall apply, as applicable, the corresponding 'good', 'moderate' or 'poor' dissolved inorganic nitrogen standard specified in Columns 3, 4 and 5, respectively, of that Table to the transitional water or part.

Table C: Dissolved inorganic nitrogen standards for transitional waters, or parts thereof				
	Mean dissolved inorganic nitrogen concentration (micromoles per litre) during the period 1st November to 28th February			
Column 1	Column 2	Column 3	Column 4	Column 5
	Dissolved inorganic nitrogen concentration (micromoles per litre)			
Type	High	Good	Moderate	Poor
	Mean for the period 1st November to 28th February	Mean for the period 1st November to 28th February		
Clear	20 ⁽ⁱ⁾	30 ⁽ⁱ⁾	45 ⁽ⁱ⁾	67.5 ⁽ⁱ⁾
		99-percentile standard for the period 1st November to 28th February		
Very turbid	20 ⁽ⁱ⁾	270	405	607.5
Medium turbidity	20 ⁽ⁱ⁾	180	270	405
Intermediate	20 ⁽ⁱ⁾	70	105	157.5

Note to Table C:

⁽ⁱ⁾*The standard refers to the concentration of dissolved inorganic nitrogen at a mean salinity for the period 1st November to 28th February of 25.*

New definitions

“99-percentile standard” means a standard that is failed if the concentration of the substance is greater than the standard for 1 % or more of the time.

ANNEX 4

SURFACE WATER RESOURCES - PROPOSED CONDITION LIMITS FOR RIVER FLOWS

1. In addition to the environmental standards for river flows specified in Part B of the Scotland River Basin District (Surface Water Typology and Environmental Standards) (Scotland) Directions 2007, SEPA shall apply each of the good condition limits for river flows specified in Columns 1, 2, 3, 4 and 5 of Table A below in relation to any river or part thereof.

Table A: Condition limits for river flows				
Condition limits for good				
Column 1	Column 2	Column 3	Column 4	Column 5
Percentage deviation from mean Q_n for any calendar month	Percentage deviation from Q_{n5}	Percentage deviation from Q_{n95}	Percentage deviation from $Q_{n\text{mean}}/Q_{n95}$	Percentage deviation from mean annual number of days on which: $Q_{nd-2} > Q_{nd-1} < Q_{nd}$
± 40	± 40	+ 40	± 40	± 40

New Definitions

' Q_{nd} ' means the Q_n for a day in a calendar year

' Q_{nd-1} ' means the Q_n for the day before Q_{nd} .

' Q_{nd-2} ' means the Q_n for the day two days before Q_{nd} .

[Other terms used are already defined in the 2007 Directions]

ANNEX 5

SURFACE WATER RESOURCES - PROPOSED CONDITION LIMITS FOR FRESHWATER FLOWS INTO TRANSITIONAL WATERS

1. To determine the freshwater flow condition limits applicable to a transitional water or any part thereof, SEPA shall classify the transitional water or part as being of the Type specified in Column 1 of Table A below which corresponds with the applicable description specified in Column 2 of that Table.
2. Once SEPA has classified, in accordance with paragraph 1, a transitional water or part thereof as being of a Type specified in Row 2 of Table B below, it shall apply, as applicable, the "high", "good", "moderate" or "poor" freshwater flow condition limits specified in Rows 3, 4, 5 and 6 of Columns 2, 3, 4, and 5 respectively, of that Table to that transitional water or part.

Table A: Criteria for identifying types of transitional water to which the freshwater flow conditional limits for transitional waters apply	
Column 1	Column 2
Type	Ratio of the total Q_{n95} freshwater inflow (in cubic metres per second) into the transitional water, or part thereof, from rivers with a catchment area $\geq 10 \text{ km}^2$; to the volume (in cubic metres) of water in the transitional water, or part thereof, at mean high water (V_H) $= \frac{\sum Q_{n95}}{V_H} \times 1000$
High sensitivity (HS)	> 60
Medium sensitivity (MS)	35 - 60
Low sensitivity (LS)	< 35

Table B: Freshwater flow condition limits for transitional waters or parts thereof													
	Column 1	Column 2			Column 3			Column 4			Column 5		
Row 1		High			Good			Moderate			Poor		
Row 2	Type	HS	MS	LS	HS	MS	LS	HS	MS	LS	HS	LS	MS
Row 3	Maximum reduction in freshwater flow volume at daily freshwater flows $\geq Q_{n60}$	10 % of daily Q_n			40 % of daily Q_n	45 % of daily Q_n	50 % of daily Q_n	55 % of daily Q_n	60 % of daily Q_n	65 % of daily Q_n	70 % of daily Q_n	75 % of daily Q_n	80 % of daily Q_n
Row 4	Maximum reduction in freshwater flow volume at daily flows $< Q_{n60}$ and \geq to Q_{n70}	10 % of daily Q_n			30 % of daily Q_n	40 % of daily Q_n	45 % of daily Q_n	50 % of daily Q_n	55 % of daily Q_n	60 % of daily Q_n	65 % of daily Q_n	70 % of daily Q_n	75 % of daily Q_n
Row 5	Maximum reduction in freshwater flow volume at daily flows $< Q_{n70}$ and \geq to Q_{n95}	10 % of daily Q_n			30 % of daily Q_n	35 % of daily Q_n	40 % of daily Q_n	45 % of daily Q_n	50 % of daily Q_n	55 % of daily Q_n	60 % of daily Q_n	65 % of daily Q_n	70 % of daily Q_n
Row 6	Maximum reduction in freshwater flow volume at daily flows $< Q_{n95}$	5 % of daily Q_{n95}			25 % of Q_{n95}	30 % of Q_{n95}	35 % of Q_{n95}	40 % of Q_{n95}	45 % of Q_{n95}	50 % of Q_{n95}	55 % of Q_{n95}	60 % of Q_{n95}	65 % of Q_{n95}

ANNEX 6

SURFACE WATER MORPHOLOGICAL CONDITION LIMITS - PROPOSED CONDITION LIMITS FOR FRESHWATER AND BRACKISH LOCHS

1. To determine the relative hazard posed to the morphological characteristics of:

- (i) a loch's shore zone; or
- (ii) a loch excluding its shore zone

by the different morphological alterations specified in Table D below, SEPA shall classify the loch or part thereof, as being of the Type specified in Column 2, 3 or 4 of Table C below which corresponds to the applicable geological and depth characteristics of the loch or part.

2. To determine the geological and depth characteristics of a loch or any part thereof and subject to paragraphs 3 and 4 below, SEPA shall classify–

- (i) all brackish lochs as being of the geological category; "high alkalinity";
- (ii) a freshwater lochs as being of the geological category specified in Column 1 of Table A which corresponds with the annual mean alkalinity range specified in Column 2 of that Table which is applicable to the loch; and
- (iii) the depth characteristics of the loch as being of the depth category specified in Column 1 of Table B which corresponds with the depth range specified in Column 2 of that Table which is applicable to the loch.

3. Where SEPA has insufficient data to classify the geological characteristics of a freshwater loch in accordance with the procedure set out in sub-paragraph (ii) of paragraph 2, it shall classify the geological characteristics of the loch as being of the geological category specified in Column 1 of Table A which corresponds with the annual mean conductivity range specified in Column 3 of that Table which is applicable to the loch.

4. Where SEPA has insufficient data to classify the geological characteristics of a freshwater loch using the criteria set out in paragraphs 2 or 3 above, it shall classify the geological characteristics of the loch as being of the geological category specified in Column 1 of Table A which corresponds with the description of the solid geology of the catchment of the loch specified in Column 4 of that Table which is applicable to the loch.

5. For the purposes of paragraph 9 below, SEPA shall determine the magnitude of each applicable alteration listed in column 1 of Table D below using the corresponding measure of the magnitude of the alteration specified in column 2 of that Table.

6. Where a range is given for a measure of the magnitude of an alteration in Column 2 of Table D below, SEPA shall assign a value for the magnitude of the alteration which falls within the applicable range and which, in the opinion of SEPA, reflects the spatial extent of influence of the alteration on the shore zone, or part thereof, or on the rest of loch or part thereof.

7. For each applicable alteration specified in Column 1 of Table E and Column 1 of Table F, SEPA shall assign the relative hazard scores corresponding to the loch type listed in column 2, 3, 4, 5, 6 or 7 of Tables E and F into which the loch or part, has been classified in accordance with paragraphs 1 to 4 above.
8. For the purposes of paragraph 7, where a range is given for a relative hazard score in Table E or F below, SEPA shall assign a score which falls within the applicable range and, which in the opinion of SEPA, reflects the severity of the alteration to the shore zone, or part thereof, or to the rest of loch or part thereof.
9. SEPA shall calculate the morphological condition values for the loch excluding the loch shore zone and for the shore zone of a loch or part thereof in accordance with the formulae—

$$\sum^n (A \times B)$$

and

$$\sum^n (C \times B)$$

respectively, where:

“A” = the hazard score for the loch excluding the shore zone, which applicable to the alteration in accordance with Table F;

“B” = the magnitude of the alteration determined in accordance with the measure of the magnitude of the alteration applicable to that alteration in accordance with Column 2 of Table D;

“C” = the hazard score for the loch shore zone, which is applicable to the alteration in accordance with Table E; and

"n" is the number of different alterations listed in Table D that are applicable to the loch or part thereof being assessed.

