

UKTAG

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Water Framework Directive: An approach to the Revoked Directives: – the Freshwater Fish Directive, the Shellfish Directive and the Dangerous substances Directive

Summary

This note recommends what we should do about the Freshwater Fish Directive (FWF), the Shellfish Directive (SWD) and the Dangerous substances Directive (DSD) which will disappear on 22 December 2013 as part of the Water Framework Directive. It explains the principles that UKTAG will follow when developing their approach to the revoked directives. It then takes each directive in turn and sets out the actions needed.

For the FWFD, ecological status defined in the WFD will set the same protection to these protected areas for fish. The UKTAG recommend that no action is needed for additional standards for this directive after 2013.

UKTAG recommend the development of a new WFD microbial standard which will be applied in the water column for *Escherichia coli*, this will replace the faecal coliforms standard currently found in the SWD. UKTAG also recommend that changes to the Mercury standard may lead to widespread failure of the standard. The 1 NM jurisdiction of WFD in England and Wales may not afford appropriate protection to offshore Shellfish Waters and may need to be reviewed.

UKTAG recommends that the twelve Dangerous Substances directive List II substances that are not currently identified as specific pollutants under the WFD should not be developed as specific pollutants at the present time. Seven of these substances are on the list for potential selection of priority substances so will be regulated in this manner. Data suggests that the remainder are not used in significant quantities so are not a risk under the WFD.

Principles

The following principles are proposed:

- a set of standards are established that deliver the same level of environmental protection as the UK's implementation of the old Directive
- Guideline Standards are dropped (except where confirmed by the administrations for use in regulatory decisions)
- Mandatory Standards not used to take past regulatory decisions are dropped
- Mandatory Standards whose function is covered by new standards under the Water Framework Directive are dropped provided the key aspects of taking decisions, and the geographical cover provided under the old Directive, are included under the Water Framework Directive
- The provisions in the Water Framework Directive for alternate objectives will not apply to any Mandatory Standards carried forward for use under the Water Framework Directive, but will be applied to any Guideline standards that are carried forward
- Standards expressed as "per cent of samples" are written as the corresponding percentiles

- Standards expressed as absolute limits are expressed as percentiles; by default, as 95-percentiles
- Units are converted to those used for the standards for the Water Framework Directive.

Fresh Water Fish

All bits of water designated under the Freshwater Fish Directive are included as or within water bodies under the Water Framework Directive. This has been confirmed for Northern Ireland and Scotland; checks are ongoing for England and Wales.

In setting up standards for the Water Framework Directive, the UKTAG anticipated the demise of the Freshwater Fish Directive and sought standards that would continue to achieve the purposes of the Freshwater Fish Directive.

Table 1 makes proposals for standards. Appendix 1 contains supporting notes extracted from the UKTAG's papers on new standards for the Water Framework Directive.

We conclude that all the river water quality standards for the Freshwater Fish Directive are covered by the standards and procedures of the Water Framework Directive.

We need to ensure that all the lake water quality standards for the Freshwater Fish Directive are covered by the standards and procedures of the Water Framework Directive.

In terms of water quality planning, actions to protect fish should follow, for England and Wales, the policies established by the Environment Agency to achieve and protect River Quality Objectives (and so taken across into our procedures for objectives like Good Status and "no deterioration" under the Water Framework Directive). Actions should be included in Programmes of Measures (we should check this is the case for the first River Basin Management Plans)

The stretches of water designated under the Freshwater Fish Directive have specific points of monitoring. These will be used for assessing compliance with the Freshwater Fish Directive, but after 2013, the topic of compliance with the requirements of the Freshwater Fish Directive should be subsumed within the issue of compliance of water bodies under the Water Framework Directive. We need to ensure that derogations allowed by the Freshwater Fish Directive are taken into account in protected area compliance reporting.

It may be that there are cases where the status of a water body is assessed for the Water Framework Directive by a single representative monitoring point and that this particular monitoring point is not the same as a monitoring point nominated for use with the Freshwater Fish Directive. This will not matter if, as proposed by the UKTAG and the environment agencies, actions are taken on a failed monitoring point even if, for whatever reason, the water body as a whole is declared to comply. (This is a potential complication for any water body that needs to have several monitoring points. It may be that such water bodies are split into separate water bodies).

We should prepare a list showing where designations under the Freshwater Fish Directive form only part of a water body, and a list of where a designation under the Freshwater Fish Directive spans more than one water body. We should decide what to do with the items on these two lists, making sure that no lengths designated as Salmonid are changed to Cyprinid, or vice versa. Such lists are being collated for England and Wales.

Any clerical errors in the official designations under the Freshwater Fish Directive should be corrected after due consultation.

There will be cases the official designation of Salmonid or Cyprinid is now thought to be wrong on grounds of new evidence or past mistakes. We should compile a list of proposed changes and make proposals for a process by which a change is agreed and made within the Water Framework Directive. If

it looks unlikely that such a change can be made through the procedures of the Water Framework Directive, we should seek the advice of the administrations on how to proceed.

