SCHEDULE 1

PART 1

Criteria for identifying the types of river, lake or transitional water to which the environmental standards specified in Part 2 of this Schedule apply

1. Subject to paragraph 2, to determine the dissolved oxygen, ammonia and biochemical oxygen demand standards applicable to a river or any part thereof, the Department must assign to that river or part thereof the Type specified in Table 1 below which corresponds with the applicable site altitude and applicable alkalinity range specified in that Table.

2. Having assigned a Type in accordance with Table 1, the Department must assign the subsequent Type in accordance with column 1 of Table 2 below.

3. To determine the morphological conditions applicable to a river or part thereof, the Department must assign to that river or part thereof the Type specified in Table 3 below which corresponds with the applicable descriptions in that Table.

4. To determine the river flow standards applicable to a river or any part thereof, the Department must assign the Type specified in column 1 of Table 4 below which corresponds to the applicable descriptions specified in columns 2, 3 and 4 of that Table.

5. To determine the total phosphorus standards to apply to a lake or any part thereof, the Department must assign to that lake or part thereof the appropriate geological category, depth category and colour category specified in Tables 5, 6 and 7 below respectively.

6. To determine the lake level standards applicable to a lake or any part thereof, the Department must assign the Type specified in Columns 1 and 2 of Table 8.

7. To determine the morphological conditions applicable to a lake or any part thereof, the Department must assign the hydromorphological characteristics of the lake or part thereof as being of the type specified in column 1 of Table 9 below which corresponds to the applicable measurements specified in columns 3 and 4 of that Table.

Table 1

Criteria for identifying the types of river to which the dissolved oxygen, ammonia and biochemical oxygen demand standards for rivers apply

Site Altitude	*Alkalinity (as mg/l $CaCO_3$)*				
	Less than 10	10 to 50	50 to 100	100 to 200	Over 200
Under 80 metres	Type 1	Type 2	Type 3	Type 5	Type 7
Over 80 metres			Type 4	Type 6	

Table 2

Final typology for dissolved oxygen, ammonia and biochemical oxygen demand in rivers	
Column 1	Column 2
Upland and low alkalinity	Types (1+2), 4 and 6

Final typology for dissolved oxygen, ammonia and biochemical oxygen demand in rivers	
Lowland and high alkalinity	Types 3, 5 and 7

Table 3

Criteria for identifying types of river to which morphological conditions apply

Type	*Characteristics*			
Bedrock channel	Normally high altitude	Channel cuts down laterally	May have waterfalls and/or cascades	Bedrock substrate
Cascade Step Pool	Normally high altitude	Channel cuts down	Both turbulent and tranquil flows	Cobble and boulder substrate
Pool-riffle-glide	Normally medium altitude	Often not confined within a valley	Slightly meandering	Pebble and cobble substrate
Meandering	Normally low altitude	Flow laminar and would naturally interact with floodplain	Meandering	More fines than other substrates

Table 4

Criteria for identifying types of river to which the river flow standards apply

Column 1	Column 2	Column 3	Column 4	
Type	*Standard Average Annual Rainfall mm (period 1961-1990)*	*Base Flow Index (BFI)*	*Catchment area (km^2)*	
A1	< 810.5	< 0.715	Any	
		≥ 0.715	≥ 251.8	
A2	< 810.5	≥ 0.715	< 251.8	≤ 100 (A2 headwaters) > 100 (A2 downstream)
	≥ 810.5 and < 1413	≥ 0.7495	Any	≤ 100 (A2 headwaters) > 100 (A2 downstream)
B1	≥ 810.5 and < 1155	≥ 0.3615 and < 0.7495	< 267.4	
B2	≥ 810.5 and < 1413	≥ 0.3615 and < 0.7495	< 267.4	
C2	≥ 1155 and < 1413	≥ 0.3615 and < 0.7495	< 267.4	

Column 1	Column 2	Column 3	Column 4
Type	*Standard Average Annual Rainfall mm (period 1961-1990)*	*Base Flow Index (BFI)*	*Catchment area (km^2)*
	≥ 1413	≥ 0.3615	≥ 32.33
D2	≥ 1413	≥ 0.3615	< 32.33
	≥ 810.5	< 0.3615	Any

Table 5

Geological categories to which total phosphorus, phytoplankton and phytobenthos standards for lakes apply

Geological category	*Annual mean alkalinity (micro-equivalents per litre)*
Low alkalinity	< 200
Moderate alkalinity	200 – 1000
High alkalinity	> 1000
Marl	

Table 6

Depth categories to which total phosphorus standards for lakes apply

Depth category	*Mean depth (metres)*
Very shallow	< 3
Shallow	3 – 15
Deep	> 15

Table 7

Colour categories to which total phosphorus standards for lakes apply

Colour category	*Platinum (mg/l)*
Humic	> 30
Non humic	≤ 30

Table 8

Geological characteristics used to identify lake types to which lake level standards apply

Categories	
Column 1	Column 2
Peat	*Non-Peat*
mean water colour ≥90 hazen units; or	mean water colour <90 hazen units; or

Categories	
Column 1	Column 2
Peat	*Non-Peat*
≥75% of solid catchment area comprised of peat	<75% of solid catchment area comprised of peat

Table 9

Hydromorphological characteristics used to identify lake types to which morphological conditions apply

Column 1	Column 2	Column 3	Column 4
Type	*Lake-MImAS[1] code*	*Mean Depth*	*Alkalinity*
Low Alkalinity Very Shallow	P/L-vS	<4m	< 20 mgl^{-1} $CaCO_3$
Low Alkalinity Shallow/ Deep	P/L-ShD	>4m	< 20 mgl^{-1} $CaCO_3$
Moderate Alkalinity Very Shallow	MA-vS	<4m	20 – 100 mgl^{-1} $CaCO_3$
Moderate Alkalinity Shallow/Deep	MA-ShD	>4m	20 – 100 mgl^{-1} $CaCO_3$
High Alkalinity Very Shallow	HA/M-vS	<4m	> 100 mgl^{-1} $CaCO_3$
High Alkalinity Shallow/ Deep	HA/M-ShD	>4m	> 100 mgl^{-1} $CaCO_3$

(1) Morphological Impact Assessment System

PART 2

Environmental Standards

Environmental standards for river water quality

1. Once the Department has, in accordance with paragraphs 1 and 2 of Part I of this Schedule, assigned to a river or any part thereof a Type—

(a) specified in column 1 of Table 1 below, it must apply, as applicable, the "high", "good", "moderate", "poor" or "bad" dissolved oxygen standard specified in columns 2, 3, 4, 5 and 6 respectively of that Table to that river or part thereof;

(b) specified in column 1 of Table 2 below, it must apply, as applicable, the "high", "good", "moderate", "poor" or "bad" ammonia standard specified in columns 2, 3, 4, 5 and 6 respectively of that Table to that river or part thereof;

(c) specified in column 1 of Table 3 below, it must apply, as applicable, the "high", "good", "moderate", "poor" or "bad" biochemical oxygen demand standard specified in columns 2, 3, 4, 5 and 6 respectively of that Table to that river or part thereof.

2. The Department must apply the "high", "good", "moderate", "poor" or "bad" biochemical oxygen demand standard specified in Table 3 below only for the purpose of deciding action to meet the standard for dissolved oxygen.