10. SEPA shall compare the morphological condition values for the loch or part thereof, excluding the shore zone, and for the shore zone of the loch or part calculated in accordance with paragraph 5 above, with the corresponding morphological condition limits for “high”, “good”, "moderate" and "poor" specified in Columns 2, 3, 4 and 5 respectively of Table G below.

Table A: Geological characteristics used to identify geological categories to which the morphological conditions for freshwater and brackish lochs apply

Column 1	Column 2	Column 3	Column 4
Geological category	Annual mean alkalinity	Annual mean conductivity	Solid geology of the catchment of the [lake]
	<i>Micro-equivalents per litre</i>	<i>Micro Siemens per centimetre</i>	<i>% of catchment</i>
Low alkalinity	< 200	≤ 70	> 90 % siliceous
Moderate alkalinity	200 - 1000	> 70 - 250	> 50 % siliceous and ≤ 90 % siliceous
High alkalinity	> 1000	> 250	> 50 % calcareous

Table B: Depth characteristics used in identifying the loch types to which the loch morphological condition limits apply

Column 1	Column 2
Depth category	Mean depth (metres)
Very shallow	< 3
Shallow	3 - 15
Deep	> 15

Table C: Types to which the morphological condition limits for lochs apply

Column 1	Column 2	Column 3	Column 4
Lake depth characteristics	Loch alkalinity characteristics		
	Low alkalinity	Moderate alkalinity	High alkalinity
Very shallow	Type I	Type III	Type V
Shallow	Type II	Type IV	Type VI
Deep	Type II	Type IV	Type VI

Table D: Morphological alterations to which the morphological condition limits for lochs apply

Column 1	Column 2
Morphological alteration	Measure of the magnitude of alteration
1. Impounding works or works causing the lowering of the river bed immediately downstream of the loch outlet.	2 - 20
2. Bank revetment using materials other than vegetation; geotextiles; or soil.	(length of bank revetment in metres) ÷ (total length in metres of the loch shore or part thereof)

3. Bank revetment using vegetation; geotextiles; or soil.	(length of bank revetment in metres) ÷ (total length in metres of the loch shore or part thereof)
4. Any structure on the bed of a loch that extends from the shore into the loch other than an outfall, pipe, cable or part of a structure referred to in alteration 1, 5 or 6.	(length of structure in metres) ÷ (total length in metres of the loch shore or part thereof)
5. Any structure which: (i) is suspended above the surface of a loch between foundation structures on the bed of the loch; and (ii) extends from the shore out into the loch.	(length of structure in metres) ÷ (total length in metres of the loch shore or part thereof)
6. In-filling by any means of a part of a loch with the effect of extending the adjacent terrestrial land surface into the area previously occupied by loch water.	(area infilled in metres ²) ÷ (total area in metres ² of loch bed or part thereof included in assessment)
7. Depositing of any material containing bedrock, boulders, gravel, sand, silt, mud or any mixture thereof on the bed of a loch other than as part of alterations 1, 2, 3, 4, 5 or 6.	(area of lake bed in metres ² occupied by such material) ÷ (total area in metres ² of loch bed or part thereof included in assessment)
8. Removal of bed material by excavation from the bed of a loch.	(area of lake bed in metres ² from which bed material is removed) ÷ (total area in metres ² of loch bed or part thereof included in assessment)
9. Alteration of the structural complexity of vegetation on land within 10 metres of the loch edge, ranging from complete removal of vegetation and replacement with impermeable surfaces to a partial change to the density of a structural component of the vegetation.	0 - 15
<p><u>Note to Table D</u></p> <p>Where it considers that:</p> <ul style="list-style-type: none"> (i) alterations to the shore zone resulting from recreational activities; (ii) alterations to the shore zone or other parts of a loch resulting from boat moorings in, or on, the loch bed; (iii) alterations to the shore zone or other parts of a loch resulting from the removal of aquatic vegetation from the loch; (iv) alterations to the shore zone or other parts of a loch resulting from floating tethered structures on the loch; (v) alterations to the shore zone or other parts of a loch resulting from the effect on water flows and sediment transport into the loch of upstream impounding works; (vi) alterations to the shore zone or other parts of a loch resulting from the effect on water flows and sediment transport into the loch of land uses within the catchment of the loch; <p>or</p>	

(vii) alterations falling under alteration 4 or 5 above that impound water or partly or completely curtail water exchange between opposite sides of the structure

pose a significant risk (on their own or in combination with other alterations) to the ecological quality of a loch or part thereof, SEPA may:

- (a) identify the appropriate hazard scores for the alteration which, in its judgement, reflects the relative hazard posed by the alteration, taking account of the loch type concerned and relevant scientific advice;
- (b) identify an appropriate measure for the magnitude of the alteration; and
- (c) include consideration of the alteration in calculating the morphological condition values for the loch or part in accordance with paragraph 9 above.

Table E: Relative hazard posed by different morphological alterations to the loch shore zone

Morphological alteration ⁽ⁱ⁾	Loch types to which the morphological conditions limits apply					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Type I	Type II	Type III	Type IV	Type V	Type VI
1	1.35 - 2.1	1.35 - 2.1	1.35 - 2.1	1.35 - 2.1	0.98 - 1.2	0.98 - 1.2
2	0.6	0.6	0.6	0.6	0.41	0.41
3	0.4	0.4	0.4	0.4	0.28	0.28
4	0.75	0.75	0.75	0.75	0.45	0.45
5	0.45	0.45	0.45	0.45	0.3	0.3
6	1.1	1.1	1.1	1.1	0.6	0.6
7	1.1	1.1	1.1	1.1	0.6	0.6
8	1.2	1.2	1.1	1.1	0.65	0.65
9	0.35	0.35	0.35	0.35	0.18	0.18

Note to Table E:

⁽ⁱ⁾The morphological alterations listed in Column 1 of Table E refer to the morphological alterations identified in accordance with Table D.

Table F: Relative hazard posed by different morphological alterations to parts of the loch other than the loch shore zone

Morphological alteration ⁽ⁱ⁾	Loch types to which the morphological conditions limits apply					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Type I	Type II	Type III	Type IV	Type V	Type VI
1	1.0 - 1.4	0.35 - 0.5	0.85 - 1.2	0.45 - 0.6	0.65 - 0.8	0.3 - 0.4
2	0.1	0	0.1	0	0.03	0
3	0.1	0	0.1	0	0.03	0
4	0.25	0.13	0.2	0.15	0.1	0.1
5	0.23	0.04	0.19	0.04	0.08	0.04
6	0.9	0.34	0.38	0.38	0.45	0.26
7	0.83	0.3	0.38	0.34	0.41	0.23
8	0.79	0.3	0.75	0.3	0.34	0.19
9	0.15	0.03	0.35	0.03	0.05	0.03

Note to Table F:

⁽ⁱ⁾The morphological alterations listed in Column 1 of Table F refer to the morphological alterations identified in accordance with Table D.

Table G: Morphological condition limits for freshwater and brackish lochs

Column 1	Column 2	Column 3	Column 4	Column 5
Loch zone	High	Good	Moderate	Poor
Loch, excluding the shore zone	0.05	0.15	0.30	0.45
Loch shore zone	0.05	0.15	0.30	0.45

ANNEX 7

SURFACE WATER MORPHOLOGICAL CONDITION LIMITS - PROPOSED CONDITION LIMITS FOR TRANSITIONAL AND COASTAL WATERS

1. To determine the relative hazard posed to:
 - (i) the morphological characteristics of the intertidal zone of a transitional water or coastal water;
 - (ii) the morphological characteristics of the subtidal zone of a transitional water or coastal water; or
 - (iii) the characteristics of the hydrodynamic zone of a transitional water or coastal water

by the different morphological alterations specified in Table B below, SEPA shall classify the transitional water or part thereof, or the coastal water or part thereof, as being of the Type specified in column 1 in Table A below which corresponds to the applicable descriptions specified in columns 2 to 5 of that Table.

2. For the purposes of paragraph 3 below, SEPA shall determine the scale of each of the applicable alterations listed in column 1 of Table B below using the corresponding measure specified in column 2 of that Table.
3. SEPA shall assign the relative hazard score for each applicable alteration specified in Column 1 of Table C, Column 1 of Table D and Column 1 of Table E corresponding to the Type listed in column 2, 3, 4, 5, 6, 7, 8 or 9 of Tables C, D and E into which the transitional water or part, or coastal water or part, has been classified in accordance with paragraph 1 above.
4. Where a range is given for a relative hazard score in Table C, D or E below, SEPA shall assign a score which falls within the applicable range and, which in the opinion of SEPA, reflects the severity of the alteration to, as relevant, the intertidal zone, sub-tidal zone or hydrodynamic zone of the transitional water or coastal water.
5. SEPA shall calculate the morphological condition values for the intertidal zone, the subtidal zone and the hydrodynamic zone of the transitional water or part thereof, or of a coastal water or part thereof, in accordance with the formulae–

$$\sum^n \left(\frac{A \times B}{C} \right)$$

$$\sum^n \left(\frac{E \times B}{D} \right)$$

And

$$\sum^n \left(\frac{G \times B}{F} \right)$$

respectively, where:

“A” = the hazard score for the intertidal zone for each applicable alteration in accordance with Table C;

“B” = the scale of each applicable alteration as measured in accordance with Column 2 of Table B;

“C” = the area of the intertidal zone in km² of the transitional water or part, or coastal water or part, being assessed;

"D" = the area of the subtidal zone in km² of the transitional water or part, or coastal water or part, being assessed;

“E” = the hazard score for the subtidal zone for each applicable alteration in accordance with Table D;

“F” = the area of the upper surface of the hydrodynamic zone in km² in the transitional water or part, or coastal water or part, being assessed;

"G" = the hazard score for the hydrodynamic zone for each applicable alteration in accordance with Table E; and

"n" is the number of different alterations listed in Table B applicable to the transitional water or part, or coastal water or part, being assessed.