Table 1: Proposals for the Freshwater Fish Directive				
Mandatory Standards for the Freshwater Fish Directive				Water Framework Directive
Parameter	Salmonid	Cyprinid	Comments	Recommendations
Dissolved Oxygen (mg/l)	9	7	These standards were 50-percentiles in the Freshwater Fish Directive	<p><i>For rivers:</i></p> <p>The 50-percentiles are dropped. The units are changed from mg/l to per cent saturation.</p> <p>The “maxima” are replaced with those for Good Status under the Water Framework Directive. Salmonid standards are those given to waters that are “Upland and Low Alkalinity”. This gives an annual 10-percentile of 75 per cent saturation. Cyprinid standards are taken from Lowland and High Alkalinity – an annual 10-percentile of 60 per cent saturation.</p> <p>Where a “Lowland, High Alkalinity, Water” is Salmonid under the Freshwater Fish Directive, the standards set for the Upland and Low Alkalinity will apply.</p> <p><i>For lakes:</i></p> <p>These are replaced by the standards proposed by UKTAG. The standards based on sampling in July or August should protect fish when thermal conditions in lakes are likely to produce the greatest impact.</p>
	6	4	These were maxima under the Freshwater Fish Directive.	
	The UKTAG noted that the standard for the Freshwater Fish Directive expressed as a 6 mg/l represents an annual 10-percentile of percentage saturation of 65 to 75. The value of 4 mg/l would be an annual 10-percentile of percentage saturation between 45 to 55.			

pH	6 - 9	6 - 9	A derogation is allowed under the Freshwater Fish Directive for naturally acidic areas	These standards have passed into the definition of High Status for the Water Framework Directive
Un-ionised Ammonia (µgN/l)	21	21	In practice, actions are set by the standards for Total Ammonia. Un-ionised Ammonia would not drive action except for the most acidic of rivers.	This standard is dropped. The standards for Good Status required no physico-chemical standards for un-ionised ammonia. Any future standard for fish for un-ionised ammonia will come through as a Specific Pollutant.
Total Ammonia (mgN/l)	0.78	0.78	A derogation is allowed as a 95 percentile of 2.3 under the Freshwater Fish Directive where there is a healthy fish population.	The “95-percentile” standards in the Freshwater Fish Directive are replaced with those for Good Status under the Water Framework Directive. Salmonid Waters are taken from Upland and Low Alkalinity –an annual 90-percentile of 0.3 mgN/l. Cyprinid Waters are taken from Lowland and High Alkalinity – an annual 90-percentile of 0.6 mgN/l. Where a Lowland, High Alkalinity water is a Salmonid, the standards for the Upland and Low Alkalinity will apply.

<p>Temperature °C</p>	<p>21.5</p>	<p>28</p>	<p>These are 98-percentiles in the Freshwater Fish Directive. Member States may decide derogations, limited in geographical scope, if the competent authority can prove that there are no harmful consequences for the balanced development of the fish population.</p> <p>A key aspect of the standards for temperature under Freshwater Fish Directive is that they apply where there are thermal discharges; they are not used generally in assessing all waters.</p>	<p>These are replaced by the standards and modes of use proposed by the UKTAG. Good status for “warm” water bodies matches the Imperative Standard for Cyprinid under the Freshwater Fish Directive.</p> <p>The boundaries for high and good for “cool” water bodies span the Imperative Standard for Salmonid under the Freshwater Fish Directive.</p>
			<p>A 10°C limit applies under the Freshwater Fish Directive to the breeding periods for species needing cold water for reproduction</p>	<p>UKTAG: the standard in the Freshwater Fish Directive, a maximum of 10 °C during the spawning season, should protect spawning of “cool” water species. No such limit should be applied to “warm” waters.</p> <p>This maximum of 10 °C is not used in classification but, where appropriate, used to regulate the operation of thermal discharges</p>
	<p>1.5</p>	<p>3</p>	<p>This is the change in temperature downstream of a point of thermal discharge. These standards are the 98-percentile at the edge of the mixing zone</p>	<p>The UKTAG proposes that these sorts of values are not used for classification under the Water Framework Directive. They can be used to calculate the action needed to achieve a target class, and for day-to-day operational control of discharges and abstractions. A 3°C uplift is to be used in this way except for waters of High Status where 2°C is used.</p>

Total Zinc ($\mu\text{g/l Zn}$)			A derogation is allowed under the Freshwater Fish Directive in areas of high mineralisation, natural enrichment or abandoned mines.	The UKTAG has proposed no new standards for zinc. Future standards for fish, and their mode of use, will come through for zinc in its role as a Specific Pollutant. The annual means standards given below will be used for classification under the Water Framework Directive.								
Water Hardness (mg/l calcium carbonate as an annual mean)			The existing standards depend on the hardness of the water.	Water Hardness (mg/l calcium carbonate as an annual mean)	Salmonid		Cyprinid					
					Annual Mean	95-percentile	Annual Mean	95-percentile				
					Up to 10	30	300	Up to 50	8	30	75	300
					10 to 50	200	700	50 to 100	50	200	175	700
					50 to 100	300	1000	100 to 250	75	300	250	1000
More than 100	400	2000	More than 250	125	500	500	2000					
Total residual chlorine (mg/l HOCl)	0.005	0.005		This standard is dropped. The standards for Good Status required no physico-chemical standards for chlorine. Any future standard for fish for chlorine will come through as a Specific Pollutant.								
Phenolic compounds	By taste			This standard is dropped. The standards for Good Status required no physico-chemical standards for phenols. Any future standards for fish for phenols will come through as Specific Pollutants.								
Petroleum hydrocarbons	Visual or by taste			This standard is dropped. The standards for Good Status required no physico-chemical standards for								

			hydrocarbons. Any future standards for fish for petroleum hydrocarbons will come through as Specific Pollutants, Priority Substances or Priority Hazardous Substances.
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The standards are all “equal or less than” or “equal or more than”, as appropriate. They are 95-percentiles except where stated otherwise. They are “Annual” standards in the sense that compliance is assessed for complete periods of 12, 24 or 36 etc continuous months.

