

Implementing the Water Environment and Water Services (Scotland) Act 2003: Updating environmental standards for the water environment

A Consultation

October 2020

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1. Purpose

This consultation proposes several new or updated environmental standards for Scotland's water environment, and updates to some of the assessment methods used for deriving such standards. Scottish Ministers intend to direct the Scottish Environment Protection Agency ("SEPA") to apply these standards and assessment methods in river basin management planning and to guide action to protect Scotland's water environment.

2. Responding to this consultation

We are inviting responses to this consultation by 11 December 2020.

Please respond to this consultation using the Scottish Government's consultation hub, Citizen Space (<http://consult.gov.scot>). Access and respond to this consultation online at <https://consult.gov.scot/environment-forestry/updating-environmental-standards/>. You can save and return to your responses while the consultation is still open. Please ensure that consultation responses are submitted before the closing date of 11 December 2020.

If you are unable to respond using our consultation hub, please complete the Respondent Information Form and send it to eqce@gov.scot.

Handling your response

If you respond using the consultation hub, you will be directed to the About You page before submitting your response. Please indicate how you wish your response to be handled and, in particular, whether you are content for your response to be published. If you ask for your response not to be published, we will regard it as confidential, and we will treat it accordingly.

All respondents should be aware that the Scottish Government is subject to the provisions of the Freedom of Information (Scotland) Act 2002 and would therefore have to consider any request made to it under the Act for information relating to responses made to this consultation exercise.

If you are unable to respond via Citizen Space, please complete and return the Respondent Information Form included in this document.

To find out how we handle your personal data, please see our privacy policy: <https://www.gov.scot/privacy/>

Next steps in the process

Where respondents have given permission for their response to be made public, and after we have checked that they contain no potentially defamatory material, responses will be made available to the public at <http://consult.gov.scot>. If you use the consultation hub to respond, you will receive a copy of your response via email.

Following the closing date, all responses will be analysed and considered along with any other available evidence to help us. Responses will be published where we have been given permission to do so. An analysis report will also be made available.

Comments and complaints

If you have any comments about how this consultation exercise has been conducted, please send them to egce@gov.scot.

Scottish Government consultation process

Consultation is an essential part of the policymaking process. It gives us the opportunity to consider your opinion and expertise on a proposed area of work.

You can find all our consultations online: <http://consult.gov.scot>. Each consultation details the issues under consideration, as well as a way for you to give us your views, either online or by email.

Responses will be analysed and used as part of the decision making process, along with a range of other available information and evidence. We will publish a report of this analysis for every consultation. Depending on the nature of the consultation exercise the responses received may:

- indicate the need for policy development or review
- inform the development of a particular policy
- help decisions to be made between alternative policy proposals
- be used to finalise legislation before it is implemented

While details of particular circumstances described in a response to a consultation exercise may usefully inform the policy process, consultation exercises cannot address individual concerns and comments, which should be directed to the relevant public body.

3. Introduction

The introduction of the Water Framework Directive (“WFD”) in 2000 changed the way we manage Scotland’s water environment. We have set up a comprehensive river basin management planning system to help protect and improve the ecological health of our rivers, lochs, estuaries and coastal waters. This is underpinned by the use of environmental standards to help assess risks to the ecological quality of the water environment and to identify the scale of improvements that would be needed to prevent deterioration and bring waters under pressure back into a good condition.

In 2014, prior to the publication of the second river basin management plans, Scottish Ministers directed¹ SEPA to apply a range of environmental standards in protecting and improving the water environment (“the 2014 Standards Directions”). They also directed² SEPA on the use of the standards in assessing the status of the water environment (“the 2014 Status Directions”). In parallel with these directions, we issued a [policy statement](#) describing how we expect SEPA to use standards in classifying the status of waterbodies, regulating controlled activities and setting environmental objectives.

We are now proposing to update the 2014 Directions to reflect the latest scientific understanding of the standards, and assessment methods used to derive them, needed for a healthy water environment. Our proposals are based on recommendations from UK Technical Advisory Group³ on the Water Framework Directive (“UKTAG”), a partnership of the UK environment and conservation agencies.

The technical basis for most of the standards has already been subject to peer review and public consultation by UKTAG. This consultation is about the adoption and application of the standards and assessment methods in river basin management in Scotland.