6. SEPA shall compare the morphological condition values for the intertidal, sub-tidal and hydrodynamic zones of a transitional water or part thereof, or of a coastal water or part thereof, calculated in accordance with paragraph 4 above, with the corresponding morphological condition limits for “high”, “good”, "moderate" and "poor" specified in Columns 2, 3, 4 and 5 respectively of Table F below.

Table A: Types to which the morphological condition limits for transitional waters and coastal waters apply				
Column 1	Column 2	Column 3	Column 4	Column 5
Type	General characteristics	Annual mean salinity	Substrate	Fetch to the coastline of a coastal water or a transitional water or part thereof
T(1)	Sea loch	< 30	any	any
C(1)	Sea loch	> 30	any	any
T(2)	Lagoon	< 30	any	any
C(2)	Lagoon	> 30	any	any
T(3)	Estuary	< 30	any	any
C(3)	Coastal waters other than those in types C(1) and C(2)	> 30	≥ 50 % exposed bedrock	> 10 km
C(4)	Coastal waters other than those in types C(1) and C(2)	> 30	< 50 % exposed bedrock	< 10 km

C(5)	Coastal waters other than those in types C(1) and C(2)	> 30	< 50 % exposed bedrock	> 10 km
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Table B: Morphological alterations to which the morphological condition limits for transitional waters and coastal waters apply

Column 1	Column 2
Morphological alteration	Measure used to define the scale of alteration
1. In-filling by any means of a part of a transitional water or a part of a coastal water with the effect of extending the adjacent terrestrial land surface into the area previously occupied by the transitional water or coastal water.	Area in-filled in km ²
3. Reduction in the length of a transitional water channel.	Length of channel lost due to the alteration in km
4. Removal or displacement of bed material such as bedrock, boulders, gravel, sand, silt, mud or any mixture thereof from the bed of a transitional water or coastal water	Area of bed from which sediment is removed in km ²
5. Depositing of any material containing bedrock, boulders, gravel, sand, silt, mud or any mixture thereof on the bed of a transitional water or coastal water other than as part of alteration 1, 5, 6 or 7.	Area of bed covered by deposited material in km ²
6. Any structure on the bed of a transitional water or coastal water that extends from the shoreline into the transitional water or coastal water other than an outfall, pipe, cable or part of a structure referred to in alteration 1, 6 or 7.	Area of structure in km ²
7. Any structure which: (i) is suspended above the surface of a transitional water or coastal water between foundation structures on the bed of the transitional water or coastal water; and (ii) extends from the shoreline out into the transitional water or coastal water.	Area of suspended structure above surface of transitional or coastal water in km ²
8. Reinforcement of the shoreline using materials other than soft sediments, geotextiles or vegetation placed at or below mean high water springs other than as part of alteration 1	Length of reinforcement in km
9. Any artificial wall, artificial earth bank or other artificial structure which: (a) is on land ≤ 10 metres inland from the landward extent that mean high water spring tides would have reached in the absence of alteration 7; and (b) limits the extent of inundation of land that would occur during flooding events in the absence of the structure.	Length of artificial structure in km
Notes to Table B Where it considers that:	
(i) shoreline reinforcement using soft sediments, geotextiles or vegetation placed at or below mean high water springs; or	

- (ii) an alteration falling under alteration 5 or 6 above that impounds water or partly or completely curtails water exchange between opposite sides of the structure

poses a significant risk (on its own or in combination with other alterations) to the ecological quality of a coastal water, transitional water or part thereof, SEPA may:

- (d) identify an appropriate hazard score for that alteration which, in its judgement, reflects the relative hazard posed by the alteration, taking account of the transitional water or coastal water type concerned and relevant scientific advice; and
- (e) include consideration of the alteration in calculating the morphological condition values for the water or part in accordance with paragraph 5

Table C: Relative hazard posed to the intertidal zone of transitional waters or coastal waters by different morphological alterations

Morpho-logical alteration ⁽ⁱ⁾	Transitional water types and coastal water types to which the morphological conditions limits apply							
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
	Type T(1)	Type C(1)	Type T(2)	Type C(2)	Type T(3)	Type C(3)	Type C(4)	Type C(5)
1	0.5	0.5	0.29	0.29	0.29	0.33	0.58	0.08
2	0.42	n/a	0.25	n/a	0.25	n/a	n/a	n/a
3	0.25 - 0.67	0.25 - 0.67	0.25 - 0.67	0.25 - 0.67	0.25 - 0.67	0.25 - 0.67	0.25 - 0.67	0.13 - 0.33
4	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.13
5	0.31	0.31	0.25	0.25	0.25	0.31	0.5	0.13
6	0.33	0.33	0.21	0.21	0.21	0.25	0.42	0.08
7	0.13	0.13	0.08	0.08	0.08	0.13	0.13	0
8	0.17	0.17	0.13	0.13	0.13	0.17	0.25	0.08

Note to Table C:

⁽ⁱ⁾The morphological alterations listed in Column 1 of Table C refer to the morphological alterations identified in accordance with Table B.

Table D: Relative hazard posed to the subtidal zone of transitional waters or coastal waters by different morphological alterations

Morpho-logical alteration ⁽ⁱ⁾	Transitional water types and coastal water types to which the morphological conditions limits apply							
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
	Type T(1)	Type C(1)	Type T(2)	Type C(2)	Type T(3)	Type C(3)	Type C(4)	Type C(5)
1	0.5	0.5	0.25	0.25	0.29	0.33	0.42	0.08
2	0.42	n/a	0.25	n/a	0.25	n/a	n/a	n/a
3	0.19 -	0.19 -	0.25 -	0.25 -	0.19 -	0.31 -	0.06 -	0.13 -

	0.5	0.5	0.67	0.67	0.5	0.83	0.17	0.33
4	0.19	0.19	0.19	0.19	0.19	0.31	0.06	0.13
5	0.31	0.31	0.19	0.19	0.19	0.31	0.44	0.13
6	0.33	0.33	0.17	0.17	0.21	0.25	0.33	0.08
7	0.17	0.17	0.08	0.08	0.08	0.17	0.17	0
8	0.13	0.13	0.08	0.08	0.13	0.13	0.21	0.08

Note to Table D:

⁽ⁱ⁾The morphological alterations listed in Column 1 of Table D refer to the morphological alterations identified in accordance with Table B.

Table E: Relative hazard posed by to the characteristics of the hydrodynamic zone by different morphological alterations

Morpho-logical alteration ⁽ⁱ⁾	Transitional water types and coastal water types to which the morphological conditions limits apply							
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
	Type T(1)	Type C(1)	Type T(2)	Type C(2)	Type T(3)	Type C(3)	Type C(4)	Type C(5)
1	0.13	0.13	0.13	0.13	0.13	0.06	0.06	0.06
2	0.13	n/a	0.06	n/a	0.06	n/a	n/a	n/a
3	0.06	0.06	0	0	0	0.06	0	0
4	0.06	0.06	0	0	0	0.06	0	0
5	0.06	0.06	0	0	0	0.06	0.06	0.09
6	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0

Note to Table E:

⁽ⁱ⁾The morphological alterations listed in Column 1 of Table E refer to the morphological alterations identified in accordance with Table B.

Table F: Morphological condition limits for transitional waters and coastal waters

Column 1	Column 2	Column 3	Column 4	Column 5
	High	Good	Moderate	Poor
Intertidal zone	0.05	0.15	0.30	0.45
Subtidal zone	0.05	0.15	0.30	0.45
Hydrodynamic zone	0.05	0.15	0.30	0.45

New definitions

"Intertidal zone" means that part of the bed and shore of transitional waters and coastal waters which is submerged at mean high water spring tides but not at mean low water spring tides.

"Subtidal zone" means that part of the bed of transitional waters and coastal waters that is submerged at mean low water spring tides.

"Hydrodynamic zone" means the water column in transitional waters or coastal waters in which sediment is transported as a result of tidal flows and meteorological forces.

"Shoreline" means the zone demarking the transition between the terrestrial environment and coastal water or transitional water and comprising the intertidal zone and any land immediately adjacent to the intertidal zone which significantly affects the ecological quality of the intertidal zone.

"Sea loch" means a sea inlet which has a length from its head at mean high water spring tides to its seaward mouth longer than its width; is entered by the tide on each cycle; and was created by glacial action.

"Lagoon" means a body of water partially separated from its adjacent estuary or coastal water by a barrier of sand, other sediment or rocks which retains all or most of its water mass during periods of low tide in the adjacent estuary or coastal water but has persistent natural water exchange between with the adjacent estuary or coastal water by percolation through or overtopping of the barrier or through inlet/outflow channels.