3. The Department must apply, as applicable, the "high", "good", "moderate", "poor" or "bad" reactive phosphorus standard to that river or part thereof, calculated in accordance with the formula specified in sub paragraph (a)—

(a) RP standard = $10^{((1.0497 \times \log_{10}(A)+1.066) \times (\log_{10}(\text{reference condition RP})-\log_{10}(3,500)) + \log_{10}(3,500))}$;

(b) In relation to the above formula—

"RP standard" is the annual mean concentration of reactive phosphorus in ug/l estimated for the lower class boundary of high, good, moderate and poor ecological status, depending on the value of "A" used;

"A" has the value 0.702 when calculating the standard for high; 0.532 when calculating the standard for good; 0.356 when calculating the standard for moderate; and 0.166 when calculating the standard for poor;

"reference condition RP" = $10^{(0.454 (\log_{10}\text{alk}) - 0.0018 (\text{altitude}) + 0.476)}$ and represents the annual mean concentration of reactive phosphorus at near natural conditions. If the predicted value of reference condition RP is <7ug/l, reference condition RP is set to 7ug/l;

"$\log_{10}$alk" means $\log_{10}$(alkalinity), where alkalinity is the concentration of $CaCO_3$ in mg/l. For sites with an alkalinity greater than 250, alkalinity is set to 250. For sites with an alkalinity less than 2, it is set to 2;

"altitude" means the site's altitude above sea level in metres. For sites with an altitude greater than 355 metres, altitude is set to 355 metres.

4. The Department must apply, as applicable, the "high", "good" "moderate" or "poor" temperature standards specified in columns 2, 3, 4 and 5 respectively of Table 4 below.

5. The Department must apply, as applicable, the "high", "good", "moderate" or "poor" acid condition standards specified in columns 2, 3, 4 and 5 of Table 5 to any river or part thereof.

Environmental standards for river flows

6.—(1) Once the Department has, in accordance with paragraph 4 of Part 1 of this Schedule, assigned to a river or part thereof a Type specified in column 1 of Tables 6, 7, 8 or 9 below, it must apply, as applicable, the "high", "good", "moderate" or "poor" river flow standards as specified by the boundary values in those Tables to that river or part thereof.

(2) The Department may, when assessing the water balance results against the "high", "good", "moderate" and "poor" boundary values, take into account the spatial extent of the river flow standard based upon the contiguous length or percentage length of the river water body.

(3) The result of this classification shall be used only to determine "high" status in accordance with Part 1 of Schedule 2.

Environmental standards for lake water quality

7. The Department must apply, as applicable, the "high", "good", "moderate", "poor" or "bad" dissolved oxygen standard specified in Table 10 below to all lakes or parts of such lakes.

8. The Department must apply the "good" salinity standard specified in Table 11 below to all lakes or parts of such lakes.

9. Once the Department has, in accordance with paragraph 5 of Part 1 of this Schedule, assigned to a lake or part thereof a geological category, depth category and colour category specified in Tables 5, 6 and 7 in that Part, it must apply, as applicable, the "high", "good", "moderate", "poor" or "bad" total phosphorus standard to that lake or part thereof, calculated in accordance with the formulae specified in columns 1, 2, 3, 4 and 5 respectively of Table 12 below, where in relation to those formulae—

"R" represents the annual mean total phosphorus concentration expected for the lake in the absence of more than very minor phosphorus inputs to the lake resulting from human activities and, where a reliable estimate of 'C' is available, shall have the value given by the formula: $Antilog_{10}$ [1.36 – (0.09 x A) + (0.24 x B)] for non-humic lakes; and $Antilog_{10}$ [1.62 – (0.09) x A + (0.24 x B)] for humic lakes;

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

"B" = Log_{10} (C÷D);

"C" = the mean alkalinity of the lake in milli-equivalents per litre estimated for the lake;

"D" = the mean depth of the lake in metres;

"H" = 0.755 + (0.012 x C) – (0.001 x D); or 0.7, whichever is larger value; and

"G" = 0.506 + (0.023 x C) – (0.002 x D); or 0.46, whichever is the larger value.

10. If the Department does not have the necessary data to calculate the total phosphorus standard applicable to a lake or part thereof in accordance with paragraph 8, it must apply, as applicable to the lake or part thereof, the "high", "good", "moderate", "poor" or "bad" total phosphorus standard specified in column 2, 3, 4, 5 and 6 respectively, of Table 13 below which corresponds with the combination of geological category and depth categories specified in column 1 of that Table that is applicable to the lake or part thereof.

Environmental standards for protection of inland lake water levels

11. Once the Department has assigned the characteristics of a lake or part thereof, in accordance with paragraph 7 of Part I of this Schedule, it must apply, as applicable, to the lake or part thereof the "high", "good", "moderate" or "poor" lake standards specified in columns 1,2, 3 and 4 of Table 14.

Environmental standards for transitional and coastal water quality

12. The Department must apply, as applicable, the dissolved oxygen standards for "high", "good", "moderate", "poor" or "bad" specified in Table 15 and Table 16 below to transitional or coastal waters or parts thereof.

13. The Department must apply, as applicable, the dissolved inorganic nitrogen standards for "high", "good", "moderate", "poor" or "bad" specified in Table 17 below to transitional or coastal waters or parts thereof.

Environmental standards for specific pollutants

14. The Department must apply, as applicable, the standards for specific pollutants given in Tables 18 to 47 below to surface waters or parts thereof.
Environmental Standards for River Water Quality

Table 1

Standards for dissolved oxygen in rivers

Dissolved oxygen (percent saturation)					
(10-percentile)					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Type[(1)]	High	Good	Moderate	Poor	Bad
Upland and low alkalinity	80	75	64	50	< 50
Lowland and high alkalinity	70	60	54	45	< 45

(1) Where a lowland, high alkalinity river is a salmonid water the standards for the upland, low alkalinity type will apply.

Table 2

Standards for ammonia in rivers

Total ammonia[(1)] (mg/l)					
(90-percentile)					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Type	High	Good	Moderate	Poor	Bad
Upland and low alkalinity	0.2	0.3	0.75	1.1	> 1.1
Lowland and high alkalinity	0.3	0.6	1.1	2.5	> 2.5

(1) Note that Ammonia is a Specific Pollutant and considered as such for compliance. It is included in this section as it is commonly assessed alongside the other inorganic chemistry elements.

Table 3

Standards for Biochemical Oxygen Demand in rivers

Biochemical oxygen demand (mg/l)[(1)]					
(90-percentile)					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Type[(2)]	High	Good	Moderate	Poor	Bad
Upland and low alkalinity	3	4	6	7.5	> 7.5
Lowland and high alkalinity	4	5	6.5	9	> 9

(1) The standard for Biochemical Oxygen Demand shall be used when deciding action to meet the standard for dissolved oxygen.

(2) Where a lowland, high alkalinity river is a salmonid water the standards for the upland, low alkalinity type will apply.

Table 4

Standards for temperature in rivers

Temperature (◦C) as an annual 98th percentile standard				
Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*
Type	High	Good	Moderate	Poor
Salmonid waters	20	23	28	30
Cyprinid waters	25	28	30	32

Table 5

Standards for acid conditions in rivers. Either pH or Acid Neutralising Capacity (ANC) or both may be used

	Clear waters[1]		*Humic waters*[2]	
Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*
	Annual mean			
	pH	ANC[3]	pH	ANC[3]
High	6.60[4]	80	5.10[4]	80
Good	5.95	40	4.55	50
Moderate	5.44	15	4.22	10
Poor	4.89	-10	4.03	5

(1) Waters with a Dissolved Organic Carbon Value of 10mg/l or less

(2) Waters with a Dissolved Organic Carbon Value of greater than 10mg/l

(3) As assessed by the Cantrell method

(4) A 95% upper limit of 9 also applies

Table 6

High environmental standards for river flows

Permitted abstraction per day as a percentage of the natural mean daily flow(Q)[1]		
High		
Column 1	Column 2	Column 3
	Maximum permitted % abstraction at Q exceeding Q_{95}[2]	Maximum permitted % abstraction at Q **not** exceeding Q_{95}

(1) 'Q' is the mean daily flow for a specified period of time

(2) 'Qx' is the Q that is expected to be exceeded by 'x' percent for a specified period of time