Shellfish Waters Directive

Existing designations under the Shellfish Waters Directive (124 Shellfish Waters in England and Wales) have become 'areas designated for the protection of economically significant aquatic species' under the Water Framework Directive and placed on the Protected Areas register. Any new or amended designation will be added to the register. We will propose a process for maintaining (correcting clerical errors) and changing (additions, deletions and amendments) the designations on the register.

There is a Designations Review ongoing in England in 2009/10 to bring 24 of the 98 Shellfish Waters in line with the Classified Harvesting Beds under the Food Hygiene Regulations (2006). This requires a full Regulatory Impact Assessment of the new Designations by Defra and a full public consultation for all amendments after ministerial sign-off. Welsh Assembly Government will follow (although a date and timetable have not been set). There is a requirement that these reviews happen approximately every 5 years making the next one due in late 2014.

We propose that the next review should be brought forward to 2013 to incorporate any new measures planned for the new designated waters into PR14, and also to feed into the revised River Basin Management Plans (RBMPs) that will be signed off by Ministers in 2015. If the reviews are linked with the planning cycle for RBMPs, then ministers can sign off new designations and measures at the same time.

We should continue to be advised by Cefas (who currently advise the UK Administrations on Designations) and make proposals for a process by which a change is agreed and made within the Water Framework Directive. If it looks unlikely that such a change can be made through the procedures of the Water Framework Directive, we should seek the advice of the Administrations on how to proceed.

Table 2 makes proposals for standards and the reasoning that this is based on for each standard when comparing against the current standards in England and Wales. Scotland has taken a different approach to this currently (Appendix 2) but from 2013 onwards the Water Framework Directive Standards in Table 2 will apply.

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
pH		7- 9 (75 per cent of samples)	Usually achieved in England and Wales	In relation to picking up Climate Change related pH changes within Transitional and Coastal Waters (Trac), adopt the same standard within WFD Good Status
Temperature °C	No more than 2 °C rise related to a discharge (75 per cent of samples)		Discharge related but has sometimes been adopted as a standard for marine waters generally. In the particular procedure used for Review of Consents for the Habitats Directive an interim 2°C uplift standard was adopted for marine Special Protection Areas and marine Special Areas of Conservation designated under the Habitats Directive.	Recommend dropping this discharge related Guideline standard within WFD, but retaining an uplift standard within the WFD.
Coloration (after filtration) Mg Pt/l		No more than 10 mg Pt/l increase related to a discharge (75 per cent of samples)	Discharge related – has not been generally applied	Recommend dropping this discharge related standard within WFD
Suspended solids mg/l		No more than 30 % increase related to a discharge (75 per cent of	Has been applied in relation to dredging, even though the boat hopper discharges this related to do not come under the exact definition	A solids standard is needed to protect Shellfish against potential smothering, release of sediment associated Faecal Coliforms and metals, DO sags etc. related to dredging activity to maintain WFD Good Status. There is a Nitrogen threshold in WFD based

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
		samples)	of a discharge	on turbidity classes and salinity but there is not an environmentally protective solids standard.
Salinity ‰	12 to 38 ‰	≤ 40 ‰ (95 per cent of samples)	Important parameter in relation to ecology of Shellfish	Adopt the same standard within WFD Good Status.
Dissolved oxygen (Saturation %)	≥80 % (100 per cent of samples)	≥ 70 % (95 per cent of samples) ≥ 60 % (100 per cent of samples)	Important parameter in relation to ecology of Shellfish	WFD Good Status 5 %ile (i.e. exceeded 95% of the time) standard of 5.7mg/l. This varies with salinity (as the solubility of oxygen declines with increasing salinity). To protect against more extreme events, dissolved oxygen should not fall below 2 mg/l at the freshwater end for more than one 6 hour tidal cycle over a 6 year period. This is achieved by assuming that the standards will continue to be supported by existing policies for the regulation of intermittent discharges.