"Fetch" means the distance the wind can blow across a water surface without crossing land.

ANNEX 8

SURFACE WATER QUALITY - ENVIRONMENTAL STANDARDS FOR SPECIFIC POLLUTANTS

Table 1: Environmental standards for 2,4-Dichlorophenoxyacetic acid (2,4-D)			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
0.3	1.3	0.3	1.3

Note to Table 1

The standards for 2,4-D specified in Column 2 and Column 4 of Table 1 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 2: Environmental standards for 2,4-Dichlorophenol	
'Good' standard for rivers and freshwater lochs	'Good' standard for transitional and coastal waters
Column 1	Column 2
Annual mean (µg/l)	Annual mean (µg/l)
20	20

Table 3a: Environmental standards for total ammonia in freshwater lochs			
'High'		'Good'	
Column 1	Column 2	Column 3	Column 4
Standard for lochs with: (i) an annual mean concentration of CaCO ₃ (mg/l) ≤ 50; or (ii) an annual mean concentration of CaCO ₃ (mg/l) > 50 and ≤ 200 and an altitude > 80 metres above mean sea level.	Standard for lochs with: (i) an annual mean concentration of CaCO ₃ (mg/l) > 50 and ≤ 200 and an altitude ≤ 80 metres above mean sea level; or (ii) an annual mean concentration of CaCO ₃ (mg/l) > 50 and ≤ 200	Standard for lochs with: (i) an annual mean concentration of CaCO ₃ (mg/l) ≤ 50; or (ii) an annual mean concentration of CaCO ₃ (mg/l) > 50 and ≤ 200 and an altitude > 80 metres above mean sea level.	Standard lochs with: (i) an annual mean concentration of CaCO ₃ (mg/l) > 50 and ≤ 200 and an altitude ≤ 80 metres above mean sea level; or (ii) an annual mean concentration of CaCO ₃ (mg/l) > 50 and ≤ 200
90-percentile (milligrams of ammoniacal nitrogen per litre)			
0.2	0.3	0.3	0.6

Note to Table 3

The standards for total ammonium in rivers are specified in paragraph 3 and Table 3 of Part B of Schedule 1 of the 2007 Direction

Table 3b: Environmental standard for un-ionised ammonia in transitional and coastal waters
'Good'
Annual mean (µg/l)
21

Table 4: Environmental standards for arsenic	
'Good' standard for rivers and freshwater lochs	'Good' standard for transitional and coastal waters
Column 1	Column 2
Annual mean ($\mu\text{g/l}$)	Annual mean ($\mu\text{g/l}$)
50	25

Table 5: Environmental standards for chlorine		
'Good' standards for rivers and freshwater lochs	'Good' standard for transitional and coastal waters	
Column 1	Column 2	Column 3
Annual mean concentration ($\mu\text{g/l}$) of total available chlorine	95-percentile concentration ($\mu\text{g/l}$) of total available chlorine	95-percentile concentration ($\mu\text{g/l}$) of total residual oxidant
2	5	10

Note to Table 5

The standard for chlorine specified in Column 2 of Table 5 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 6: Environmental standards for chromium VI		
'Good' standard for rivers and freshwater lochs	'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3
Annual mean concentration ($\mu\text{g/l}$) of dissolved chromium VI	Annual mean concentration ($\mu\text{g/l}$) of dissolved chromium VI	95-percentile concentration ($\mu\text{g/l}$) of dissolved chromium VI
3.4	0.6	32

Note to Table 6

The standard for chromium VI specified in Column 3 of Table 6 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 7: Environmental standards for chromium III	
'Good' standards for rivers and freshwater lochs	
Column 1	Column 2
Annual mean concentration ($\mu\text{g/l}$) of dissolved chromium III	95-percentile concentration ($\mu\text{g/l}$) of dissolved chromium III
4.7	32

Note to Table 7

The standard for chromium III specified in Column 2 of Table 7 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 8: Environmental standards for copper		
Water hardness bands to which the corresponding river and freshwater loch standards in Column 2 apply	'Good' standards for rivers and freshwater lochs	'Good' standards for transitional and coastal waters
Column 1	Column 2	Column 3
Annual mean concentration of CaCO_3 (mg/l)	Annual mean concentration ($\mu\text{g/l}$) of dissolved copper	Annual mean concentration ($\mu\text{g/l}$) of dissolved copper
0 - 10	1	5
> 10 - 50	6	
> 50 - 100	10	
> 100	28	

Table 9: Environmental standards for cyanide			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean concentration ($\mu\text{g/l}$) of hydrogen cyanide	95-percentile concentration ($\mu\text{g/l}$) of hydrogen cyanide	Annual mean concentration ($\mu\text{g/l}$) of hydrogen cyanide	95-percentile concentration ($\mu\text{g/l}$) of hydrogen cyanide
1	5	1	5

Note to Table 9

The standards for cyanide specified in Column 2 and Column 4 of Table 9 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 10: Environmental standards for cypermethrin			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean (ng/l)	95-percentile (ng/l)	Annual mean (ng/l)	95-percentile (ng/l)
0.1	0.4	0.1	0.41

Note to Table 10

The standards for cypermethrin specified in Column 2 and Column 4 of Table 10 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 11: Environmental standards for diazinon			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean ($\mu\text{g/l}$)	95-percentile ($\mu\text{g/l}$)	Annual mean ($\mu\text{g/l}$)	95-percentile ($\mu\text{g/l}$)
0.01	0.02	0.01	0.1

Note to Table 11

The standards for diazinon specified in Column 2 and Column 4 of Table 11 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 12: Environmental standards for dimethoate			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean ($\mu\text{g/l}$)	95-percentile ($\mu\text{g/l}$)	Annual mean ($\mu\text{g/l}$)	95-percentile ($\mu\text{g/l}$)
0.48	4.0	0.48	4.0

Note to Table 12

The standards for dimethoate specified in Column 2 and Column 4 of Table 12 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 13: Environmental standards for iron	
'Good' standard for rivers and freshwater lochs	'Good' standard for transitional and coastal waters
Column 1	Column 2
Annual mean concentration (mg/l) of dissolved iron	Annual mean concentration (mg/l) of dissolved iron
1	1

Table 14: Environmental standards for linuron			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
0.5	0.9	0.5	0.9

Note to Table 14

The standards for linuron specified in Column 2 and Column 4 of Table 14 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 15: Environmental standards for mecoprop			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
18	187	18	187

Notes to Table 15

The standards for mecoprop specified in Column 2 and Column 4 of Table 15 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 16: Environmental standards for permethrin	
'Good' standard for rivers and freshwater lochs	'Good' standard for transitional and coastal waters
Column 1	Column 2
95-percentile (µg/l)	95-percentile (µg/l)
0.01	0.01

Table 17: Environmental standards for phenol			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
7.7	46	7.7	46

Note to Table 17

The standards for phenol specified in Column 2 and Column 4 of Table 17 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 18: Environmental standards for toluene			
'Good' standards for rivers and freshwater lochs		'Good' standards for transitional and coastal waters	
Column 1	Column 2	Column 3	Column 4
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
50	380	40	370

Note to Table 18

The standards for toluene specified in Column 2 and Column 4 of Table 18 shall not be used for the purpose of classifying the status of bodies of surface water.

Table 19: Environmental standards for zinc		
Water hardness to which the corresponding river and freshwater loch standards in Column 2 apply*	'Good' standards for rivers and freshwater lochs	'Good' standards for transitional and coastal waters
Column 1	Column 2	Column 3
Annual mean concentration of CaCO ₃ (mg/l)	Annual mean concentration (µg/l) of total zinc	Annual mean concentration (µg/l) of dissolved zinc
10	8	40
50	50	
100	75	
500	125	

Note to Table 19

*The standards applicable to intermediate water hardness should be calculated by simple linear interpolation.