Permitted abstraction per day as a percentage of the natural mean daily flow(Q)[1]		
A1, A2 (downstream), A2 (headwaters), B1, B2, C2, D2	10	5

(1) 'Q' is the mean daily flow for a specified period of time

(2) 'Qx' is the Q that is expected to be exceeded by 'x' percent for a specified period of time

Table 7

Good environmental standards for river flows

Permitted abstraction per day as a percentage of the natural mean daily flow(Q)				
Good				
Column 1	Column 2	Column 3	Column 4	Column 5
River type	Maximum % abstraction at Q exceeding Q_{60}	Maximum % abstraction at Q exceeding Q_{70}	Maximum % abstraction at Q exceeding Q_{95}	Maximum % abstraction at Q **not** exceeding Q_{95}
A1	35	30	25	20
A2 (downstream), B1, B2	30	25	20	15
A2 (headwaters), C2, D2	25	20	15	10

Table 8

Moderate environmental standards for river flows

Permitted abstraction per day as a percentage of the natural mean daily flow(Q)				
Moderate				
Column 1	Column 2	Column 3	Column 4	Column 5
River type	Maximum % abstraction at Q exceeding Q_{60}	Maximum % abstraction at Q exceeding Q_{70}	Maximum % abstraction at Q exceeding Q_{95}	Maximum % abstraction at Q **not** exceeding Q_{95}
A1	70	50-70[1]	50	45
A2 (downstream), B1, B2,	70	45-70[1]	45	40
A2 (headwaters), C2, D2	70	40-70[1]	40	35

(1) incremental increase in allowable take at flows $<Q_{60}$ to $\geq Q_{90}$

Table 9

Poor environmental standards for river flows

Permitted abstraction per day as a percentage of the natural mean daily flow(Q)				
Poor				
Column 1	Column 2	Column 3	Column 4	Column 5
River type	Maximum % abstraction at Q exceeding Q_{60}	Maximum % abstraction at Q exceeding Q_{90}	Maximum % abstraction at Q exceeding Q_{95}	Maximum % abstraction at Q **not** exceeding Q_{95}
A1	Q_x less 25% of Q_{90}	Q_x less 25% of Q_{90}	75	70
A2 (downstream), B1, B2,	Q_x less 30% of Q_{90}	Q_x less 30% of Q_{90}	70	65
A2 (headwaters), C2, D2	Q_x less 35% of Q_{90}	Q_x less 35% of Q_{90}	65	60

Environmental Standards for Lake Water Quality

Table 10

Standards for dissolved oxygen in lakes

Status	*Mean in July – August (mg/l)*	
	Salmonid waters	Cyprinid waters
High	9	8
Good	7	6
Moderate	4	4
Poor	1	1
Bad	< 1	< 1

Table 11

Salinity Standards for lakes with no natural saline influence

Status	*Proposed Boundary*
	Annual Mean (micro Siemens per centimetre)
Good	1000

Table 12

Total phosphorus standards for lakes

Annual mean concentration of total phosphorous (µg/l)				
Column 1	Column 2	Column 3	Column 4	Column 5
High	Good	Moderate	Poor	Bad
R ÷ H; or 5, whichever is the larger value	R ÷ G; or 8, whichever is the larger value	(R ÷ G) ÷ 0.5	(R ÷ G) ÷ 0.25	> (R ÷ G) ÷ 0.25

Table 13

Type-specific total phosphorus standards for lakes where the standards specified in Table 12 above do not apply

Annual mean concentration of total phosphorus (µg/l)					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Geological and depth category	High	Good	Moderate	Poor	Bad
High alkalinity; shallow	16	23	46	92	> 92
High alkalinity; very shallow	23	31	62	124	> 124
Moderate alkalinity; deep	8	12	24	48	> 48
Moderate alkalinity; shallow	11	16	32	64	> 64
Moderate alkalinity; very shallow	15	22	44	88	> 88
Low alkalinity; deep	5	8	16	32	> 32
Low alkalinity; shallow	7	10	20	40	> 40
Low alkalinity; very shallow	9	14	28	56	> 56
Marl; shallow	9	20	40	80	> 80
Marl; very shallow	10	24	48	96	> 96

Table 14

Environmental standards for lake water levels

Daily maximum % reduction in the habitable zone lake surface area for 99% of the days in any year			
Column 1	Column 2	Column 3	Column 4
High	Good	Moderate	Poor
1	5	10	20
The habitable zone lake surface is dependent on whether the lake is considered to have the geological sub-type “Peat” or “Non-Peat”. The habitable zone lake surface area means the proportion of the reference conditions[1] lake surface area from the shore to a depth 5 metres deeper than the depth to which light penetration to the lake bed would be sufficient to enable the growth of rooted plants (macrophytes) or bottom-living algae. In the absence of field data to the contrary, the depth to which light penetration to the lake bed is sufficient to enable the growth of rooted plants (macrophytes) or bottom-living algae may be taken to be 2 metres for lakes with the geological sub-type of “Peat” and 7 metres for “Non-Peat” lakes. The lake habitable zone extends 5m below the level of light penetration to account for impacts on the aphotic habitat.			

(1) The reference conditions lake surface area means the natural lake surface area in the absence of any abstractions, discharges or other man-made influences

Environmental Standards for Transitional and Coastal Water Quality

Table 15

Dissolved oxygen standards for transitional and coastal waters with salinities normalised to 35

	Dissolved oxygen concentrations (mg/l) as 5-percentile values
High	5.7
Good	4.0
Moderate	2.4
Poor	1.6
Bad	<1.6

Table 16

Dissolved oxygen standards for transitional and coastal waters with salinities <35

	Dissolved oxygen concentrations (mg/l) as 5-percentile values
High	≥5.7

	Dissolved oxygen concentrations (mg/l) as 5-percentile values
Good	≥4.0 and <5.7
Moderate	≥2.4 and <4.0
Poor	≥1.6 and <2.4
Bad	<1.6

Table 17

Dissolved inorganic nitrogen standards for coastal waters with salinities from 30-34.5 normalised to salinity of 32, and transitional waters with salinities < 30 normalised to a salinity of 25.

	Mean dissolved inorganic nitrogen concentration (micromoles per litre) during the period 1st December to 28th February
High	12
Good	18
Moderate	30
Poor	40.5
Bad	>40.5

Environmental Standards for Specific Pollutants

Table 18

Environmental standards for 2,4-Dichlorophenoxyacetic acid (2,4-D)

Good standards for rivers and freshwater lakes		*Good standards for transitional and coastal waters*	
Column 1	Column 2[(1)]	Column 3	Column 4[(1)]
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
0.3	1.3	0.3	1.3

(1) The standards for 2,4 D specified in Column 2 and Column 4 must not be used for the purpose of classifying the ecological status or potential of bodies of surface water.

Table 19

Environmental standards for 2,4-Dichlorophenol

Good standard for rivers and freshwater lakes		*Good standard 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)

Good standard for rivers and freshwater lakes		*Good standard for transitional and coastal waters*	
4.2	140	0.42	6

Table 20

Environmental standards for 3,4-Dichloroaniline

Good standard for rivers and freshwater lakes		*Good standard 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)
0.2	5.4	0.2	5.4

Table 21

Environmental standards for arsenic (dissolved)

Good standard for rivers and freshwater lakes	*Good standard for transitional and coastal waters*
Column 1[(1)]	Column 2[(1)]
Annual mean (µg/l)	Annual mean (µg/l)
50	25

(1) The standard for arsenic refers to the dissolved fraction of a water sample obtained by filtration through a 0.45µm filter or any equivalent pre-treatment

Table 22

Environmental standards for benzyl butyl phthalate

Good standard for rivers and freshwater lakes		*Good standard for transitional and coastal waters*	
Column 1	Column 2	Column 1	Column 2
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
7.5	51	0.75	10

Table 23

Environmental standards for carbendazim

Good standards for rivers and freshwater lakes	
Column 1	Column 2
Annual mean (µg/l)	95-percentile (µg/l)
0.15	0.7

Table 24

Environmental standards for chlorine

Good standards for rivers and freshwater lakes		*Good standard for transitional and coastal waters*
Column 1	Column 2[(1)]	Column 3[(1)]
Annual mean concentration (µg/l) of total available chlorine	95-percentile concentration (µg/l) of total available chlorine	95-percentile concentration (µg/l) of total residual oxidant[(2)]
2	5	10

(1) The standards for chlorine specified in Column 2 and 3 must not be used for the purpose of classifying the ecological status or potential of bodies of surface water.