Adopting the standards has implications for where efforts to protect and improve the water environment are targeted. However, the standards do not dictate the objectives we set. The latter have to strike the right balance between protecting the water environment and enabling its sustainable use. Where, for example, making the improvements needed to achieve the standards required for good status would be disproportionately expensive, appropriate, alternative objectives will be set. Our 2007 [paper](#), Principles for Setting Objectives for the River Basin Management Plan, describes the objective setting process in more detail.

¹ [The Scotland River Basin District \(Standards\) Directions 2014](#), [The Scotland River Basin District \(Standards\) Amendment Directions 2015](#), [The Solway Tweed River Basin District \(Standards\) \(Scotland\) Directions 2014](#) & [The Solway Tweed River Basin District \(Standards\) \(Scotland\) Amendment \(No. 2\) Directions 2015](#).

² [The Scotland River Basin District \(Status\) Directions 2014](#); & [The Solway Tweed River Basin District \(Status\) \(Scotland\) Directions 2014](#).

³ [UKTAG biological and environmental standards consultation response October 2019](#), [UKTAG information note: Developments in the classification of river phytobenthos \(diatoms\) November 2019](#), and [UKTAG Lake Fish \(eDNA\) Consultation Response Report October 2020](#).

Environmental standards form the foundation of a risk-based approach to river basin management planning. Updating environmental standards in the light of improved scientific understanding is important. It helps ensure we appropriately protect the water environment without imposing unnecessary constraints on development. It also enables us to refine our understanding of where the water environment is under pressure and the scale of environmental improvements we would need to achieve good ecological quality.

We are proposing to introduce a small number of changes to standards and assessment methods, based on the latest scientific understanding of aquatic ecosystems, and taking account of the evidence gained from using the existing standards and environmental monitoring programmes from across the UK.

They include new and revised specific ecological standards for rivers and lochs along with new and revised assessment methods. Their introduction will make an important contribution to improving our understanding of the ecological quality of the water environment. This will help us better prioritise action, particularly in relation to one of our top priority areas, easing barriers to fish migration.

Some of our existing standards have proved insufficiently stringent to protect ecological quality whilst others have proved more stringent than necessary. Consequently, some of the proposed standards are less stringent than the existing standards they will replace whilst others are more stringent.

The proposed updates to the 2014 Directions, below, reflect the latest scientific understanding of the standards and needed for a healthy water environment.

- river fish statistical methodology update
- river phyto-benthos assessment method update
- loch fish new eDNA assessment method
- loch morphology: bank protection assessment method update
- introduction of spatial standards for fish barrier assessment
- river flow standards changes:
 - artificially increased flows in high hydrological status waterbodies
 - short term abstraction in good hydrological status waterbodies
- new nitrogen standards for lochs
- invasive non-native species list updates

The following sections of the paper describe these proposed changes in detail.

4. River fish

We are proposing to revise the river fish classification system for Scotland by changing the method by which results are aggregated at the waterbody level. Further technical details about changes to the assessment method are available from UKTAG⁴.

The current tool for classifying river fish in Scotland for River Basin Management Planning is FCS2 (Scotland). The tool relates the number of salmon and trout caught in a survey to the predicted abundance and prevalence of the species at the specific site. For multiple sites within a single waterbody, it currently calculates status class using a Bayesian statistical approach implemented using specially developed software. The method is described in detail in the UKTAG method statement produced for the second RBMP⁵.

For multiple sites within a single waterbody we propose applying a simple arithmetic mean to amalgamate individual results provided by the FCS2 (Scotland) tool, rather than using the current approach. This will provide a clearer reflection of the overall ecological quality across multiple sites.

Implications of the proposal

Based on an assessment of 517 waterbodies, which have multiple sites available, Table 4.1 summarises the effect on river fish classification.

Class	Existing assessment method	New proposed assessment method	Net change
High	142	99	-43
Good	122	129	+7
Moderate	157	227	+70
Poor	90	57	-33
Bad	6	5	-1

Using the new proposed assessment method 85 waterbodies would be downgraded in river fish classification, while 43 waterbodies would be upgraded.

Out of the 85 instances in total where the fish status would drop in class only 21 of these would result in the overall waterbody lowering in status to below good; whereas out of the 43 waterbodies upgraded in river fish class only 3 would result in the overall waterbody status being raised to good status or better.