ANNEX 9

SURFACE WATER QUALITY - ENVIRONMENTAL QUALITY STANDARDS FOR PRIORITY SUBSTANCES AND OTHER DANGEROUS SUBSTANCES

Table A: Environmental quality standards⁽¹⁾ for priority substances and other dangerous substances (indicated in bold font) for which standards have been set at EU-level.						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
N ^o	Name of substance	CAS number	Annual average EQS ⁱ (µg/l) Inland surface watersⁱⁱ	Annual average EQS ⁱ (µg/l) Other surface waters	Maximum allowable concentration ⁱⁱⁱ (µg/l) Inland surface watersⁱⁱ	Maximum allowable concentration ⁱⁱⁱ (µg/l) Other surface waters
(1)	Alachlor	15972-60-8	0.3	0.3	0.7	0.7
(2)	Anthracene	120-12-7	0.1	0.1	0.4	0.4
(3)	Atrazine	1912-24-9	0.6	0.6	2.0	2.0
(4)	Benzene	71-43-2	10	8	50	50
(5)	Brominated diphenylether ^{iv}	32534-81-9	0.0005	0.0002	<i>not applicable</i>	<i>not applicable</i>
(6)	Cadmium and its compounds <i>(depending on water hardness classes)^v</i>	7440-43-9	≤ 0.08 (Class 1) 0.08 (Class 2) 0.09 (Class 3) 0.15 (Class 4) 0.25 (Class 5)	0.2	≤ 0.45 (Class 1) 0.45 (Class 2) 0.6 (Class 3) 0.9 (Class 4) 1.5 (Class 5)	
(6a)	Carbon-tetrachloride^{vi}	56-23-5	12	12	<i>not applicable</i>	<i>not applicable</i>
(7)	C10-13 Chloroalkanes	85535-84-8	0.4	0.4	1.4	1.4
(8)	Chlorfenvinphos	470-90-6	0.1	0.1	0.3	0.3
(9)	Chlorpyrifos (Chlorpyrifos-ethyl)	2921-88-2	0.03	0.03	0.1	0.1

Table A: Environmental quality standards⁽¹⁾ for priority substances and other dangerous substances (indicated in bold font) for which standards have been set at EU-level.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
N°	Name of substance	CAS number	Annual average EQS ⁱ (µg/l) Inland surface waters ⁱⁱ	Annual average EQS ⁱ (µg/l) Other surface waters	Maximum allowable concentration ⁱⁱⁱ (µg/l) Inland surface waters ⁱⁱ	Maximum allowable concentration ⁱⁱⁱ (µg/l) Other surface waters
(9a)	Cyclodiene pesticides: Aldrin ^{vi} Dieldrin ^{vi} Endrin ^{vi} Isodrin ^{vi}	309-00-2 60-57-1 72-20-8 465-73-6	Σ=0.01	Σ=0.005	<i>not applicable</i>	<i>not applicable</i>
(9b)	DDT total ^{vii, vi}	<i>not applicable</i>	0.025	0.025	<i>not applicable</i>	<i>not applicable</i>
	para-para-DDT ^{vi}	50-29-3	0.01	0.01	<i>not applicable</i>	<i>not applicable</i>
(10)	1,2-Dichloroethane	107-06-2	10	10	<i>not applicable</i>	<i>not applicable</i>
(11)	Dichloromethane	75-09-2	20	20	<i>not applicable</i>	<i>not applicable</i>
(12)	Di(2-ethylhexyl)-phthalate (DEHP)	117-81-7	1.3	1.3	<i>not applicable</i>	<i>not applicable</i>
(13)	Diuron	330-54-1	0.2	0.2	1.8	1.8
(14)	Endosulfan	115-29-7	0.005	0.0005	0.01	0.004
(15)	Fluoranthene	206-44-0	0.1	0.1	1	1
(16)	Hexachlorobenzene	118-74-1	0.01 ^{viii}	0.01 ^{viii}	0.05	0.05
(17)	Hexachlorobutadiene	87-68-3	0.1 ^{viii}	0.1 ^{viii}	0.6	0.6
(18)	Hexachlorocyclohexane	608-73-1	0.02	0.002	0.04	0.02
(19)	Isoproturon	34123-59-6	0.3	0.3	1.0	1.0
(20)	Lead and its compounds	7439-92-1	7.2	7.2	<i>not applicable</i>	<i>not applicable</i>
(21)	Mercury and its compounds	7439-97-6	0.05 ^{viii}	0.05 ^{viii}	0.07	0.07
(22)	Naphthalene	91-20-3	2.4	1.2	<i>not applicable</i>	<i>not applicable</i>

Table A: Environmental quality standards⁽¹⁾ for priority substances and other dangerous substances (indicated in bold font) for which standards have been set at EU-level.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
N°	Name of substance	CAS number	Annual average EQS ⁱ (µg/l) Inland surface waters ⁱⁱ	Annual average EQS ⁱ (µg/l) Other surface waters	Maximum allowable concentration ⁱⁱⁱ (µg/l) Inland surface waters ⁱⁱ	Maximum allowable concentration ⁱⁱⁱ (µg/l) Other surface waters
(23)	Nickel and its compounds	7440-02-0	20	20	<i>not applicable</i>	<i>not applicable</i>
(24)	Nonylphenol (4-Nonylphenol)	104-40-5	0.3	0.3	2.0	2.0
(25)	Octylphenol ((4-(1,1',3,3'-tetramethylbutyl)-phenol))	140-66-9	0.1	0.01	<i>not applicable</i>	<i>not applicable</i>
(26)	Pentachlorobenzene	608-93-5	0.007	0.0007	<i>not applicable</i>	<i>not applicable</i>
(27)	Pentachlorophenol	87-86-5	0.4	0.4	1	1
(28)	Polyaromatic hydrocarbons (PAH) ^{ix}	<i>not applicable</i>	<i>not applicable</i>	<i>not applicable</i>	<i>not applicable</i>	<i>not applicable</i>
	Benzo(a)pyrene	50-32-8	0.05	0.05	0.1	0.1
	Benzo(b)fluoranthene	205-99-2	Σ=0.03	Σ=0.03	<i>not applicable</i>	<i>not applicable</i>
	Benzo(k)fluoranthene	207-08-9				
	Benzo(g,h,i)perylene	191-24-2	Σ=0.002	Σ=0.002	<i>not applicable</i>	<i>not applicable</i>
Indeno(1,2,3-cd)-pyrene	193-39-5					
(29)	Simazine	122-34-9	1	1	4	4
(29a)	Tetrachloroethylene ^{vi}	127-18-4	10	10	<i>not applicable</i>	<i>not applicable</i>
(29b)	Trichloroethylene ^{vi}	79-01-6	10	10	<i>not applicable</i>	<i>not applicable</i>
(30)	Tributyltin compounds (Tributyltin-cation)	36643-28-4	0.0002	0.0002	0.0015	0.0015
(31)	Trichlorobenzenes	12002-48-1	0.4	0.4	<i>not applicable</i>	<i>not applicable</i>

Table A: Environmental quality standards⁽¹⁾ for priority substances and other dangerous substances (indicated in bold font) for which standards have been set at EU-level.						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
N°	Name of substance	CAS number	Annual average EQSⁱ (µg/l) Inland surface watersⁱⁱ	Annual average EQSⁱ (µg/l) Other surface waters	Maximum allowable concentrationⁱⁱⁱ (µg/l) Inland surface watersⁱⁱ	Maximum allowable concentrationⁱⁱⁱ (µg/l) Other surface waters
(32)	Trichloro-methane	67-66-3	2.5	2.5	<i>not applicable</i>	<i>not applicable</i>
(33)	Trifluralin	1582-09-8	0.03	0.03	<i>not applicable</i>	<i>not applicable</i>

Notes to Table A:

⁽¹⁾The maximum allowable concentrations are to help manage short-term incidents. We are proposing that they are not used to classify the chemical status of surface waters.

- (i) This parameter is the Environmental Quality Standard expressed as an annual average value (EQS-AA). Unless otherwise specified, it applies to the total concentration of all isomers.
- (ii) Inland surface waters encompass rivers and lakes and related artificial or heavily modified water bodies.
- (iii) This parameter is the Environmental Quality Standard expressed as a maximum allowable concentration (EQS-MAC). Where the MAC-EQS are marked as "not applicable", the AA-EQS values are considered protective against short-term pollution peaks in continuous discharges since they are significantly lower than the values derived on the basis of acute toxicity.
- (iv) For the group of priority substances covered by brominated diphenylethers (No. 5) listed in Decision 2455/2001/EC, an EQS is established only for congener numbers 28, 47, 99, 100, 153 and 154.
- (v) For Cadmium and its compounds (No. 6) the EQS values vary dependent upon the hardness of the water as specified in five class categories (Class 1: <40 mg CaCO₃/l, Class 2: 40 to <50 mg CaCO₃/l, Class 3: 50 to <100 mg CaCO₃/l, Class 4: 100 to <200 mg CaCO₃/l and Class 5: ≥200 mg CaCO₃/l).
- (vi) This substance is not a priority substance but one of the other pollutants for which the EQS are identical to those laid down in the legislation that applied prior to the entry into force of this Directive.
- (vii) DDT total comprises the sum of the isomers 1,1,1-trichloro-2,2 bis (*p*-chlorophenyl) ethane (CAS number 50-29-3; EU number 200-024-3); 1,1,1-trichloro-2 (*o*-chlorophenyl)-2-(*p*-chlorophenyl) ethane (CAS number 789-02-6; EU Number 212-332-5); 1,1-dichloro-2,2 bis (*p*-chlorophenyl) ethylene (CAS number 72-55-9; EU Number 200-784-6); and 1,1-dichloro-2,2 bis (*p*-chlorophenyl) ethane (CAS number 72-54-8; EU Number 200-783-0).
- (viii) If Member States do not apply EQS for biota they shall introduce stricter EQS for water in order to achieve the same level of protection as the EQS for biota set out in Article 2(1a). They shall notify the Commission and other Member States, through the Committee referred to in Article 21 of Directive 2000/60/EC, of the reasons and basis for using this approach, the alternative EQS for water

established, including the data and the methodology by which they were derived, and the categories of surface water to which they would apply.

- (ix) For the group of priority substances of polycyclic aromatic hydrocarbons (PAH) (No. 28), each individual EQS is applicable, i.e., the EQS for Benzo(a)pyrene, the EQS for the sum of Benzo(b)fluoranthene and Benzo(k)fluoranthene and the EQS for the sum of Benzo(g,h,i)perylene and Indeno(1,2,3-cd)pyrene must be met.