(2) The term "total residual oxidants" refers to the sum of all oxidising agents existing in water, expressed as available chlorine.

Table 25

Environmental standards for chlorothalonil

Good standards for rivers and freshwater lakes	
Column 1	Column 2
Annual mean (µg/l)	95-percentile (µg/l)
0.035	1.2

Table 26

Environmental standards for chromium III

Good standards for rivers and freshwater lakes	
Column 1	Column 2[(1)]
Annual mean concentration (µg/l) of dissolved chromium III	95-percentile concentration (µg/l) of dissolved chromium III
4.7	32

(1) The standard for chromium III specified in column 2 must not be used for the purpose of classifying the ecological status or potential of bodies of surface water

Table 27

Environmental standards for chromium VI

Good standard for rivers and freshwater lakes	*Good standards for transitional and coastal waters*	
Column 1	Column 2	Column 3[(1)]

(1) The standard for chromium VI specified in column 3 must not be used for the purpose of classifying the ecological status or potential of bodies of surface water.

Good standard for rivers and freshwater lakes	*Good standards for transitional and coastal waters*	
Annual mean concentration (µg/l) of dissolved chromium VI	Annual mean concentration (µg/l) of dissolved chromium VI	95-percentile concentration (µg/l) of dissolved chromium VI
3.4	0.6	32

(1) The standard for chromium VI specified in column 3 must not be used for the purpose of classifying the ecological status or potential of bodies of surface water.

Table 28

Environmental standards for copper

Good standards for rivers and freshwater lakes	*Good standards for transitional and coastal waters*[(2)]
Column 2	Column 3
Annual mean concentration (µg/l) of dissolved copper	Annual mean concentration (µg/l) of dissolved copper
1(bioavailable)[(1)]	3.76 µg/l dissolved, where DOC[(3)] ≤ 1 mg/l
	3.76 +(2.677 × ((DOC/2) - 0.5)) µg/ l dissolved, where DOC > 1 mg/l

(1) bioavailable means the fraction of the dissolved concentration of copper likely to result in toxic effects as determined using the Metal Bioavailability Assessment Tool (also referred to as a PNEC Estimator) for copper.

(2) The recommended salt water standard applies to the fraction of a water sample that passes through a 0.45-µm filter or that is obtained by any equivalent pre-treatment.

(3) "DOC" means the annual mean concentration of dissolved organic carbon in mg/l.

Table 29

Environmental standards for cyanide

Good standards for rivers and freshwater lakes		*Good standards for transitional and coastal waters*	
Column 1	Column 2[(1)]	Column 3	Column 4[(1)]
Annual mean concentration (µg/l) of 'free' cyanide (HCN and CN)	95-percentile concentration (µg/l) of 'free'cyanide (HCN and CN)	Annual mean concentration (µg/l) of hydrogen cyanide	95-percentile concentration (µg/l) of hydrogen cyanide
1	5	1	5

(1) The standards for cyanide specified in column 2 and column 4 must not be used for the purpose of classifying the ecological status or potential of bodies of surface water.

Table 30

Environmental standards for cypermethrin

Good standards for rivers and freshwater lakes[(1)(2)]		*Good standards for transitional and coastal waters*[(1)(2)]	
Column 1	Column 2	Column 3	Column 4
Annual mean (µg/l)	95-percentile (µg/l)	Annual mean (µg/l)	95-percentile (µg/l)
0.1	0.4	0.1	0.41

(1) Cypermethrin ceases to be a specific pollutant from 22 December 2018, when it shall be listed as a priority substance.

(2) The standards for cypermethrin specified in column 2 and column 4 must not be used for the purposes of classifying the ecological status or potential of bodies of surface water.

Table 31

Environmental standards for diazinon

Good standards for rivers and freshwater lakes		*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)
0.01	0.02	0.01	0.26

Table 32

Environmental standards for dimethoate

Good standards for rivers and freshwater lakes		*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)
0.48	4.0	0.48	4.0

Table 33

Environmental standards for glyhosate

Good standards for rivers and freshwater lakes		*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)
196	398	196	398

Table 34

Environmental standards for iron

Good standard for rivers and freshwater lakes	*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 35

Environmental standards for linuron

Good standards for rivers and freshwater lakes		*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

Table 36

Environmental standards for manganese

Good standard for rivers and freshwater lakes
Annual mean (µg/l) bioavailable
123[(1)]

(1) bioavailable means the fraction of the dissolved concentration of manganese likely to result in toxic effects as determined in accordance with the Metal Bioavailability Assessment Tool for manganese.

Table 37

Environmental standards for mecoprop

Good standards for rivers and freshwater lakes		*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

Table 38

Environmental standards for methiocarb

Good standards for rivers and freshwater lakes	
Column 1	Column 2
Annual mean (µg/l)	95-percentile (µg/l)
0.01	0.77

Table 39

Environmental standards for pendimethalin

Good standards for rivers and freshwater lakes	
Column 1	Column 2
Annual mean (µg/l)	95-percentile (µg/l)
0.3	0.58

Table 40

Environmental standards for permethrin

Good standard for rivers and freshwater lakes		*Good standard 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)
0.001	0.01	0.0002	0.001

Table 41

Environmental standards for phenol

Good standards for rivers and freshwater lakes		*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

Table 42

Environmental standards for tetrachloroethane (TCE)

Good standards for rivers and freshwater lakes	
Column 1	Column 2

Good standards for rivers and freshwater lakes	
Annual mean (µg/l)	95-percentile (µg/l)
140	1848

Table 43

Environmental standards for toluene

Good standards for rivers and freshwater lakes		*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)
74	380	74	370

Table 44

Environmental standards for triclosan

Good standard for rivers and freshwater lakes		*Good standard 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)
0.1	0.28	0.1	0.28

Table 45

Environmental standards for un-ionised ammonia as nitrogen

Good standard for rivers and freshwater lakes	*Good standard for transitional and coastal waters*
Annual mean (µg/l)	Annual mean (µg/l)
Not applicable	21

Table 46

Environmental standards for zinc

Good standards for rivers and freshwater lakes	*Good standards for transitional and coastal waters*
Column 1	Column 2
Annual mean	Annual mean

(1) bioavailable means the fraction of the dissolved concentration of zinc likely to result in toxic effects as determined using the Metal Bioavailability Assessment Tool (also referred to as a PNEC Estimator) for zinc.

(2) Ambient Background Concentration is an estimate of background levels of zinc based on a low percentile of monitoring data. A figure of 1 µg/l has been estimated for freshwaters in Northern Ireland.

Good standards for rivers and freshwater lakes	*Good standards for transitional and coastal waters*
10.9 bioavailable[(1)] plus Ambient Background Concentration[(2)] (µg/l) dissolved	6.8 dissolved plus Ambient Background Concentration (µg/l)

(1) bioavailable means the fraction of the dissolved concentration of zinc likely to result in toxic effects as determined using the Metal Bioavailability Assessment Tool (also referred to as a PNEC Estimator) for zinc.