⁴ [UKTAG Biological and Environmental Standards Consultation May 2019.](#)
[UKTAG biological and environmental standards consultation response October 2019.](#)

⁵ [WFD-UKTAG \(2014\). UKTAG river assessment method fish fauna: Fish classification scheme 2 \(FCS2\) Scotland. ISBN: 978-1-906934-50-7](#)

For those 21 waterbodies which would be newly downgraded to below good more evidence would be needed on the underlying causes of these impacts before determining whether any regulatory action is appropriate.

5. River Phytobenthos

River phytobenthos refers to a mostly microscopic group of freshwater algae found attached to submerged surfaces such as stones and plant stems. Phytobenthos are good indicators of nutrient enrichment and other pressures, and are used to assess river water quality. Diatoms are the main plant groups that are used because their silica shells are easy to identify under the microscope.

The current tool for river phytobenthos assessment is DARLEQ2 (Diatoms for Assessing River and Lake Ecological Quality), which was adopted across the UK for River Basin Management Planning cycle 2. DARLEQ2 is described in the method statement published by UKTAG ([DARLEQ2 River Phytobenthos method statement](#)), with an accompanying calculator spreadsheet, but is also available as an online tool.

DARLEQ2 uses traditional light microscopy for sample analysis, based on the standard CEN methods embedded in the Water Framework Directive. The individual taxon scores used to calculate observed Trophic Diatom Index (TDI) values for derivation of classification are referred to as TDI4 (i.e. Trophic Diatom Index version 4).

It was recognised that there were some inconsistencies in the TDI4 taxon scores, which have now been addressed. The result of this has been small adjustments to a few scores and the creation of an updated version of the TDI, referred to as TDI5 LM. Further technical details about proposed changes to the TDI are available from [UKTAG](#).

An updated version of the DARLEQ software (DARLEQ3) has been developed that allows calculation of the new (TDI5 LM) scores. The change from TDI4 to TDI5 LM represents a method improvement resulting in minor changes to classification.

Implications of the proposal

The impact on classification of switching from the current (TDI4) to the new proposed taxon scores (TDI5 LM), is shown in Table 5.1,

Table 5.1: Comparison of the existing and proposed new river Phytobenthos assessment			
Class	Existing river Phytobenthos classification	New proposed river Phytobenthos classification	Net change
High	603	594	-9
Good	422	438	+16
Moderate	129	122	-7
Poor	4	4	0
Bad	0	0	0

*These figures are taken from draft classification results and are for indicative purposes only.

This shows that the change from TDI4 to TDI5 LM would result in a slight increase in the number of sites at Good or better status with seven waterbodies being upgraded from moderate to good. The impact on the overall classification of waterbodies would

be negligible, with only one waterbody being downgraded from high to good status. There are no regulatory implications from this change.

6. Loch fish

We are proposing a new loch fish assessment procedure using environmental DNA (eDNA) monitoring. It is a completely new method and would be the first WFD assessment procedure based on environmental DNA (eDNA) sampling and analysis. Further technical details about this new assessment method are available from UKTAG⁶.

Gill netting has traditionally been the sampling method used to describe lake fish communities across the globe. However, for a number of reasons there has not been a tradition of lake gill netting in Great Britain. This has meant that we have lacked the basic data to develop a loch fish assessment procedure. With the development of eDNA based monitoring methods an opportunity has arisen to develop a loch fish sampling procedure using this new method.

Field and laboratory investigations have identified that eDNA analysis provides a description of the contemporary fish communities. Studies have shown that fish eDNA rapidly declines after fish have been removed from the study environment, indicating that eDNA in water samples is representative of the fish population at the time of sampling.

Implications of the proposal

As there is no pre-existing loch fish assessment procedure, it is not possible to make comparisons and Table 6.1, below, only shows the effect of applying the new loch fish (eDNA) classification method.

Class	New proposed loch fish class
High	20
Good	19
Moderate	4
Poor	0
Bad	0

Only one of the four waterbodies classified as moderate for loch fish (eDNA) would downgrade the overall classification of that waterbody from good to moderate status. Given the high level of symmetry between the new lake fish tool and other methods for assessing nutrient enrichment the need for any regulatory action as a result of this change is unlikely.

⁶ [UKTAG biological standard consultation January 2020](#), and [UKTAG Lake Fish \(eDNA\) Consultation Response Report October 2020](#)

7. Loch morphology: bank protection

Recent work undertaken by SEPA has shown that the existing method used to assess the physical condition of lochs can overestimate the morphological impact of bank protection on some loch waterbodies. The new proposed method is to use a graduated impact rating which takes account of the shoreline characteristics and location of the pressure relative to the waterline.