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
Petroleum hydrocarbons		Hydrocarbons must not produce a visible film on the surface of the water and/or a deposit on the shellfish, or have harmful effects on the shellfish	Important parameter in relation to ecology of Shellfish	<p>Adopt the same standard within WFD Good Status.</p> <p>In addition, Hydrocarbons within WFD will include substances with individual standards under the WFD – e.g. toluene, benzene, naphthalene and the Polycyclic Aromatic Hydrocarbons (PAHs) that may fall under the definition of Petroleum Hydrocarbons. We propose to apply these standards using a risk based approach in relation to their toxicity to and capacity for bioaccumulation in Shellfish that will be evaluated.</p> <p>Toluene is a Specific Pollutant: standards for TRaC water: Annual Average (AA) = 40 ug/l 95%ile = 370 ug/l</p> <p>Benzene is a Priority Substance: standards for TRaC waters: AA = 8 ug/l Maximum Admissible Concentration (MAC) = 50 ug/l</p> <p>Naphthalene is a Priority Substance: standards for TRaC water: AA = 1.2 ug/l MAC = not applicable</p> <p>PAHs are Priority Hazardous Substance and include a number of substances in a group:</p> <p>Standards for TRaC water:</p>

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
				<p>Benzo(a)pyrene AA = 0.05 ug/l MAC = 0.1 ug/l</p> <p>Benzo(b) fluoranthene + benzo(k)fluoranthene AA = \sum0.03 ug/l MAC = not applicable</p> <p>Benzo(g,h,i)-perylene + Indeno(1,2,3-cd)-pyrene AA = \sum0.002 ug/l MAC = not applicable</p>

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
Organohalogenated Substances		Expressed as Maximum Allowable Concentration (MAC)	The concentration of each substance in the shellfish water or in shellfish flesh must not reach or exceed a level which has harmful effects on the shellfish and larvae	The pesticides that we currently monitor for are in Annex IX of the Water Framework Directive or as Priority Hazardous Substances (PHS) therefore these standards will be maintained including via the EQS Directive.
Lindane		100 ug/l MAC		PHS – There is a standard for HCH (must not exceed 0.002ug/l Annual Average, 0.02ug/l MAC) but there is not a standard for Lindane. Lindane is predominantly made up from gamma-HCH. The PHS standard relates to HCH (608-73-1) which is the mixture of all isomers. There is no specific standard for Lindane – therefore the HCH standards, as listed above, should apply. As Lindane is just one isomer of HCH, the standard for HCH will be more protective than the existing Lindane standard.
Dieldrin		100 ug/l MAC		Annex IX along with the total 'drins must not exceed $\Sigma = 0.005$ ug/l as an Annual Average
Total DDT		33 ug/l MAC	(Total DDT consists of DDT-pp, DDT-op, DDE-pp and TDE-pp)	Annex IX Total DDT must not exceed 0.025 ug/l as an Annual Average Annex IX DDT-pp must not exceed 0.01 ug/l Annual Average

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
Parathion		100 ug/l MAC		Parathion is not included in WFD. It is no longer an approved pesticide in the UK and although reasonably persistent (for approximately 2 years after application), it is not regarded as a problem. Recommend reviewing the monitoring data for this substance with a view to dropping the standard.
<u>Metals</u>			The concentration of each substance in the shellfish water or in the shellfish flesh must not exceed a level which gives rise to harmful effects on the shellfish and their larvae. The synergic effects of the metals must be taken into consideration.	The metals that we currently monitor for are in the Water Framework Directive as Priority Hazardous Substances (PHS), Priority Substances (PS) or as Specific Pollutants (SP) therefore these standards will be maintained. Further proposals may be made for some metals in the second Specific Pollutants report and if these are revised then these new standards will apply.
Silver (ug/l Ag)		10 ug/l MAC		Silver is not included as a WFD Standard currently, but in view of its potential toxicity in the environment it has been recommended for EQS development.
Arsenic (ug/l As Dissolved)		3000 ug/l MAC (25 in SW Region, 50 in EA Wales)		Specific Pollutant 25 ug/l AA (Dissolved)

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
Cadmium (ug/l Cd)		330 ug/l MAC (5 in SW Region & EA Wales)		PHS 0.2 ug/l AA (Dissolved)
Chromium (ug/l Cr Dissolved)		1000 ug/l MAC (15 in SW Region)		SP Cr (VI) 0.6 ug/l AA dissolved 32 ug/l 95%ile (Dissolved) There is no SP standard for Cr(III) in Trac Waters, but this is not regarded as an issue due to the low toxicity of Cr (III)
Copper (ug/l Cu Dissolved)		10 ug/l MAC (5 in SW Region)		SP 5 ug/l AA (Dissolved) . A new saline WFD EQS for Cu is planned.
Mercury (ug/l Hg)		1 ug/l MAC (0.5 in SW Region)		Mercury – biota standard set under EQS Directive: 20 ug/kg prey tissue (wet weight) <u>It is likely that many Shellfish Waters may fail this standard – the implications are discussed below.</u>
Nickel (ug/l Ni)		100 ug/l MAC (30 in SW Region)		PS 20 ug/l AA (Dissolved) MAC – not applicable

Table 2: Proposals for the Shellfish Waters Directive				
Standards for the Shellfish Waters Directive				Water Framework Directive
Parameter	Guideline	Imperative	Comments	Standards and Recommendations
<p>Dissolved)</p> <p>Lead (ug/l Pb Dissolved)</p> <p>Total Zinc (µg/l Zn)</p>		<p>100 ug/l MAC (25 in SW Region)</p> <p>10 ug/l MAC (40 in SW Region & EA Wales)</p> <p>10 ug/l MAC (40 in SW Region, Thames & EA Wales)</p>		<p>PS 7.2 ug/l AA (Dissolved) MAC – not applicable</p> <p>SP 40 ug/l AA. A new saline WFD EQS for Zn is planned.</p> <p>SP 40 ug/l AA. A new saline WFD EQS for Zn is planned.</p>
<p>Faecal coliforms/100 ml ≤</p>	<p>≤ 300 in the shellfish flesh and intervalvular liquid</p>			<p>WFD Annex V omits any reference to the microbiology of Trac Waters</p>

We conclude that most of the chemical and physical water quality standards for the Shellfish Waters Directive are covered by the standards and procedures of the Water Framework Directive (apart from Silver, Parathion, pH, total hydrocarbons, colour and suspended solids) other than to ensure the same protection is given to Shellfish Waters. Therefore no new standards have been proposed for these.