(2) Ambient Background Concentration is an estimate of background levels of zinc based on a low percentile of monitoring data. A figure of 1 µg/l has been estimated for freshwaters in Northern Ireland.

Environmental Standards for Priority Substances and other Substances

Table 47

Environmental quality standards for priority substances and other substances for which standards have been set at EU-level

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*	*Column 6*	*Column 7*	*Column 8*	*Column 9*
Number	*Name of substance*	*Chemical Abstracts Service number*	*Date from which standards apply*	*All rivers and lakes*		*All transitional and coastal waters*		*EQS Biota[(11)]*
				Good		Good		
				AA-EQS (µg/l)[(1)] Inland surface waters[(2)]	*MAC-EQS (µg/l)[(3)] Inland surface waters[(2)]*	*AA-EQS (µg/l)[(1)]*	*MAC-EQS (µg/l)[(3)]*	
1	Alachlor	15972-60-8		0.3	0.7	0.3	0.7	
2	Anthracene	120-12-7	14/09/15-21/12/15	0.1	0.4	0.1	0.4	
			22/12/15 onwards	0.1	0.1	0.1	0.1	
3	Atrazine	1912-24-9		0.6	2.0	0.6	2.0	
4	Benzene	71-43-2		10	50	8	50	
5	Brominated diphenylethers[(4)]	32534-81-9	14/09/15-21/12/15	0.0005	not applicable	0.0002	not applicable	
			22/12/15 onwards	not applicable	0.14	not applicable	0.014	0.0085
6	Cadmium and its compounds (depending on water hardness classes)[(5)]	7440-43-9		≤ 0.08 (class 1)	≤ 0.45 (class 1)	0.2	≤ 0.45 (class 1)	
				0.08	0.45		0.45	

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*	*Column 6*	*Column 7*	*Column 8*	*Column 9*
Number	*Name of substance*	*Chemical Abstracts Service number*	*Date from which standards apply*	*All rivers and lakes*		*All transitional and coastal waters*		*EQS Biota*[11]
				Good		Good		
				AA-EQS (µg/l)[1] *Inland surface waters*[2]	*MAC-EQS (µg/l)*[3] *Inland surface waters*[2]	*AA-EQS (µg/l)*[1]	*MAC-EQS (µg/l)*[3]	
				(class 2)	(class 2)		(class 2)	
				0.09 (class 3)	0.6 (class 3)		0.6 (class 3)	
				0.15 (class 4)	0.9 (class 4)		0.9 (class 4)	
				0.25 (class 5)	1.5 (class 5)		1.5 (class 5)	
6a	Carbon-tetrachloride[6]	56-23-5		12	not applicable	12	not applicable	
7	C10-13 Chloroalkanes[7]	85535-84-8		0.4	1.4	0.4	1.4	
8	Chlorfenvinphos	470-90-6		0.1	0.3	0.1	0.3	
9	Chlorpyrifos (Chlorpyrifos-ethyl)	2921-88-2		0.03	0.1	0.03	0.1	
9a	Cyclodiene pesticides:			Σ=0.01	not applicable	Σ=0.005	not applicable	
	Aldrin[6]	309-00-2						
	Dieldrin[6]	60-57-1						
	Endrin[6]	72-20-8						
	Isodrin[6]	465-73-6						
9b	DDT total[6][8]	not applicable		0.025	not applicable	0.025	not applicable	
	Para-para-DDT[6]	50-29-3		0.01	not applicable	0.01	not applicable	
10	1,2-Dichloroethane	107-06-2		10	not applicable	10	not applicable	

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*	*Column 6*	*Column 7*	*Column 8*	*Column 9*
Number	*Name of substance*	*Chemical Abstracts Service number*	*Date from which standards apply*	*All rivers and lakes*		*All transitional and coastal waters*		*EQS Biota*[11]
				Good		Good		
				AA-EQS (µg/l)[1] *Inland surface waters*[2]	*MAC-EQS (µg/l)*[3] *Inland surface waters*[2]	*AA-EQS (µg/l)*[1]	*MAC-EQS (µg/l)*[3]	
11	Dichloro-methane	75-09-2		20	not applicable	20	not applicable	
12	Di(2-ethylhexyl)-phthalate (DEHP)	117-81-7		1.3	not applicable	1.3	not applicable	
13	Diuron	330-54-1		0.2	1.8	0.2	1.8	
14	Endosulfan	115-29-7		0.005	0.01	0.0005	0.004	
15	Fluoranthene	206-44-0	14/09/15-21/12/15	0.1	1	0.1	1	
			22/12/15 onwards	0.0063	0.12	0.0063	0.12	30
16	Hexachlorobenzene	118-74-1			0.05		0.05	10
17	Hexachlorobutadiene	87-68-3			0.6		0.6	55
18	Hexachloro-cyclohexane	608-73-1		0.02	0.04	0.002	0.02	
19	Isoproturon	34123-59-6		0.3	1.0	0.3	1.0	
20	Lead and its compounds	7439-92-1	14/09/15-21/12/15	7.2	not applicable	7.2	not applicable	
			22/12/15 onwards	1.2[12]	14	1.3	14	
21	Mercury and its compounds	7439-97-6			0.07		0.07	20
22	Naphthalene	91-20-3	14/09/15-21/12/15	2.4	not applicable	1.2	not applicable	
			22/12/15 onwards	2	130	2	130	
23	Nickel and its compounds	7440-02-0	14/09/15-21/12/15	20	not applicable	20	not applicable	
			22/12/15 onwards	4[12]	34	8.6	34	

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*	*Column 6*	*Column 7*	*Column 8*	*Column 9*
Number	*Name of substance*	*Chemical Abstracts Service number*	*Date from which standards apply*	*All rivers and lakes*		*All transitional and coastal waters*		*EQS Biota*[11]
				Good		Good		
				AA-EQS (µg/l)[1] *Inland surface waters*[2]	*MAC-EQS (µg/l)*[3] *Inland surface waters*[2]	*AA-EQS (µg/l)*[1]	*MAC-EQS (µg/l)*[3]	
24	Nonylphenol (4-Nonylphenol)	104-40-5		0.3	2.0	0.3	2.0	
25	Octylphenol ((4-(1,1',3,3'-tetramethylbutyl)-phenol))	140-66-9		0.1	not applicable	0.01	not applicable	
26	Pentachlorobenzene	608-93-5		0.007	not applicable	0.0007	not applicable	
27	Pentachlorophenol	87-86-5		0.4	1	0.4	1	
28	Polyaromatic hydrocarbons (PAH)[10]			not applicable	not applicable	not applicable	not applicable	
	Benzo(a)pyrene	50-32-8	14/09/15-21/12/15	0.05	0.1	0.05	0.1	
			22/12/15 onwards	1.7×10^{-4}	0.27	1.7×10^{-4}	0.027	5
	Benzo(b)fluoranthene	205-99-2	14/09/15-21/12/15	Σ=0.03	not applicable	Σ=0.03	not applicable	
			22/12/15 onwards	see footnote 10	0.017	see footnote 10	0.017	see footnote 10
	Benzo(k)fluoranthene	207-08-9	14/09/15-21/12/15	Σ=0.03	not applicable	Σ=0.03	not applicable	
			22/12/15 onwards	see footnote 10	0.017	see footnote 10	0.017	see footnote 10
	Benzo(g,h,i)-perylene	191-24-2	14/09/15-21/12/15	Σ=0.02	not applicable	Σ=0.02	not applicable	
			22/12/15 onwards	see footnote 10	8.2×10^{-3}	see footnote 10	8.2×10^{-4}	see footnote 10