ANNEX 10

SURFACE WATER BIOLOGICAL STANDARDS - BIOLOGICAL STANDARDS FOR RIVERS

Surface water biological standards for rivers in Scotland are presented in Tables A to D below. The standards are presented as 'ecological quality ratios'.

The standards are compared with the measured ecological quality ratio derived by comparing the monitored biological conditions pertaining in the river with the conditions expected under reference conditions.

Reference conditions represent conditions before intensification of agriculture and the development of extensive waste water collection and disposal systems from centres of population. A predicted reference value is used for this purpose. The method for predicting reference conditions is based on data collected from networks of reference sites in the UK or a mixture of sites in the UK and elsewhere in Europe.

Table A: Phytobenthos⁽ⁱ⁾ standards for rivers	
Standards for the degree to which the relative annual mean abundances of nutrient-sensitive and nutrient-tolerant groups of diatom taxa differ from the relative annual mean abundances of these groups of taxa expected under reference conditions	
Column 1	Column 2
	Ecological quality ratio
High	0.93
Good	0.78
Moderate	0.52
Poor	0.26

Note to Table A

⁽ⁱ⁾The term 'phytobenthos' refers to bottom-dwelling multi-cellular and unicellular aquatic plants, such as some species of diatom.

Table B: Benthic invertebrate standards for rivers (ASPT)	
Standards for the degree to which the annual mean sensitivity to disturbance of the observed taxa differs from the annual mean sensitivity of the taxa expected under reference conditions	
Column 1	Column 2
High	0.97
Good	0.86
Moderate	0.75
Poor	0.63

Table C: Benthic invertebrate standards for rivers (NTAXA)	
Standards for the degree to which the annual mean number of disturbance-sensitive taxa differs from the annual mean number of taxa expected under reference conditions	
Column 1	Column 2
	Ecological quality ratio
High	0.85
Good	0.71

Moderate	0.57
Poor	0.47

Table D: Aquatic macrophyte(i) standards for rivers	
Standards for the degree to which the annual mean abundances of disturbance-sensitive and disturbance-tolerant macrophyte taxa differ from the annual mean abundances of those taxa under reference conditions	
Column 1	Column 2
	Ecological quality ratio
High	0.80
Good	0.60
Moderate	0.40
Poor	0.20

Note to Table D

⁽ⁱ⁾The term 'macrophyte' refers to larger plants, typically including flowering plants, mosses and larger algae, but not including single-celled phytoplankton or diatoms.

ANNEX 11

SURFACE WATER BIOLOGICAL STANDARDS - BIOLOGICAL STANDARDS FOR FRESHWATER AND BRACKISH LOCHS

Surface water biological standards for freshwater and brackish lochs in Scotland are presented in Tables A to F below. The standards are presented as 'ecological quality ratios' applicable either to all lochs or to any loch of a specified type, as indicated in the relevant table.

The standards are compared with the measured ecological quality ratio. This is derived by comparing the monitored biological conditions pertaining in the loch with the conditions expected under reference conditions.

Reference conditions represent conditions before intensification of agriculture and the development of extensive waste water collection and disposal systems from centres of population. Reference conditions are predicted based on relevant characteristics of the loch concerned. The methods for predicting reference conditions have been developed using data collected from networks of reference sites in the UK or a mixture of sites in the UK and elsewhere in Europe. Low levels of intensive agriculture in the catchment of lochs and low population density, together with the absence of other direct pressures such as fish cage units were used to select reference lochs. These criteria were supported with data from palaeolimnological studies (which can provide a timeline of ecological change in a loch) where such information was available.

Where the standards apply to specified loch types, the characteristics differentiating the loch types may vary depending on the plant or animal group and the impacts being assessed. For example, standards for the biomass of phytoplankton in the water column in a loch will be sensitive to the alkalinity of the water and the depth of the loch, whereas benthic invertebrates on the bed of a loch and responding to acidification pressure are unlikely to be sensitive to differences between lochs in mean depth.

Table A: Phytoplankton⁽ⁱ⁾ standards for lochs – chlorophyll a							
Standards for the degree to which the biomass of phytoplankton taxa (as represented by the annual mean chlorophyll a concentration) differ from the biomass of those phytoplankton taxa (annual mean chlorophyll a concentration) expected under reference conditions.							
	Ecological quality ratio						
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Loch characteristics ⁽ⁱⁱ⁾	Marl, shallow; and high alkalinity, shallow.	High alkalinity, very shallow.	Medium alkalinity, deep; medium alkalinity, shallow; low alkalinity, deep; and low alkalinity, shallow at mid-altitude.	Medium alkalinity, very shallow.	Low alkalinity, shallow at low altitude & with < 75 % by area of the soils in the catchment being peat.	Low alkalinity, shallow at low altitude & with ≥ 75 % by area of the soils in the catchment being peat.	Low alkalinity, very shallow.

High	0.55	0.63	0.50	0.63	0.50	0.50	0.63
Good	0.32	0.30	0.33	0.34	0.29	0.30	0.33
Moderate	0.16	0.15	0.165	0.17	0.145	0.15	0.165

Note to Table A

⁽ⁱ⁾The term 'phytoplankton' refers to solitary and colonial unicellular algae and cyanobacteria that live in the water column, at least for part of their lifecycle.

⁽ⁱⁱ⁾For the purposes of Table A, the geological and depth characteristics of lochs applicable to Columns 2 to 8 are classified in accordance with paragraphs 1 to 5 of Annex 2 above

"mid-altitude" means $\geq 200 - 800$ metres above mean sea level.

"low altitude" means < 200 metres above mean sea level

Table B: Phytoplankton standards for lochs – percentage cyanobacteria			
Standards for the degree to which the annual mean percentage of cyanobacteria differ from the annual mean percentage of cyanobacteria expected under reference conditions.			
	Ecological quality ratio		
Column 1	Column 2	Column 3	Column 4
Geological characteristics*	High Alkalinity	Medium Alkalinity	Low alkalinity
High	0.97	0.95	0.97
Good	0.82	0.77	0.82
Moderate	0.61	0.61	0.61

Note to Table B

*For the purposes of Table B, the geological characteristics of lochs applicable to Columns 2, 3 and 4 are classified in accordance with paragraphs 2 to 4 of Annex 6 above.

Table C: Phyto-benthos standards for lochs		
Standards for the degree to which the relative annual mean abundances of nutrient-sensitive and nutrient-tolerant groups of diatom taxa differ from the relative annual mean abundances of these groups of taxa expected under reference conditions		
	Ecological quality ratio	
Column 1	Column 2	Column 3
	Low alkalinity lochs	Moderate alkalinity lochs; high alkalinity lochs; and marl lochs
High	0.90	0.90
Good	0.63	0.66
Moderate	0.44	0.44

Table D: Aquatic macrophyte⁽ⁱ⁾ standards for lochs	
Standards for the degree to which the annual mean abundance of disturbance-sensitive macrophyte taxa differ from the annual mean abundance of those taxa expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.80
Good	0.60
Moderate	0.40
Poor	0.20

Note to Table D

⁽ⁱ⁾The term 'macrophyte' refers to larger plants, typically including flowering plants, mosses and larger algae, but not including single-celled phytoplankton or diatoms.

Table E: Benthic invertebrate standards for lochs (1)	
Standards for the degree to which the annual mean ratio of nutrient-sensitive to nutrient-tolerant chironomid taxa differ from the annual mean ratio of such taxa expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.78
Good	0.60
Moderate	0.40
Poor	0.20

Table F: Benthic invertebrate standards for lochs (2)		
Standards indicating the degree to which the annual mean taxon sensitivity, niche breadth and abundance of benthic invertebrate taxa has been altered from that expected under reference conditions as a result of acidification		
	Ecological quality ratio	
Column 1	Column 2	Column 3
Geological characteristics	Low alkalinity with < 75 % by area of the soils in the catchment being peat	Low alkalinity with ≥ 75 % by area of the soils in the catchment being peat.
High	0.867	0.845
Good	0.725	0.506
Moderate	0.596	-

Note to Table F

*For the purposes of Table F, the geological characteristics of lochs applicable to Columns 2 and 3 are classified in accordance with paragraphs 2 to 4 of Annex 6 above.