For Silver, Parathion, pH, hydrocarbons, colour and suspended solids, each of these substances needs to be considered, and a decision made to add the substance to the specific pollutants list, to incorporate the substance into the WFD monitoring programme as an additional parameter, or to no longer monitor the parameter.

It is recommended that pH and suspended solids should continue to be monitored due to the ecological significance of these parameters (Table 2). Silver is already being addressed as a specific pollutant. Individual hydrocarbons are included in WFD therefore total hydrocarbons can be dropped. Levels of parathion are likely to fall in the environment since the pesticide has been taken out of use. Monitoring data should be reviewed to assess whether or not this is the case and if so the parameter can be dropped (Table 2). Colour can be dropped.

Early indications are that the application of the biota standard for mercury may result in failures for many shellfish waters. It is believed that a similar problem will be encountered by other Member States. The standard of 20 ug/kg has been developed to protect predator species that feed on Shellfish, resulting in a high dietary intake compared to their body mass. We note from a 2005 Food Standards Agency Report that the standard is more stringent than levels set for human consumption, i.e. 500 ug/kg in shellfish flesh that was achieved at all sites surveyed in the UK in 2005.

The body burdens of mercury found in Shellfish are unlikely to be detrimental to the Shellfish themselves and this needs to be investigated. An aqueous standard is more protective of shellfish as it protects the vulnerable larval stage against toxicity in the water column. The relationship between levels in the water column and in the shellfish needs to be understood to set ecologically appropriate standards that are also protective of predator species.

Although the EQS Directive (2008/105/EC) - a Daughter Directive of the WFD - does include an aqueous standard of 0.05 µg/l as an annual average this is caveated by a note that if Member States do not apply EQS for biota they shall introduce stricter EQS for water in order to achieve the same level of protection as the EQS for biota. This caveat effectively negates the application of 0.05 µg/l value as published.

A variety of approaches to this issue may result (such as revision of the biota standard (at EU level), an alternative aqueous standard, or alternative objectives) in addition to control measures. We do have options in interpretation of compliance, but reporting failures will be challenging.

In terms of water quality planning, actions to protect Shellfish should follow, for England and Wales, the policies established by the Environment Agency to achieve and protect Transitional and Coastal (Trac) Quality Objectives (and so taken across into our procedures for objectives like Good Status and “no deterioration” under the Water Framework Directive).

Microbiological Parameters

The Shellfish Waters Directive has a guideline standard for faecal coliforms in shellfish flesh and intervalvular fluid. Four samples per year are required, and the guideline standard is for 300 coliforms per 100ml flesh and intervalvular fluid in 75% of samples. There is no equivalent microbiological standard in the Water Framework Directive (Table 2) and this is seen as a gap in the WFD. We propose that standards should be set by 2013 and that E.coli should replace Faecal Coliforms. The rationale behind this and the approach to take is detailed in Appendix 3.

A Norovirus standard may come into the Food Hygiene Regulations from 2014. Although it is unlikely that Norovirus standards would be required in the WFD, our understanding of the environmental control of Norovirus needs to improve in order to have sufficient measures in place to protect human health.

Monitoring and Compliance

We do not propose that the environment agencies establish specific monitoring regimes to replace those in the old Directives. They should use the risk based monitoring approach established for the Water Framework Directive to establish an equivalent level of protection. We propose that the relevant competent authorities should determine a risk based monitoring programme at a frequency necessary to satisfy themselves that the relevant quality standards are being achieved, rather than adopting a strict adherence to the to the programme that was set out in the SWD.

Monitoring for WFD does not have to be carried out in all water bodies. Surveillance monitoring aims to cover a range of water bodies from high through to poor ecological quality. Similar types of water bodies within a river basin district may be grouped and only a sub-set monitored. Operational monitoring focuses on water bodies at risk of failing to meet the ecological objectives of the Directive, and water bodies under similar pressures may be grouped and only a sub-set monitored.

The Shellfish Waters designated under the Shellfish Waters Directive have specific points of monitoring. These will continue to be used for assessing compliance with the Shellfish Waters Directive, but after 2013, the topic of compliance with the requirements of the Shellfish Waters Directive should be subsumed within the issue of compliance of water bodies under the Water Framework Directive. We propose that compliance is assessed at a representative monitoring point within the protected area, rather than at sampling points designated under the old Directives.

It may be that there are cases where the status of a water body is assessed for the Water Framework Directive by a single representative monitoring point and that this particular monitoring point is not the same as a monitoring point nominated for use with the Shellfish Waters Directive. This will not matter if, as proposed by the UKTAG and the environment agencies, actions are taken on a failed monitoring point even if, for whatever reason, the water body as a whole is declared to comply. (This is a potential complication for any water body that needs to have several monitoring points. It may be that such water bodies are split into separate water bodies).