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*	*Column 6*	*Column 7*	*Column 8*	*Column 9*
Number	*Name of substance*	*Chemical Abstracts Service number*	*Date from which standards apply*	*All rivers and lakes*		*All transitional and coastal waters*		*EQS Biota*[11]
				Good		Good		
				AA-EQS (µg/l)[1] *Inland surface waters*[2]	*MAC-EQS (µg/l)*[3] *Inland surface waters*[2]	*AA-EQS (µg/l)*[1]	*MAC-EQS (µg/l)*[3]	
	Indeno(1,2,3-cd)-pyrene	193-39-5	14/09/15-21/12/15	Σ=0.002	not applicable	Σ=0.02	not applicable	
			22/12/15 onwards	see footnote 10	not applicable	see footnote 10	not applicable	see footnote 10
29	Simazine	122-34-9		1	4	1	4	
29a	Tetrachloroethylene	127-18-4		10	not applicable	10	not applicable	
29b	Trichloroethylene	79-01-6		10	not applicable	10	not applicable	
30	Tributyltin compounds (Tributhyltin-cation)	36643-28-4		0.0002	0.0015	0.0002	0.0015	
31	Trichlorobenzenes	12002-48-1		0.4	not applicable	0.4	not applicable	
32	Trichloromethane	67-66-3		2.5	not applicable	2.5	not applicable	
33	Trifluralin	1582-09-8		0.03	not applicable	0.03	not applicable	
34	Dicofol	115-32-2	22/12/18 onwards	1.3×10^{-3}	not applicable[9]	3.2×10^{-5}	not applicable[9]	33
35	Perfluorooctane sulfonic acid and its derivatives (PFOS)	1763-23-1	22/12/18 onwards	6.5×10^{-4}	36	1.3×10^{-4}	7.2	9.1
36	Quinoxyfen	124495-18-7	22/12/18 onwards	0.15	2.7	0.015	0.54	
37	Dioxins and dioxin-like compounds	See footnote 9 in Annex X to	22/12/18 onwards		not applicable		not applicable	Sum of PCDD +PCDF +PCB-DL

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*	*Column 6*	*Column 7*	*Column 8*	*Column 9*
Number	*Name of substance*	*Chemical Abstracts Service number*	*Date from which standards apply*	*All rivers and lakes*		*All transitional and coastal waters*		*EQS Biota*[11]
				Good		Good		
				AA-EQS (µg/l)[1] *Inland surface waters*[2]	*MAC-EQS (µg/l)*[3] *Inland surface waters*[2]	*AA-EQS (µg/l)*[1]	*MAC-EQS (µg/l)*[3]	
		Directive 2000/60/EC						0.0065 µg.kg^{-1} TEQ [13]
38	Aclonifen	74070-46-5	22/12/18 onwards	0.12	0.12	0.012	0.012	
39	Bifenox	42576-02-3	22/12/18 onwards	0.012	0.04	0.0012	0.004	
40	Cybutryne	28159-98-0	22/12/18 onwards	0.0025	0.016	0.0025	0.016	
41	Cypermethrin	52315-07-8	22/12/18 onwards	8 x 10^{-5}	6 x 10^{-4}	8 x 10^{-6}	6 x 10^{-5}	
42	Dichlorvos	62-73-7	22/12/18 onwards	6 x 10^{-4}	7 x 10^{-4}	6 x 10^{-5}	7 x 10^{-5}	
43	Hexabromo-cyclododecane (HBCDD)	See footnote 11 in Annex X to Directive 2000/60/EC	22/12/18 onwards	0.0016	0.5	0.0008	0.05	167
44	Heptachlor and heptachlor epoxide	76-44-8 / 1024-57-3	22/12/18 onwards	2 x 10^{-7}	3 x 10^{-4}	1 x 10^{-8}	3 x 10^{-5}	6.7 x 10^{-3}
45	Terbutryn	886-50-0	22/12/18 onwards	0.065	0.34	0.0065	0.034	

(1) This parameter is the EQS expressed as an annual average value (AA-EQS). Unless otherwise specified, it applies to the total concentration of all isomers.

(2) Inland surface waters encompass rivers and lakes and related artificial or heavily modified water bodies.

(3) This parameter is the Environmental Quality Standard expressed as a maximum allowable concentration (MAC-EQS). 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.

(4) For the group of priority substances covered by brominated diphenylethers (No 5), the EQS refers to the sum of the concentrations of congener numbers 28, 47, 99, 100, 153 and 154.

(5) 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: <40mg $CaCO_3$/l, class 2: 40 to <50mg $CaCO_3$/l, class 3: 50 to <100mg $CaCO_3$/l, class 4: 100 to <200mg $CaCO_3$/l and class 5: ≥200mg $CaCO_3$/l).

(6) 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 13 January 2009.

(7) No indicative parameter is provided for this group of substances. The indicative parameter(s) must be defined through the analytical method.

(8) 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).

(9) There is insufficient information available to set a MAC-EQS for these substances.

(10) For the group of priority substances of polyaromatic hydrocarbons (PAH) (No 28), the biota EQS and corresponding AA-EQS in water refer to the concentration of benzo(a)pyrene, on the toxicity of which they are based. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene needs to be monitored for comparison with the biota EQS or the corresponding AA-EQS in water.

(11) Unless otherwise indicated, the biota EQS relate to fish. An alternative biota taxon, or another matrix, may be monitored instead, as long as the EQS applied provides an equivalent level of protection. For substances numbered 15 (Fluoranthene) and 28 (PAHs), the biota EQS refers to crustaceans and molluscs. For the purpose of assessing chemical status, monitoring of Fluoranthene and PAHs in fish is not appropriate. For substance number 37 (Dioxins and dioxin-like compounds), the biota EQS relates to fish, crustaceans and molluscs, in line with section 5.3 of the Annex to Commission Regulation (EU) No 1259/2011 of 2 December 2011 amending Regulation (EC) No 1881/2006 as regards maximum levels for dioxins, dioxin-like PCBs and non-dioxin-like PCBs in foodstuffs (OJ L 320, 3.12.2011, P.18).

(12) These EQS refer to bioavailable concentrations of the substances.

(13) PCDD: polychlorinated dibenzo-p-dioxins; PCDF: polychlorinated dibenzofurans; PCB-DL: dioxin-like polychlorinated biphenyls; TEQ: toxic equivalents according to the World Health Organisation 2005 Toxic Equivalence Factors.

Application of the standards set out in Table 47

For any given surface water body, applying the AA-EQS means that, for each representative monitoring point within the water body, the arithmetic mean of the concentrations measured at different times during the year does not exceed the standard.

The calculation of the arithmetic mean, the analytical method used and, where there is no appropriate analytical method meeting the minimum performance criteria, the method of applying a standard must be in accordance with implementing acts adopting technical specifications for chemical monitoring and quality of analytical results, in accordance with the Water Framework Directive.

For any given surface water body, applying the MAC-EQS means that the measured concentration at any representative monitoring point within the water body does not exceed the standard.

However, in accordance with section 1.3.4. of Annex V to the Water Framework Directive, the Department may introduce statistical methods, such as a percentile calculation, to ensure an acceptable level of confidence and precision for determining compliance with the MAC-EQS. Where the Department introduces statistical methods, such methods must apply with rules laid down in accordance with the examination procedure referred to in Article 9(2) of Directive 2008/105/EC.

With the exception of cadmium, lead, mercury and nickel (hereinafter “metals”) the standards set out in Table 47 are expressed as total concentrations in the whole water sample. In the case of metals the standards refer to the dissolved concentration i.e. the dissolved phase of a water sample obtained by filtration through a 0.45 µm filter or any equivalent pre-treatment, or, where specifically indicated, to the bioavailable concentration.