The existing method is applied using the Lake MImAS tool, which calculates the morphological status of a waterbody using a range of impact ratings associated with different engineering activities and structures. The current impact ratings associated with bank protection (Table 7.1) take no account of the position of the works relative to the water's edge and the potentially variable levels of associated habitat damage. This can lead to an over estimation of the impact associated with bank protection in both the current classification and when undertaking the environmental standards tests for licensing.

Lake zone	Lake type					
	Low alkalinity and very shallow	Low alkalinity and shallow or deep	Moderate alkalinity and very shallow	Moderate alkalinity and shallow or deep	High alkalinity and very shallow	High alkalinity and shallow or deep
Shore zone impact ratings	0.6	0.6	0.6	0.6	0.41	0.41

In order to address this issue, a more flexible approach is proposed that will allow SEPA to select from a range of shore zone impact ratings the one that most accurately reflects the risk posed by individual sections of bank protection in their site-specific context. The range of impact ratings is shown in Table 7.2, and a description of the hard bank protection set back locations is provided in Table 7.3.

Lake zone	Impact rating consistent with status class indicated	Lake type					
		Low alkalinity and very shallow	Low alkalinity and shallow or deep	Moderate alkalinity and very shallow	Moderate alkalinity and shallow or deep	High alkalinity and very shallow	High alkalinity and shallow or deep
Shore zone impact ratings	High	0.025	0.025	0.025	0.025	0.025	0.025
	Good	0.1	0.1	0.1	0.1	0.1	0.1
	Moderate	0.22	0.22	0.22	0.22	0.22	0.22
	Poor	0.37	0.37	0.37	0.37	0.37	0.37
	Bad	0.6	0.6	0.6	0.6	0.41	0.41

Table 7.3 Shore zone hard bank protection set back locations	
Class	Description
High status	Hard bank protection well within the zone landward of the terrestrial riparian vegetation boundary
Good	Hard bank protection on the landward side terrestrial riparian vegetation boundary.
Moderate	Moderate space for littoral processes. Bank protection in the water-wards side of the terrestrial riparian vegetation line AND at least half ($\geq 50\%$) of the width of the natural littoral zone is available for natural processes.
Poor	Substantial reduction of space for littoral processes. Bank protection in the water-wards side of the terrestrial riparian vegetation line AND less than half ($< 50\%$) of the width of the natural littoral zone is available for natural processes.
Bad	Hard bank protection goes down into the water

Implications of the proposal

The proposed revised loch morphological standards for hard bank protection require additional survey information in order to select the correct impact rating. In most cases, this information is not currently available. Hence, the existing rating will continue to be used until the required information becomes available.

SEPA will seek the information required to apply the proposed new loch morphology standards as part of all new relevant licence applications. This will ensure that loch shoreline developments are assessed more accurately in future. Application of the more flexible proposed approach is always likely to lead to an improvement in condition and any regulatory impacts are, therefore, expected to be minimal.

8. Spatial standards for fish barriers

We are proposing to apply the spatial standards used in the classification of other parameters to the fish barrier classification method in Scotland. The current fish barrier method consists of a GIS based tool to assess the proportion of suitable habitat in a waterbody from which migratory fish are excluded by artificial impassable barrier. It is described in detail in the [UKTAG method statement 'Barrier to fish migration method \(Scotland\)'](#). The current method downgrades some waterbodies where the total affected length is actually relatively short and therefore of limited significance in terms of available fish habitat.

The spatial standards introduced by the Scottish Government in 2014 require at least a specified minimum total length of habitat to be impacted in order for a classification downgrade to apply. They are designed to avoid a disproportionate downgrade where the total length of impacted habitat is relatively insignificant when considering the total length of that waterbody. Hydrology, hydro-morphology, water quality and biological tools all currently follow this approach, but to date the fish barrier tool has not included this spatial element.

The existing fish barrier assessment method will continue to be used to generate an initial classification result. The spatial standards would then be applied, and only those results which breach the minimum habitat length would be treated as downgraded. These proposals will ensure that the effect of barriers on classification better reflects their actual impact on fish habitat. This will better support assessment of ecological status, regulatory decisions and help target the implementation of programmes of measures aimed at achieving improvements in ecological status in rivers. It also means that the barrier tool will be better aligned to the approaches taken to classify other elements.