We should prepare a list showing where designations under the Shellfish Waters Directive form only part of a water body, and a list of where a designation under the Shellfish Waters Directive spans more than one water body. We should decide what to do with the items on these two lists.

New legal instruments

When the old Directives and UK transposition instruments are revoked, new legal instruments will be required to give effect to the new set of water quality standards. This will enable the environment agencies to use the standards in regulatory decisions.

Currently the WFD in England and Wales applies to 1 Nautical Mile (NM) offshore whereas the SWD extends to 3 NM. There is an increasing interest in culture/harvest of bivalve molluscs in open coast areas, some of which may lay offshore (i.e. outside 1NM). It may be necessary to review the 1 NM jurisdiction in future if this does not afford appropriate protection to those offshore Shellfish Waters.

Dangerous Substances Directive

In UKTAG Specific Pollutants report, twelve Dangerous Substances Directive (DSD) List II substances are not currently identified either as Priority List substances or Specific Pollutants. These substances are:

Bentazone, biphenyl, 4-chloro-3-methylphenol, chloronitrotoluenes, 2-chlorophenol, dichlorvos, fenitrothion, malathion, 1,1,1-trichloroethane, 1,1,2-trichloroethane, triphenyltin and xylene.

The existing environmental quality standards for these substances will remain in force until 2013 when Dangerous Substances Directive is finally repealed.

However after this date the need for Environmental Quality Standards will become a matter for national consideration unless any of the substances is subsequently nominated as a priority substance.

Bentazone, 4-chloro-3-methylphenol, dichlorvos, fenitrothion, malathion, triphenyltin and xylene are currently on the candidate list for potential selection as priority substances. If not selected the key consideration remains whether any of these substances is still discharged in significant quantities in UK. Where this is the case they should be considered for potential inclusion as UK Specific Pollutants and revised EQ standards derived in accordance with the Annex V methodology.

These substances have been evaluated to identify substances discharged in significant quantities. However, while every effort has been made to provide a comprehensive position, data on these substances is not as widely available in Scotland and Northern Ireland. There may still be a need to undertake some additional monitoring to ensure that this evaluation is fully representative of the overall UK position.

Environmental monitoring data was collated for the period January 2004 to September 2008. A statistical examination of the data revealed that for rivers, groundwater and estuarine water the majority of the reported concentrations are less than the analytical limit of detection. The monitoring data were compared with the Dangerous Substances Directive environmental quality standards. In almost all cases there was full compliance. Potential non-compliance with EQSs was only identified in a few instances:

- a) where samples were taken after a pollution incident (some xylene data) or
- b) where the limit of detection is greater than the EQS (dichlorvos).

Examination of readily available marketing and use data indicate that extensive marketing and use controls exist for most of these substances and furthermore that future trends in concentrations in water are likely to be downwards, below the already very low levels. Bentazone remains the only substance used in any quantity, where concentrations are unlikely to decline. However Bentazone has

already been highlighted by European Parliament and included in Annex III of Priority Substances Directive (2008/105/EC as a candidate priority substance under the WFD and could, therefore, be subject to EQS derivation by the European Commission in the future, if it satisfies the selection criteria.

On the basis of the investigation undertaken UKTAG do not have any evidence to suggest that these substances are still discharged in significant quantities. Furthermore marketing and use data would suggest that levels in the environment are falling and will continue to reduce. CTT suggests that there is thus no case at present for their consideration as Specific Pollutants.

The only exception is bentazone where levels in the environment appear steady. However given the inclusion of this substance as a potential EU Priority Substance we would advocate a further review once CIS Working Group E has delivered its verdict in this matter. This is expected to be delivered at the March 2010 meeting.

The UKTAG proposed standards for dissolved oxygen (DO), Biochemical Oxygen Demand (BOD) and ammonia on the basis of conditions associated with macro-invertebrate communities.

Dissolved Oxygen and Biochemical Oxygen Demand

The standards are in Tables 5 and 6. A comparison with standards for the Freshwater Fish Directive (FWFD) is indicated.

Generally, the UKTAG standards are to be used in the same way as the existing standards. The standard for dissolved oxygen is used for assessing and reporting compliance, and that the standard for BOD is used for deciding action to meet the standard for dissolved oxygen. This is because the levels of BOD can be misleading in clean rivers, and because the link between BOD and dissolved oxygen is a complex and uncertain issue if dealt with on a site-by-site basis.

Table 5: standards for oxygen in rivers				
Dissolved Oxygen (per cent saturation)				
(10-percentile)				
Type	High	Good	Moderate	Poor
Upland and low alkalinity	80	75	64	50
Lowland and high alkalinity	70	60	54	45

Other (older) standards		
Dissolved Oxygen (per cent saturation)		
(10-percentile)		(5-percentile)
High	Good	
Existing classification schemes (note 1)		Freshwater Fish Directive (note 2)
80	70	65 - 75 Salmonid
		45 - 55 Cyprinid

Note:

1. The existing values are those for River Quality Objectives, RE1 and RE2 for England and Wales and for the best two classes of the schemes used in all countries.
2. The values from the Freshwater Fish Directive as 6 mg/l would typically represent a 10-percentile of percentage saturation of approximately 65 to 75%. The value of 4 mg/l would represent a 10-percentile of percentage saturation between 45 to 55%.