The Department may, when assessing the monitoring results against the standards, take into account:

natural background concentrations for metals and their compounds, if they prevent compliance with the standard; and

hardness, pH, dissolved organic carbon or other water quality parameters that affect the bioavailability of metals, the bioavailable concentrations being determined using appropriate bioavailability modelling.

PART 3

Boundary values for biological quality elements

Boundary values for aquatic plants and animals in rivers

1. The Department must apply, as applicable, to any river or part thereof, the "high", "good", "moderate", "poor" or "bad" benthic invertebrate fauna boundary value for rivers specified in Tables 1 and 2 below.

2. The Department must apply, as applicable, to any river or part thereof, the "high", "good", "moderate", "poor" or "bad" phytobenthos boundary value for rivers specified in Table 3 below.

3. The Department must apply, as applicable, to any river or part thereof, the "high", "good", "moderate", "poor" or "bad" aquatic macrophyte boundary value for rivers specified in Table 4 below.

4. The Department must apply, as applicable, to any river or part thereof, the "high", "good", "poor" or "bad" freshwater fish boundary value for rivers specified in Table 5 below.

Boundary values for aquatic plants and animals in lakes

5. To determine the phytoplankton and phytobenthos boundaries to apply to a lake or any part thereof, the Department must assign to that lake or any part thereof, the appropriate geological category, depth category and colour category specified in Schedule 1 Part 1, Tables 5, 6 and 7 respectively.

6. The Department must apply, as applicable, to any lake or part thereof, the "high", "good", "moderate", "poor" or "bad" phytoplankton boundary values for lakes specified in columns 2, 3, 4, 5 and 6 of Table 6 below and columns 2, 3, 4, 5 and 6 of Table 7 below and columns 2 and 3 of Table 8 below respectively.

7. The Department must apply, as applicable, to any lake or part thereof, the "high", "good", "moderate", "poor" or "bad" phytobenthos boundary value for lakes specified in Table 9 below.

8. The Department must apply, as applicable, to any lake or part thereof, the "high", "good", "moderate", "poor" or "bad" aquatic macrophyte boundary value for lakes specified in Table 10 below.

9. The Department must apply, as applicable, to any lake or part thereof, the "high", "good", "moderate", "poor" or "bad" freshwater fish boundary value for lakes specified in Table 11 below.

Boundary values for aquatic plants and animals in transitional and coastal waters

10. The Department must apply, as applicable, to any transitional water, coastal water or part thereof, the "high", "good", "moderate", "poor" or "bad" benthic invertebrate fauna boundary values for transitional and coastal waters specified in Tables 12 and 13 below.

11. The Department must apply, as applicable, to any transitional water, coastal water or part thereof, the "high", "good", "moderate", "poor" or "bad" aquatic angiosperm boundary value for transitional and coastal waters specified in Table 14 below.

12. The Department must apply, as applicable, to any transitional water, coastal water or part thereof, the "high", "good", "moderate", "poor" or "bad" phytoplankton boundary value for transitional and coastal waters specified in Table 15 below.

13. The Department must apply, as applicable, to any transitional water, coastal water or part thereof, the "high", "good", "moderate", "poor" or "bad" aquatic macroalgae boundary values for transitional and coastal waters specified in Tables 16 and 17 below.

14. The Department must apply, as applicable, to any transitional water or part thereof, the "high", "good", "moderate", "poor" or "bad" fish boundary value for transitional waters specified in Table 18 below.

Table 1

Benthic invertebrate fauna Walley Hawkes Paisley Trigg (WHPT) boundary values (WHPT Average Score per Taxon) for rivers

Boundary values 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	
	Ecological quality ratio
High	0.97
Good	0.86
Moderate	0.72
Poor	0.59
Bad	< 0.59

Table 2

Benthic invertebrate fauna Walley Hawkes Paisley Trigg (WHPT) boundary values (WHPT Number of TAXA) for rivers

Boundary values 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	
	Ecological quality ratio
High	0.80
Good	0.68
Moderate	0.56
Poor	0.47
Bad	< 0.47

Table 3

Phytobenthos (Diatom) boundary values for rivers

Boundary values 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

Boundary values 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	
High	0.80
Good	0.60
Moderate	0.40
Poor	0.20
Bad	< 0.20

Table 4

Macrophyte boundary values for rivers

Boundary values 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	
	Ecological quality ratio
High	0.80
Good	0.60
Moderate	0.40
Poor	0.20
Bad	< 0.20

Table 5

Freshwater Fish FCS2 (Ireland) boundary values for rivers

	Ecological quality ratio[(1)]
High	0.845 < EQR<= 1.0
Good	0.54 < EQR <= 0.854
Moderate	0.12 < EQR <= 0.54
Poor	0.007 < EQR <= 0.12
Bad	0 <= EQR <= 0.007

(1) FCS2 (Ireland) is the Fisheries Classification Scheme 2 (Ireland) model developed for WFD Ecoregion 17 which is the island of Ireland

Table 6

Phytoplankton boundary values for lakes – chlorophyll a

Boundary values 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
Lake Type	High alkalinity, shallow Marl shallow	High alkalinity, very shallow Moderate alkalinity, very shallow Low alkalinity, very shallow Marl very shallow	Moderate alkalinity, deep Moderate alkalinity, shallow Moderate alkalinity shallow humic	Low alkalinity, shallow Low alkalinity, shallow humic	Low alkalinity deep
High	0.55	0.63	0.50	0.64	0.64
Good	0.32	0.30	0.33	0.29	0.33
Moderate	0.16	0.15	0.17	0.15	0.17
Poor	0.05	0.05	0.05	0.05	0.05
Bad	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Table 7

Phytoplankton boundary values for lakes – plankton trophic index

Ecological quality ratio					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Lake Type	High alkalinity, shallow Moderate alkalinity very shallow Low alkalinity very shallow humic Marl very shallow	High alkalinity very shallow	Moderate alkalinity, deep Moderate alkalinity shallow Low alkalinity, shallow humic Low alkalinity very shallow Clear	Low alkalinity Deep Clear Water Low alkalinity shallow Clear Water	Low alkalinity shallow humic

Ecological quality ratio					
			Marl Shallow		
High	0.93	0.91	0.95	0.98	0.96
Good	0.82	0.80	0.84	0.87	0.85
Moderate	0.70	0.68	0.72	0.75	0.73
Poor	0.58	0.56	0.60	0.63	0.61
Bad	<0.58	<0.56	<0.60	<0.63	<0.61

Table 8

Phytoplankton boundary values for lakes – cyanobacteria biomass

Ecological quality ratio		
Column 1	Column 2	Column 3
Lake Type	All Low and Moderate alkalinity and Marl Lakes	High alkalinity Lakes
High	0.47	0.63
Good	0.32	0.43
Moderate	0.23	0.34
Poor	0.13	0.21
Bad	< 0.13	< 0.21

Table 9

Phytobenthos boundary values for lakes

Boundary values 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
	High and Low alkalinity lakes	Moderate alkalinity lakes
High	0.92	0.93
Good	0.70	0.66
Moderate	0.46	0.46
Poor	0.23	0.23
Bad	< 0.23	< 0.23

Table 10

Aquatic macrophyte boundary values for lakes

Boundary values for the degree to which the annual mean abundance of disturbance-sensitive macrophyte[1] taxa differ from the annual mean abundance of those taxa expected under reference conditions	
	Ecological quality ratio
Column 1	Column 2
High	0.90
Good	0.68
Moderate	0.42
Poor	0.33
Bad	< 0.33

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

Table 11

Freshwater Fish FiL2 boundary values for lakes

	Ecological quality ratio[1]
High	0.76 < EQR<= 1.0
Good	0.53 < EQR <= 0.76
Moderate	0.32 < EQR <= 0.53
Poor/Bad	0 <= EQR <= 0.32