The spatial standards are summarised below; this is a simplified version, and the full version in Schedule 4 of the [Scotland River Basin District \(Standards\) Directions 2014](#) should be consulted for caveats and exceptions.

- If a barrier is affecting >1.5km of contiguous habitat, then spatial standards are breached. If not then:
- If a barrier is blocking >15% of the total waterbody length, then the spatial standards are breached. If not then:
- If a barrier is blocking a significant length of tributary and the length of tributaries is >25% of the total length of all watercourses in the waterbody catchment (from GIS analysis), then the spatial standards are breached. If not then the spatial standards are not breached, and the fish barrier result should be applied.

Applying the extra spatial standards test will remove the influence of some barriers from classification, if they are only blocking access to a short stretch of habitat. This will have the effect of upgrading the barrier classification on a small proportion of waterbodies and remove the need for an improvement measure.

Implications of the proposal

A comparison between the current classification and one incorporating the spatial standards is summarised in Table 8.1.

Table 8.1: Comparison of the new proposed additional spatial standard assessment and the current fish barrier classification			
Class	Existing fish barrier classification	New proposed fish barrier classification	Net change
High	2275	2355	+80
Good	61	17	-44
Moderate	66	38	-28
Poor	315	307	-8
Bad	0	0	0

This shows that of the 2717 waterbodies classified for fish barriers, the application of spatial standards would mean 81 being upgraded in status. As well as the 80 waterbodies moving to High status one waterbody improves to moderate status. This would result in overall classification status for 14 waterbodies being upgraded to good or above.

9. River flows

We are proposing to introduce revised standards for two aspects of river flows. SEPA uses river flow standards to assess the risk to the ecological quality of rivers posed by new abstractions and to identify the scale of improvements likely to be needed to achieve our objectives for rivers that are already under pressure from water abstraction.

The new proposed standards that redefine the existing standards for High status are set out in Table 9.1. The proposed revision of existing flow standards that allow for a short term exceedance from the thresholds set for classification of Good status, provided that a number of test are met, are shown in Table 9.2. Further technical information about the proposed standards and their derivation is available from UKTAG⁷.

9.1 High hydrological status and artificially increased flows

Evidence reviewed by UKTAG suggests that persistent artificially increased flows have a negative impact on river macroinvertebrates. Under WFD, High ecological status is defined as near naturalness associated with no or very low human pressure. Consequently, we consider High hydrological status thresholds should take account of persistent artificially elevated flows in addition to the current limits on flow from abstraction pressures.

We propose that the existing flow standards for High hydrological status are amended to include an upper threshold of 5% deviation above natural at flow less than or equal to Q_{n95} and 10% deviation above natural where flows are greater than Q_{n95}. This mirrors the thresholds for flow reduction for High status. Details are shown in Table 9.1.

Table 9.1 Recommended revisions to the “High” standards for river flows

		Permitted maximum as a proportion of natural flow		
		At daily flows (Q _n) less than Q ₉₅		At daily flows (Q _n) greater than Q ₉₅
River Type	Existing standards	Proposed revision	Existing standards	Proposed revision
ALL	-5%	+/- 5%	-10%	+/- 10%

No changes are proposed to the existing standards for daily flows for Good status

The above proposal to redefine High status does not apply to Heavily Modified Waterbodies (HMWBs).

⁷ [UKTAG Biological and Environmental Standards Consultation May 2019.](#)
[UKTAG biological and environmental standards consultation response October 2019.](#)

Implications of the proposal

There are approximately 2000 non-HMWB river waterbodies in Scotland. Of these, there are 84 which meet the current high hydrology environmental standard, but would breach the revised standard. However, of these, only two would drop in overall ecological status from high to good with the other 82 already being at less than high status due to other parameters. The two waterbodies which would be downgraded to good are those with elevated flows due to catchment transfers as part of large storage hydropower schemes. However, there would be no regulatory impact on the two hydropower schemes as the waterbodies will be at good status.

9.2 Good hydrological status and short-term abstractions

The current flow standards are in the form of a series of limits of allowable reduction from natural flows at a range of flow conditions. However, this takes no account of the duration of an abstraction, nor how frequently it occurs. This means that an abstraction that breaches a standard for a few days once a year is treated the same as one causing a continuous breach; the same limits apply to both.