Where a lowland, high alkalinity, water body is a salmonid river, the standards for the upland, low alkalinity type will apply. This is because in these conditions the standards required by fish are tighter than those required by invertebrates.

Table 6: standards for oxygen conditions (BOD)				
Biochemical Oxygen Demand (mg/l)				
(90-percentile)				
Type	High	Good	Moderate	Poor
Upland and low alkalinity	3	4	6	7.5
Lowland and high alkalinity (note 2)	4	5	6.5	9

Existing standards (note 1)	
Biochemical Oxygen Demand (mg/l)	
(90-percentile)	
High	Good
2.5	4

Note:

1. The existing values are the thresholds for the River Quality Objectives, RE1 and RE2 for England and Wales, and for the best two classes of the schemes used in all countries.
2. Where a lowland, high alkalinity water body is a salmonid river then the standards for the upland, low alkalinity type will apply.

The standards have been developed on the basis of oxygen conditions associated with macro-invertebrate communities as these are most sensitive biota to this pressure. Invertebrate communities at Reference Condition¹ in these river types require higher oxygen levels than fish.

Ammonia

Our standards for ammonia are in Table 7.

Table 7: Standards for ammonia				
Total Ammonia (mg/l)				
(90-percentile)				
Type	High	Good	Moderate	Poor

Existing standards	
Total Ammonia (mg/l)	
(90-percentile)	
High	Good
Existing classification schemes (note 1)	

¹ The term used by the Directive to define conditions that are close to pristine.

Upland and low alkalinity	0.2	0.3	0.75	1.1
Lowland and high alkalinity	0.3	0.6	1.1	2.5

0.25	0.6
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1. The existing values are the thresholds used for the River Quality Objectives, RE1 and RE2, for England and Wales, and for Class A and B of the General Quality Assessment.

The standards were developed on the basis of ammonia conditions associated with macro-invertebrate communities at High and Good Status. Further work will be done during the first cycle of River Basin Management Plans to confirm that the proposed values also protect communities of freshwater fish, though this seems likely from the comparison with present standards.

Acid conditions for rivers

We retain the existing standards for the first cycle of River Basin Management Plans. These standards are in Tables 8a and 8b.

Table 8: Standards for acid conditions in rivers			
pH – all river types in England, Wales and Northern Ireland ²			
High	Good	Moderate	Poor
(5 and 95 percentile)		10 percentile	10 percentile
>=6 to <=9		4.7	4.2
pH – all river types in Scotland			
High	Good	Moderate	Poor
(5 and 95 percentile)	10 percentile	10 percentile	10 percentile
>=6 to <=9	5.2	4.7	4.2

Temperature

² The consultation paper on environmental standards for England and Wales (*Consultation on Directions to the Environment Agency on Classification of Water Bodies for the Water Framework Directive, October 2008*) expresses the good standard is 5.2 as a 10 percentile

The monitoring of temperature is usually based on spot measurements taken, for convenience, at the same time as routine chemical samples. This regime gives estimates of summary statistics such as the annual mean and annual percentiles, and, especially through pooled data, the shape of the statistical distributions underlying these summary statistics.

Standards set in the form of such summary statistics work on the expectation that the achievement of them through regulatory action reduces to acceptable levels the risk from rarer peaks of temperature.

The types for rivers and lakes were grouped according to the temperature preferences of fish species. Two categories were distinguished: cool-water (formerly 'salmonid') and warm-water (formerly 'cyprinid'). This suggests that that the groupings for the Freshwater Fish Directive remain adequate.

Existing standards – Freshwater Fish Directive

Table 6 shows the Imperative Standards for temperature. There are no Guideline Standards for temperature.

There is an additional standard of 10°C for salmonid waters during the spawning season. This seeks to protect species that need cold water for reproduction. A provision is also made that sudden variations in temperature should be avoided. A key aspect of the standards for temperature is that they apply where there are thermal discharges, and they are not used generally in assessing all waters.

Table 6: Imperative Standards from the Freshwater Fish Directive	
The temperature measured downstream of a point of thermal discharge (at the edge of the mixing zone) must not exceed the unaffected temperature by more than the following:	
Salmonid: 1.5 °C	Cyprinid: 3 °C
Caveat: sudden variations in temperature should be avoided	
The following temperatures should not be exceeded at the edge of the mixing zone, for more than 2 per cent of the time:	
Salmonid: 21.5 °C	Cyprinid: 28 °C
Caveat: species that require cold water for reproduction are protected by an upper limit of 10°C during the breeding season	

Member States may decide derogations, limited in geographical scope, if the competent authority can prove that there are no harmful consequences for the balanced development of the fish population.

Derivation of standards for temperature for the Water Framework Directive

The UKTAG's review of standards, and of the temperature requirements for fish species, was carried out by searching the literature and the Internet, and by correspondence with international specialists. The UKTAG recommends that the issue be kept under review during the first cycle of River Basin Plans.

The UKTAG concludes that three criteria are relevant: lethal temperatures, a preferred range of temperature, and the requirements for spawning.