ANNEX 12

SURFACE WATER BIOLOGICAL STANDARDS - BIOLOGICAL STANDARDS FOR TRANSITIONAL WATERS AND COASTAL WATERS

Table A: Benthic invertebrate standards for coastal waters (1)		
Standards for the degree to which the annual mean occurrence and degree of tributyl tin (TBT) -induced imposex in the common dog whelk, <i>Nucella lapillus</i> , differs from the annual mean occurrence and degree of imposex expected under reference conditions		
	Ecological quality ratio	Vas Deferens Stage Index (VDSI)
Column 1	Column 2	Column 3
High	0.95	0.3
Good	0.33	4
Moderate	0.17	5
Poor	0.00	6

Table B: Benthic invertebrate standards for transitional (salinity > 20) and coastal waters (2)	
Standards relating to the degree to which the annual mean number of benthic invertebrate taxa in soft sediments, the diversity of taxa, and the ratio of disturbance-sensitive and disturbance-tolerant taxa differ from the annual mean number, diversity and the ratio of disturbance-sensitive and disturbance tolerant taxa expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.75
Good	0.64
Moderate	0.44
Poor	0.24

Table C: Indicators used in calculating the standards for the condition of benthic invertebrates in Table B.		
Observed Simpson's evenness index divided by the maximum expected Simpson's evenness value expected under reference conditions (Simpson's evenness index gives a measure of the proportion of individuals that each taxonomic group contributes to the total number of taxa in a sample)	Observed number of taxa in a sample divided by the maximum number of taxa expected under reference conditions	Observed AZTI Marine Biotic Index (AMBI) divided by the maximum AMBI expected under reference conditions AMBI describes the ratio of disturbance-sensitive to disturbance tolerant invertebrate taxa

Table D: Fish standards for transitional waters	
Standards for the degree to which the annual mean composition and abundance of disturbance-sensitive fish taxa differ from the annual mean composition and abundance of disturbance-sensitive fish taxa expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2

Table E: Aquatic angiosperm⁽ⁱ⁾ standards for transitional waters and coastal waters	
Standards relating to the degree to which the annual mean shoot density in, and spatial extent of, sea grass beds, differ from the annual mean shoot density in, and spatial extent of, sea grass beds expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2

Note to Table E

⁽ⁱ⁾The term 'angiosperm' refers to the flowering plants. In transitional waters and coastal waters, angiosperms include sea grasses and the flowering plants found in salt marshes.

Table F: Phytoplankton⁽ⁱ⁾ standards for transitional waters and coastal waters	
Standards relating to mean of the results for each of the indicators of the condition of phytoplankton in Table G	
	Ecological quality ratio
Column 1	Column 2
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2

Note to Table F

⁽ⁱ⁾The term 'phytoplankton' refers to solitary and colonial unicellular algae and cyanobacteria that live in the water column, at least for part of their lifecycle.

Table G: Standards for different indicators of the condition of phytoplankton in transitional waters and coastal waters used in calculating the phytoplankton standards in Table E				
	Indicators of the condition of phytoplankton			
Column 1	Column 2	Column 3	Column 4	Column 5
	Biomass indicator		Bloom indicator	Species succession indicator
	90-percentile chlorophyll a	90-percentile chlorophyll a	Elevated phytoplankton	Deviation from the pattern of taxonomic functional group

	concentration ($\mu\text{g/l}$)	concentration ($\mu\text{g/l}$)	abundance ^(a)	succession expected under reference conditions ^(b)
	North Sea waters	Atlantic waters		
High	10	5	15	0.85
Good	15	10	30	0.75
Moderate	20	15	40	0.6
Poor	25	20	50	0.5

Notes to Table G

^(a)Elevated phytoplankton abundance is represented by the mean of:

- (i) the percentage of the total number of samples taken in the period April to September in which the counts of any individual phytoplankton species (other than Phaeocystis species) exceed $10^6/\text{l}$;
- (ii) the percentage of the total number of samples taken in the period April to September in which the counts of Phaeocystis species exceed $10^6/\text{l}$;
- (iii) the percentage of the total number of samples taken in the period April to September in which the total count of all phytoplankton species exceed $10^7/\text{l}$; and
- (iv) the percentage of the total number of samples taken in the period April to September in which the concentration of chlorophyll exceeds $10 \mu\text{g/l}$.

^(b)Percentage of time during a year in which the number of individuals in each of the following taxonomic groups; diatoms, dinoflagellates, microflagellates (excluding Phaeocystis sp.) and Phaeocystis sp, is consistent with the number expected under reference conditions

Table H: Aquatic macroalgae⁽ⁱ⁾ standards for transitional waters(1)	
Standards relating to the degree to which the annual mean penetration of different fucoid communities from the seaward toward the freshwater end of an estuary differs from their annual mean penetration expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2

Note to Table H

⁽ⁱ⁾The term 'macroalgae' refers to multicellular algae such as seaweeds and filamentous algae.

Table I: Aquatic macroalgae standards for transitional waters and coastal waters(2)	
Standards calculated from the combined results of the different indicators of macroalgae specified in Table J	
	Ecological quality ratio
Column 1	Column 2
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2

Table J: Standards for different indicators of the condition of macroalgae in transitional waters and coastal waters used in calculating the macroalgae standards in

Table I					
Indicators of the condition of macroalgae					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	Mean % cover of available intertidal habitat	Total extent of the bloom across available intertidal (hectares)	Average biomass on available intertidal habitat (g/m ²)	Average biomass on affected intertidal habitat (g/m ²)	Percentage of quadrats with algae growing > 3 cm into the underlying sediment
High	5	100	100	100	5
Good	15	500	500	500	20
Moderate	25	1,000	1,000	1,000	50
Poor	75	2,500	3,000	3,000	75

Table K: Aquatic macroalgae standards for coastal waters(3)	
Standards calculated for the combined results of the different indicators of macroalgae in Table L and relating to the degree to which the annual mean species richness and diversity of red, green and brown seaweeds on rocky intertidal areas differs from that expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2

Table L: Standards for different indicators of the condition of macroalgae in transitional waters and coastal waters used in calculating the macroalgae standards in Table I					
Indicators of the condition of macroalgae					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	Species richness (number of taxa)	Proportion of Chlorophyta taxa (%)	Proportion of Rhodophyta taxa (%)	Ratio of late succession or perennial taxa to opportunist or annual taxa	Proportion of opportunist taxa (%)
High	55	25	47	0.65	15
Good	35	30	42	0.5	22
Moderate	20	40	32	0.35	35
Poor	5	60	15	0.1	45

ANNEX 13

GROUNDWATER THRESHOLD VALUES

	Electrical conductivity	Nitrate	Atrazine	Total chromium	Simazine	Mecoprop	Epoxyconazole
Chemical classification tests	Mean conductivity (micro-Siemens/cm)	Mean NO ₃ concentration (mg/l) in the associated transitional water or coastal water	Mean concentration (ug/l)	Mean concentration (ug/l)	Mean concentration (ug/l)	Mean concentration (ug/l)	Mean concentration (ug/l)
Test 1 - Saline Intrusion	1000						
Test 2a - Surface Water – Diffuse	-	10	-	-	-	-	-
Test 2b - Surface Water - Point Source							
Test 3 – Drinking Water Protected Areas		31	0.075	-	-	-	-
Test 4 - General Assessment of Quality		31 ⁽ⁱ⁾	0.075 ⁽ⁱⁱ⁾	37.5	0.075 ⁽ⁱⁱ⁾	0.075 ⁽ⁱⁱ⁾	0.075*

	Dichloromethane	Trichloroethene	Tetrachloroethene	Benzo(a)pyrene	Any pollutant for which a surface water standard has been set
Chemical classification tests	Mean concentration (ug/l)	Mean concentration (ug/l)	Mean concentration (ug/l)	Mean concentration (ug/l)	
Test 2b - Surface Water - Point Source					Failure of the standards in the associated surface water
Test 3 – Drinking water Protected Areas	-	-	-	-	-
Test 4 - General Assessment of Quality	1.5	7.5	7.5	0.0075 ⁽ⁱⁱ⁾	-

Note to Table A

⁽ⁱ⁾This standard has been designed to be equivalent to 50 mg/l as a 95 -percentile standard

⁽ⁱⁱ⁾These standards have been designed to be equivalent to 0.1 µg/l as a 95 -percentile standard

⁽ⁱⁱⁱ⁾UKTAG has been unable to develop a methodology for deriving threshold values indicative of risks to terrestrial ecosystems dependent on groundwater. Consequently, threshold values cannot be proposed at this time.

ANNEX 14

SURFACE WATER QUALITY STANDARDS - ADDITIONS TO THE 2007 DIRECTIONS

Additions to Table 1 of Part B of Schedule 1 to the 2007 Directions				
Table 1: Dissolved oxygen standards for rivers				
Column 1	Column 2	Column 3	Column 4	Column 5
	% oxygen saturation as 10-percentile values			
River type	High	Good	Moderate	Poor
1, 2, 4 and 6 and salmonid	80	75	64	50
3, 5 and 7	70	60	54	45

Additions to Table 2 of Part B of Schedule 1 to the 2007 Directions				
Table 2: Biochemical oxygen demand (BOD) standards for rivers⁽ⁱ⁾				
Column 1	Column 2	Column 3	Column 4	Column 5
	BOD concentration (mg/l) as 90-percentile values			
River type	High	Good	Moderate	Poor
1, 2, 4 and 6 and salmonid	3	4	6	7.5
3, 5 and 7	4	5	6.5	9

Additions to Table 3 of Part B of Schedule 1 to the 2007 Directions				
Table 3: Total ammonia standards for rivers				
Column 1	Column 2	Column 3	Column 4	Column 5
	Total ammonia (milligrams of ammoniacal nitrogen per litre) as 90-percentile values			
River type	High	Good	Moderate	Poor
1, 2, 4 and 6	0.2	0.3	0.75	1.1
3, 5 and 7	0.3	0.6	1.1	2.5

Additions to Table 4 of Part B of Schedule 1 to the 2007 Directions

Table 4: Acid condition standards for all river types

Column 1	Column 2	Column 3	Column 4
High	Good	Moderate	Poor
pH 6 as a 5-percentile value; pH 9 as a 95-percentile value	pH 5.2 as a 10-percentile value	pH 4.7 as a 10-percentile value	pH 4.2 as a 10-percentile value