River animals and plants have evolved to live under a highly variable flow regime. This includes short-term periods of naturally low flow, which animals and plants are expected to be better adapted to than longer term events. Evidence reviewed by UKTAG found that for flow reductions lasting less than one month, impacts on aquatic life forms were low, provided some flowing water remains in the channel. The exception to this is where the low flows result in a loss of connectivity, with the appearance of isolated pools. Under these conditions significant ecological impacts can arise quickly.

We propose that a temporal element is applied to the flow standards, such that, depending upon frequency and duration, short-term exceedances might not result in a deterioration in class. The magnitude of allowable exceedance would depend on both the duration of, and typical interval between, exceedances. This accounts for the resilience of aquatic ecology to short low flow events but also the need for a recovery period.

Table 9.2 shows a matrix of allowable flow standard exceedances for short-term flow reductions. An allowable exceedance means High or Good hydrology status can be confirmed even if the threshold for High or Good status is exceeded (within the given time constraints) if the waterbody is at Good or High hydrology status prior to the low flow event. If hydrology is at less than Good status pre low flow event, it will inform deterioration risk to a lower class. Exceedances are not permitted, i.e. current standards continue to apply, where:

- the standard for Poor is exceeded, or
- an exceedance lasts more than twenty days, or
- exceedances typically occur more frequently than once every two months, or
- the natural daily mean flow is below Q_{n98}.

The revision allows an increasing degree of exceedance of the current standards as flow reduction events become shorter and less frequent. For example, an event of a

magnitude that breaches the existing Moderate standard (i.e. Poor class) which occurs typically between one and six times per year (interval 2 months to ≤1 year) and lasts up to five days would still meet the Moderate short-term standard.

The allowable exceedances would mean that, where the frequencies and durations of abstraction events are small, a higher class than permitted by the current standards may be assigned. This would apply to the waterbody (not an individual abstraction) and would need to take account of any cumulative effects from multiple abstractions, as well as effects on flow on any downstream waterbodies. Normal classification spatial rules would apply.

Table 9.2 Revised classification accounting for short-term flow deviations

Median interval between abstraction events - select as appropriate	>3 years	≤3 years to >1 year	≤1 year to >2 months
Abstraction event reducing flow to H/G/M/P/B - select as appropriate	H G M P B	H G M P B	H G M P B
Abstraction Event Duration (days):	↓ ↓	↓ ↓	↓ ↓
		Revised class	
>10 to ≤20	H G G M B	H G M P B	H G M P B
>5 to ≤10	H G G M B	H G G M B	H G M P B
≤5	H H G G B	H G G M B	H G G M B

Note: look up event interval, magnitude (class) and duration to find revised class

Implications of the proposal

These changes would potentially change the way ecological evidence of a failure of Good status is interpreted where there are short-term abstractions i.e. whether the ecological class of less than Good status is due to a water resource pressure. The impact of the proposed change will be on waterbodies currently assigned a class of Moderate or Good for hydrology due to the influence of intermittent abstractions, typically for irrigation. It is estimated that up to 20 waterbodies impacted by short-term abstractions could change class from Moderate to Good status as a result of these changes. These improvements would be seen in areas that have high numbers of agricultural abstractions such as Angus, Fife, Tay and Tweed. However, there is still significant pressure from irrigation on many of these waterbodies and it will not open up significantly more capacity for abstraction in most cases.

10. Loch nitrogen

We are proposing to introduce new standard for nitrogen in lochs. Nitrogen is a plant nutrient and elevated concentrations can lead to accelerated growth of algae and other plants. The impact on the composition and abundance of plant species can have adverse implications for other aspects of water quality, such as oxygen levels. The various changes can then impact on animals, such as invertebrates and fish. Elevated concentrations result from inputs of nitrogen from a range of sources, including in particular discharges of sewage and various diffuse agricultural sources. The process of nutrient enrichment, accelerated algal and plant growth and associated adverse effects is termed eutrophication.

The Water Framework Directive refers to “nutrient conditions” as one of the general physicochemical elements supporting ecological status. To date, in Scotland phosphorus has been the only nutrient used as a supporting element in freshwaters, primarily because historically it has been considered the most likely to be limiting to plant/algal growth. However, for lochs there is convincing evidence from the recent scientific literature that nitrogen can also play a significant role in the eutrophication process, and that control of both phosphorus and nitrogen concentrations/loadings is desirable where they are both present in excess.