(1) FiL2 is the Fish in Lakes version 2 model developed for WFD Ecoregion 17 which is the island of Ireland

Table 12

Benthic invertebrate fauna boundary values for IMPOSEX in coastal waters

Boundary values for the degree to which the annual mean occurrence and degree of tributyl tin (TBT) -induced imposex in the common dog whelk, Nucella lapillus, differs from the annual mean occurrence and degree of imposex expected under reference conditions using the Vas Deferens Stage Index (VDSI) (UKTAG Method ISBN 978-1-906934-35-4)		
	Ecological quality ratio	Vas Deferens Stage Index (VDSI)
High	0.95	0.3
Good	0.33	4
Moderate	0.17	5

Table 13

Benthic invertebrate fauna boundary values for the INFAUNAL Quality Index (IQI) for transitional and coastal waters

Boundary values 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 that expected under reference conditions (UKTAG Method ISBN 978-1-906934-34-7)	
	Ecological quality ratio
High	0.75
Good	0.64
Moderate	0.44
Poor	0.24
Bad	< 0.24

Table 14

Aquatic angiosperm boundary values in transitional and coastal waters

Aquatic Angiosperm(1) Boundary values relating to the degree to which the annual mean shoot density, and spatial extent of sea grass beds, differ that expected under reference conditions (UKTAG Method ISBN 978-1-906934-36-1)	
	Ecological quality ratio
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2
Bad	< 0.2

(1) The term "angiosperm" refers to flowering plants. In transitional waters and coastal waters, angiosperms include sea grasses and the flowering plants found in salt marshes, salt marsh tools have not yet been developed.

Table 15

Phytoplankton boundary values for transitional and coastal waters

Boundary values relating to the degree to which biomass, taxonomic composition, bloom frequency and bloom intensity for phytoplankton(1) differ from that expected under reference conditions (UKTAG Method ISBN 978-1-906934-41-5 for Transitional waters and UKTAG method ISBN 978-1-906934-33-0 for Coastal Waters)	
	Ecological quality ratio
High	0.8

(1) 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.

Boundary values relating to the degree to which biomass, taxonomic composition, bloom frequency and bloom intensity for phytoplankton[(1)] differ from that expected under reference conditions (UKTAG Method ISBN 978-1-906934-41-5 for Transitional waters and UKTAG method ISBN 978-1-906934-33-0 for Coastal Waters)	
Good	0.6
Moderate	0.4
Poor	0.2
Bad	< 0.2

(1) 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 16

Aquatic macroalgae boundary values in transitional and coastal waters

Boundary values relating to the degree to which mean species richness, proportion of red, green and opportunist seaweeds and ecological status group ratio on rocky intertidal areas differ from that expected under reference conditions (UKTAG Method ISBN 978-1-906934-39-2)	
	Ecological quality ratio
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2
Bad	< 0.2

Table 17

Aquatic macroalgae boundary values in transitional and coastal waters

Boundary values relating to the degree to which opportunistic macroalgal[(1)] extent, biomass and entrainment differ from that expected under reference conditions (UKTAG Method ISBN978-1-906934-37-8)	
	Ecological quality ratio
High	0.8
Good	0.6
Moderate	0.4
Poor	0.2
Bad	< 0.2

(1) The term "macroalgae" refers to multicellular algae such as seaweeds and filamentous algae.

Table 18

Fish boundary values for transitional waters

Boundary values relating to the degree to which transitional water fish communities deviate from expectations in terms of species diversity and composition, species abundance, estuarine utilisation, and trophic composition using the Estuarine Multi-metric Fish Index (EMFI)	
	Ecological quality ratio
High	≥ 0.92
Good	0.65
Moderate	0.35
Poor	0.10
Bad	< 0.10

PART 4

Intermittent Discharge Standards

Table 1

Intermittent standards for dissolved oxygen in rivers

Salmonid waters			
	Dissolved oxygen concentration (mg/l)		
Return period	1 hour	6 hours	24 hours
1 month	5.0	5.5	6.0
3 months	4.5	5.0	5.5
1 year	4.0	4.5	5.0
Cyprinid waters			
	Dissolved oxygen concentration (mg/l)		
Return period	1 hour	6 hours	24 hours
1 month	4.0	5.0	5.5
3 months	3.5	4.5	5.0
1 year	3.0	4.0	4.5
The standards apply when the concurrent concentration of un-ionised ammonia concentration is below 0.02 mg/l. The following correction factors apply at higher concurrent un-ionised concentrations: Where the un-ionised ammonia lies between 0.02-0.15mg NH3-N/I: the correction factor is an additioin of (0.97 x log (mg NH3-N/I) + 3.8) mg O2/l. For concentrations that exceed 0.15 mg NH3-N/I, the correction factor is +2 mg O2/litre.			

Salmonid waters
A correction factor of 3mg O2/l is added for salmonid spawning grounds.

Table 2

Intermittent standards for un-ionised ammonia in rivers

Salmonid waters			
	Un-ionised Ammonia concentration (mg NH3-N/l)		
Return period	1 hour	6 hours	24 hours
1 month	0.065	0.025	0.018
3 months	0.095	0.035	0.025
1 year	0.105	0.040	0.030
Cyprinid waters			
	Un-ionised Ammonia concentration (mg NH3-N/l)		
Return period	1 hour	6 hours	24 hours
1 month	0.150	0.075	0.030
3 months	0.225	0.125	0.050
1 year	0.250	0.150	0.065
The above limits apply when the concurrent concentration of dissolved oxygen is above 5 mg/ l. At lower concentrations of dissolved oxygen the following correction factor applies: For dissolved oxygen less than 5mg/l DO, multiply the standard by 0.0126 and the concentration of dissolved oxygen in mg O/litre, C, raised to the power of 2.72, that is, $0.0126\ C^{2.72}$. The standards also assume that the concurrent pH is greater than 7 and temperature is greater than 5 degress Centigrade. For lower pH and temperatures the following correction factors apply: Where the pH is less than 7, multiply the standard by 0.0003 and by the value of the pH, p, raised to the power of 4.17, that is: $0.0003p^{4.17}$. Where the temperature is less than 5 degrees Centigrade, multiply this correction factor by a further 0.5.			

Table 3

99th percentile standards for biochemical oxygen demand in rivers

Status	*Types of river*	*99th percentile BOD (mg/l)*
High	1,2,4,6 and salmonid	7.0
High	3,5 and 7	9.0
Good	1,2,4,6 and salmonid	9.0
Good	3,5 and 7	11.0
Moderate	1,2,4,6 and salmonid	14.0
Moderate	3,5 and 7	14.0
Poor	1,2,4,6 and salmonid	16.0

Status	*Types of river*	*99th percentile BOD (mg/l)*
Poor	3,5 and 7	19.0

Table 4

99th percentile standards for ammonia in rivers

Status	*Types of river*	*Total ammonia (mg NH4-N/l)*	*Un-ionised ammonia (mg NH3-N/l)*
		99th percentile	*99th percentile*
High	1,2,4,6 and salmonid	0.5	0.04
High	3,5 and 7	0.7	0.04
Good	1,2,4,6 and salmonid	0.7	0.04
Good	3,5 and 7	1.5	0.04
Moderate	1,2,4,6 and salmonid	1.8	0.04
Moderate	3,5 and 7	2.6	0.04
Poor	1,2,4,6 and salmonid	2.6	0.04
Poor	3,5 and 7	6.0	

Table 5

Types of river to which the proposed 99th percentile standards in Tables 3 and 4 apply

Alkalinity (as mg/l $CaCO_3$)					
Altitude	Less than 10	10-50	50-100	100-200	Over 200
Under 80 metres	Type 1	Type 2	Type 3	Type 5	Type 7
Over 80 metres			Type 4	Type 6	