Additions to Table 5 of Part B of Schedule 1 to the 2007 Directions

Table 5: Phosphorus standards for rivers

Column 1	Column 2	Column 3	Column 4	Column 5
	Soluble reactive phosphorus concentrations (µg/l) as annual mean values			
River type	High	Good	Moderate	Poor
1n	30	50	150	500
2n	20	40	150	500
3n and 4n	50	120	250	1,000

ANNEX 15

SURFACE WATER RESOURCES STANDARDS - ADDITIONS TO THE 2007 DIRECTIONS

Additions to Table 11 of Part B of Schedule 1 to the 2007 Directions				
Table 11(a): Environmental standards for moderate river flows				
Column 1	Column 2	Column 3	Column 4	Column 5
permitted abstraction per day as a proportion of natural flow				
Moderate				
River type	Maximum volume of water removed per day at daily flows $\geq Q_{n60}$	Maximum volume of water removed per day at daily flows $< Q_{n60}$ and $\geq Q_{n70}$	Maximum volume of water removed per day at daily flows $< Q_{n70}$ and $\geq Q_{n95}$	Maximum volume of water removed per day at daily flows $< Q_{n95}$
A1	60 % of daily Q_n	55 % of daily Q_n	50 % of daily Q_n	45 % of Q_{n95}
A2 (downstream), B1, B2, C1, D1	55 % of daily Q_n	50 % of daily Q_n	45 % of daily Q_n	40 % of Q_{n95}
A2 (headwaters), C2, D2	50 % of daily Q_n	45 % of daily Q_n	40 % of daily Q_n	35 % of Q_{n95}

Table 11(b): Environmental standards for poor river flows				
Column 1	Column 2	Column 3	Column 4	Column 5
permitted abstraction per day as a proportion of natural flow				
Poor				
River type	Maximum volume of water removed per day at daily flows $\geq Q_{n60}$	Maximum volume of water removed per day at daily flows $< Q_{n60}$ and $\geq Q_{n70}$	Maximum volume of water removed per day at daily flows $< Q_{n70}$ and $\geq Q_{n95}$	Maximum volume of water removed per day at daily flows $< Q_{n95}$
A1	85 % of daily Q_n	80 % of daily Q_n	75 % of daily Q_n	70 % of Q_{n95}
A2 (downstream), B1, B2, C1, D1	80 % of daily Q_n	75 % of daily Q_n	70 % of daily Q_n	65 % of Q_{n95}
A2 (headwaters), C2, D2	75 % of daily Q_n	70 % of daily Q_n	65 % of daily Q_n	60 % of Q_{n95}

Additions to Table 15 of Part B of Schedule 1 to the 2007 Directions

Table 15(a): Environmental standards for inland loch water levels

permitted percentage change in any day to the loch's total natural daily outflow volume (i)

Moderate

Column 1	Column 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9	col 10	col 11	col 12	col 13	col 14
Geology	Altitude	Low				Mid				High			
	Size	Small		Large		Small		Large		Small		Large	
	Basin form	L	V	L	V	L	V	L	V	L	V	L	V
	Depth¹¹												
Peat	Shallow or deep	40	40	40	35	40	40	40	35	40	40	40	35
	Very shallow	40	35	35	35	40	35	35	35	40	35	35	35
Low Alkalinity	Shallow or deep	55	50	50	50	55	50	50	50	55	50	50	50
	Very shallow	50	50	50	50	50	50	50	50	50	50	50	50
Medium Alkalinity	Shallow or deep	45	45	45	45	45	45	45	45	45	45	45	45
	Very shallow	45	45	45	40	45	45	45	40	45	45	45	40
High Alkalinity, Marl	Shallow or deep	55	50	50	50	55	50	50	50	55	50	50	50
	Very shallow	50	50	50	50	50	50	50	50	50	50	50	50
Brackish	Shallow or deep	55	50	50	50	55	50	50	50	50	50	50	50
	Very shallow	50	50	50	50	50	50	50	50	50	50	50	50

Note to Table 15(a):

- (i) On days where the natural outflow volume is $< Q_{n95}$, the standards refer to a percentage of the Q_{n95} outflow volume.

¹¹ As categorised in accordance with Table B of Annex 2 above.

Additions to Table 15 of Part B of Schedule 1 to the 2007 Directions

Table 15(b): Environmental standards for inland loch water levels

permitted percentage change in any day to the loch's total natural daily outflow volume (i)

Poor													
Column 1	Column 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9	col 10	col 11	col 12	col 13	col 14
Geology	Altitude	Low				Mid				High			
	Size	Small		Large		Small		Large		Small		Large	
	Basin form	L	V	L	V	L	V	L	V	L	V	L	V
	Depth¹²												
Peat	Shallow or deep	65	65	65	60	65	65	65	60	65	65	65	60
	Very shallow	65	60	60	60	65	60	60	60	65	60	60	60
Low Alkalinity	Shallow or deep	80	75	75	75	80	75	75	75	80	75	75	75
	Very shallow	75	75	75	75	75	75	75	75	75	75	75	75
Medium Alkalinity	Shallow or deep	70	70	70	70	70	70	70	70	70	70	70	70
	Very shallow	70	70	70	65	70	70	70	65	70	70	70	65
High Alkalinity, Marl	Shallow or deep	80	75	75	75	80	75	75	75	80	75	75	75
	Very shallow	75	75	75	75	75	75	75	75	75	75	75	75
Brackish	Shallow or deep	80	75	75	75	80	75	75	75	75	75	75	75
	Very shallow	75	75	75	75	75	75	75	75	75	75	75	75

Note to Table 15(b):

- (i) On days where the natural outflow volume is $< Q_{n95}$, the standards refer to a percentage of the Q_{n95} outflow volume.

¹² As categorised in accordance with table B of Annex 2 above. The nomenclature is slightly different from that used in the 2007 Directions but the relevant depth categories are the same.

ANNEX 16

SURFACE WATER MORPHOLOGICAL CONDITION LIMITS - UPDATES TO THE 2007 DIRECTIONS

Amendments to paragraph 6 of Schedule 2 to the 2007 Directions

6. SEPA shall calculate the morphological condition values for the channel and banks of a river or part thereof in accordance with the formulae—

$$\frac{\sum_n (A \times B)}{C} \text{ and}$$

$$\frac{\sum_n (E \times B)}{C} \text{ respectively, where:}$$

- “A” = the river channel hazard score assigned in accordance with paragraph 4 or 5 above, as applicable;
 “B” = the scale of alteration determined in accordance with paragraph 3 above;
 “C” = the length of channel assessed; **and**
 //
 “E” = the river bank hazard score assigned in accordance with paragraph 4 or 5 above, as applicable.

Amendments to Table 3 of Part B of Schedule 2 to the 2007 Directions					
Table 3: Relative hazard posed to the river channel by different morphological alterations					
	River types to which the morphological conditions apply				
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Morphological alteration (i)	A	B	C	D	F
1	0.01	0.02	0.06	0.04	0.02
2	0.21	0.33	0.83	0.58	0.29
3	0 - 0.03	0 - 0.08	0 - 0.11	0.01 - 0.16	0 - 0.05
4	0.03	0.08	0.11	0.16	0.05
5a	0.08	0.16	0.38	0.28	0.13
5b	0.42	0.67	1.67	1.17	0.58
5c	0.54	0.81	1.85	1.44	0.69
6	0.25	0.42	0.63	0.71	0.38
7	0.42	0.67	0.92	1.08	0.58
8	0.33	0.58	1.58	1.08	0.5

9	0.13	0.25	0.72	0.47	0.22
10	0.16	0.28	0.88	0.56	0.25
11	0.42	0.67	1.67	1.17	0.58
12a	0.33	0.58	1.67	1.17	0.5
12b	0.13	0.22	0.31	0.38	0.19

Amendments to Table 4 of Part B of Schedule 2 to the 2007 Directions

Table 4: Relative hazard posed to the river banks by different morphological alterations

	River types to which the morphological conditions apply				
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Morphological alteration(<i>i</i>)	A	B	C	D	F
1	0	0	0	0	0
2	0	0.19	0.38	0.31	0.19
3	0	0 - 0.09	0.01 - 0.16	0.01 - 0.16	0 - 0.09
4	0	0.09	0.16	0.16	0.09
5a	0	0.19	0.38	0.31	0.19
5b	0	0.50	1.00	0.83	0.50
5c	0	0.50	1.00	0.83	0.50
6	0	0	0	0	0
7	0	0.31	0.50	0.56	0.31
8	0	0.13	0.25	0.19	0.13
9	0	0.38	0.75	0.63	0.38
10	0	0.08	0.17	0.17	0.08
11	0	0.33	0.67	0.58	0.33
12a	0	0.50	1.00	0.83	0.50
12b	0	0.13	0.19	0.19	0.13

Updates to Table 5 of Schedule 2 to the 2007 Directions**Table 5: Morphological condition limits for rivers**

Column 1	Column 2	Column 3	Column 4	Column 5
	High	Good	Moderate	Poor
River channel morphological condition limit	0.05	0.25	0.5	0.75
River bank morphological limit	0.05	0.25	0.5	0.75