Under the EU WFD Common Implementation Strategy, work was undertaken to review and improve the comparability and consistency of WFD nutrient boundary values across Member States. The outputs of this work have been used to analyse UK lake data to produce the total nitrogen status class boundaries for lochs in Scotland. Further technical detail on the derivation of the proposed standards is available from UKTAG⁸. The proposed nitrogen standards for lochs are set out in Tables 10.1.

Table 10.1 Proposed total nitrogen boundary values (standards) for lochs (mg/l N, annual mean concentration)				
Lake type*	Status boundary			
	High/ Good	Good/ Moderate	Moderate/ Poor	Poor/ Bad
Clear, Very Shallow	0.67	1.07	2.13	4.27
Clear, Shallow	0.48	0.77	1.54	3.08
Clear, Deep	0.46	0.74	1.47	2.94
Humic, Very shallow	0.91	1.46	2.92	5.85
Humic, Shallow	0.81	1.30	2.60	5.20
Humic, Deep	0.72	1.16	2.32	4.65

*type as for the UK reporting typology: clear = <30 mg/l Pt, humic > 30 mg/l Pt (includes polyhumic), depth classes (mean depth): very shallow <3m, shallow 3-15m, deep >15m.

⁸ [UKTAG Biological and Environmental Standards Consultation May 2019.](#)
[UKTAG biological and environmental standards consultation response October 2019.](#)

Implications of the proposal

Table 10.2 shows the distribution by nitrogen standard class in terms of number of loch waterbodies where monitoring data is available.

Table 10.2: Distribution of lochs in each class for the proposed new total nitrogen standard	
Class	New proposed loch nitrogen class
High	36
Good	2
Moderate	4
Poor	1
Bad	0

*Relatively few Scottish lochs have been routinely monitored for total nitrogen in recent years.

Out of the five loch waterbodies classed at less than good status for nitrogen, only one would see a downgrade in overall class status from good to moderate. The lochs at less than good status for nitrogen are also impacted by phosphorus and this will remain the primary driver for improvements, so there is unlikely to be any additional regulatory action required as a result of this new standard.

11. Invasive non-native species

The 2014 Status Directions require SEPA to take account of a range of listed high impact non-native invasive species when classifying the status of rivers, lochs, estuaries and coastal waters. An alien species is defined by the International Union for Conservation of Nature and Natural Resources as a species introduced “outside its normal past or present distribution”. “Invasive” alien species are those which “threaten ecosystems, habitats or species with environmental or socio-economic harm.”

A high impact invasive non-native species is expected to have a significant adverse effect on the ecological quality of any part of the water environment in which it becomes established. Waters in which one or more of the species have become established cannot be classed as high ecological status. Instead, they are classed as good, moderate, poor or bad status, depending on the extent and severity of the impact they have on the other plants and animals present.

We are proposing to amend the list of species that we direct SEPA to specifically take into account in classification, adding a number of species and removing one. Our proposals regarding species added to the high impact list are summarised in Table 11.1.

Table 11.1: Additions to the existing list of High Impact non-native invasive species				
Common name		Species	Plant/ Animal/Fish	Habitat
HIGH IMPACT	Quagga mussel	<i>Dreissena rostriformis bugensis</i>	Animal	Freshwater
	Two-leaf water-milfoil	<i>Myriophyllum heterophyllum</i>	Plant	Freshwater
	Gulf wedge clam	<i>Rangia cuneata</i>	Animal	Freshwater/ Brackish
	Asian shore crab	<i>Hemigrapsus sanguineus</i>	Animal	Marine
	Asian shore crab	<i>Hemigrapsus takanoi</i>	Animal	Marine
	American lobster	<i>Homarus americanus</i>	Animal	Marine
	Water Fern	<i>Azolla caroliniana</i>	Plant	Freshwater
	Floating primrose willow	<i>Ludwigia peploides</i>	Plant	Freshwater
	American skunk-cabbage	<i>Lysichiton americanus</i>	Plant	Freshwater
	Gunnera manicata & tinctoria	<i>Gunnera</i> spp.	Plant	Riparian
	Himalayan knotweed	<i>Persicaria wallichii</i>	Plant	Riparian
	Japanese kelp	<i>Undaria pinnatifida</i>	Plant	Marine

Elodea canadensis has been moved from the high impact list to the moderate list following risk assessment. The proposals are based on the results of detailed risk assessments undertaken by the Great Britain Non-Native Species Secretariat (“[GBNNS](#)”). Further information about the background to the proposals is available from UKTAG⁹.

Irrespective of whether a non-native species is listed as high impact, there are strict controls designed to prevent introductions into the wild. Further information is available from the [Scottish Government](#). Any further proposals to revise the list will be based on the results of risk assessments undertaken by the GBNNS.

Implications of the proposal

Table 11.2 shows a comparison of the existing Invasive Non-Native Species (INNS) classification with the new proposed classification following updates to the High Impact non-native invasive species list.

Class	Existing INNS list classification	New proposed INNS list classification	Net change
High	0	95	+95
Good	144	49	-95
Moderate	43	43	0
Poor	0	0	0
Bad	0	0	0

The removal of Elodea canadensis from the high impact list will result in 95 waterbodies reverting to High status, currently at Good. This will result in the overall classification for one waterbody changing from good to high status. It is unlikely that other additions to the high impact list will lead to existing waterbody classifications being downgraded at the present time.

⁹ [UKTAG Biological and Environmental Standards Consultation May 2019.](#)
[UKTAG biological and environmental standards consultation response October 2019.](#)

12. Summary and next steps

The proposed updates to the 2014 Directions reflect the latest scientific understanding of the standards and needed for a healthy water environment. SEPA has undertaken an initial assessment of the likely overall effect of the new standards on the classification of rivers and lochs.

In summary, the results indicate that around 1.5% of waterbodies will be upgraded in overall classification status under the new standards than under the existing standards with 1% being upgraded to good status or better. Whereas 0.9% of waterbodies will be downgraded in overall classification status. Therefore, the changes to overall classification from these proposals are relatively minor

The technical basis the standards has already been subject to peer review and public consultation by UKTAG, where necessary. The majority represent a refinement of the previous standards rather than a fundamental change, and as such, whilst these are of value in determining the accuracy of our classification assessment, they are of less significance in regulatory terms.

Following this consultation, we plan to issue new Directions to SEPA on standards and classification. These will replace the 2014 Standards Directions and the 2014 Status Directions.

This will enable SEPA to base the third river basin management plans on the improved understanding of the impacts of pressures on the water environment provided by the proposed standards.

Appendix 1. Respondent information form



Implementing the Water Environment and Water Services (Scotland) Act 2003: Updating environmental standards for the water environment

RESPONDENT INFORMATION FORM

Please Note this form **must** be completed and returned with your response.

To find out how we handle your personal data, please see our privacy policy:
<https://www.gov.scot/privacy/>

Are you responding as an individual or an organisation?

- Individual
- Organisation

Full name or organisation's name

Phone number

Address

Postcode

Email

The Scottish Government would like your permission to publish your consultation response. Please indicate your publishing preference:

- Publish response with name
- Publish response only (without name)
- Do not publish response

Information for organisations:

The option 'Publish response only (without name)' is available for individual respondents only. If this option is selected, the organisation name will still be published.

If you choose the option 'Do not publish response', your organisation name may still be listed as having responded to the consultation in, for example, the analysis report.

We will share your response internally with other Scottish Government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for Scottish Government to contact you again in relation to this consultation exercise?

- Yes
- No

CONSULTATION QUESTIONNAIRE

1. Do you agree with the proposal in Section 4 to update the river fish statistical assessment method?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

2. Do you agree with the proposal in Section 5 to update the river phyto­benthos assessment method?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

3. Do you agree with the proposal in Section 6 for a new loch fish (eDNA) assessment method?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

4. Do you agree with the proposal in Section 7 to update the loch morphology bank protection assessment method?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

5. Do you agree with the proposal in Section 8 to the introduction of spatial standards for fish barrier assessment?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

6. Do you agree with the proposal in Section 9.1 to update river flow standards to include artificially increased flows in high hydrological status waterbodies?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

7. Do you agree with the proposal in Section 9.2 to update river flow standards to allow for short term flow deviation?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

8. Do you agree with the proposal in Section 10 for a new nitrogen standards for lochs?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:

9. Do you agree with the proposal in Section 11 to update the invasive non-native species list?

- Yes
- No
- N/A

If you answered yes or no, please provide any further comments in the text box below:



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