Proposed standards for the Water Framework Directive

The proposed standards for the Water Framework Directive were intended to supersede the standards in the Directive on Freshwater Fish.

Temperature preferences were represented by the concept of a “niche” – fish spend two-thirds of their time within 2°C of a preferred temperature. The proposed boundary between high and good status for rivers is the upper limit of the niche in which most fish will spend two-thirds of their time ($\pm 2^\circ\text{C}$ of the preferred temperature). Similarly the boundary between good and moderate status is the upper limit of the niche in which most fish will spend all of their time ($\pm 5^\circ\text{C}$ of the preferred temperature).

The standards for the Water Framework Directive are expressed as boundaries between high, good, moderate, poor and bad (Table 8).

The UKTAG proposes that these standards are used in the classification of rivers and in calculating the action needed to achieve a target class for rivers. It is proposed that the values are not used for the classification of lakes; but are to be used for these waters to calculate the action needed to achieve a target class, or for day-to-day operational control of discharges and abstractions. In the regulation of thermal discharges more specific locally derived background reference conditions may be required if the thresholds below are not appropriate.

Table 8: Proposed boundaries for temperature				
	Temperature (°C) (Annual 98-percentiles)			
	High	Good	Moderate	Poor
Cold water	20	23	28	30
Warm water	25	28	30	32

In these proposals the boundaries for good status for warm water bodies matches the Imperative Standard for cyprinid fish under the Freshwater Fish Directive. The boundaries for high and good for cool water bodies span the Imperative Standard for salmonid fish under the Freshwater Fish Directive.

Uplift values for temperature - not proposed for use in classification

The work of the UKTAG confirmed generally that standards from the Freshwater Fish Directive should be protective of salmonid and cyprinid fisheries in rivers, lakes and reservoirs.

The validity of the ‘uplift’ values of 1.5°C and 3°C (Table 8) in the Freshwater Fish Directive was less clear. These aim to ensure that a step rise or a sharp gradient is not a thermal barrier to fish movement.

The UKTAG was unable to find good evidence of the reality of such thermal barriers in rivers and estuaries, except with temperature rises of more than 3°C or near the lethal limit of temperature (which is already protected by standards for maximum temperature).

The UKTAG therefore proposes that the 1.5°C uplift and drop values are not used for classification of rivers under the Water Framework Directive³. They can be used to calculate the action needed to achieve a target class, and for day-to-day operational control of discharges and abstractions.

It is proposed that a 3°C uplift is used in this way except for waters of high ecological status where a 2°C uplift limit is proposed.

Lower temperature limit for spawning – not proposed for use in classification

A review of the spawning temperatures of UK species indicates that generally, the existing standard in the Freshwater Fish Directive, a maximum 10°C during the spawning season, should protect spawning of cool water species. No such limit should be applied to warm water bodies.

Again the UKTAG proposes that this is not used in classification of rivers and lakes, for the Water Framework Directive but used, where appropriate, to regulate the operation of thermal discharges.

Zinc

Receiving medium and exposure	Existing EQS (µg/l)
Freshwater/long-term: 0–50 mg l ⁻¹ CaCO ₃ 50–100 mg l ⁻¹ CaCO ₃ 100–250 mg l ⁻¹ CaCO ₃ >250 mg l ⁻¹ CaCO ₃	 8 50 75 125
Recommendation	
An EU Risk Assessment is being compiled. The UK will use the proposals derived through this process. There remain issues about the implementation of these. We recommend, in the interim, the continued use of the existing standards. These were developed in 1984 (WRc 1984).	
Background Information	
Zinc is a naturally occurring element. It plays an essential role in organisms, where its internal concentration can be regulated to a limited extent depending on the concentrations to which it is exposed. Effects of deficiency or toxicity may occur if the concentrations deviate from those that the organism can regulate. In water, zinc exists in forms that depend on parameters such as pH, hardness and the content of dissolved organic carbon. Bioavailability and toxicity may be affected by the formation on complexes between zinc and other chemical species. To account for these, EU proposals for PNECs are based on the use of Biotic Ligand Models.	

³ It is also proposed, in line with the Freshwater Fish Directive, that where they are used, the proposed uplift standards are the 98-percentile at the edge of the mixing zone.

Long-term:	<p>The standards proposed in the 1984 report and subsequently adopted for the long-term protection of freshwater life were banded according to water hardness (ranging between 8 - 125 ug/l total zinc as annual averages, see above).</p> <p>The European Inland Fisheries Advisory Commission recommended that values for intermediate hardness should be calculated by linear interpolation between the relevant hardness-related values.</p>
Short-term:	No standard is proposed

Appendix 2: Current Shellfish Waters Directive Standards in Scotland

National guideline (G) and imperative (I) environmental quality standards for Scottish Shellfish Waters, for substances where values must be determined by Member States

Parameter	Concentration units	Authority G value	Authority I value
pH	pH unit		Directive
Temperature	Deg C	Directive	
Colour	mg Pt/l		Directive
Suspended Solids	mg/l		Directive
Salinity	parts/thousand	Directive	Directive
Dissolved Oxygen	percent	Directive	Directive
Hydrocarbons	Visibility		Directive
HCB	ng/g wet flesh	30	100
DDT	ng/g wet flesh	30	100
Dieldrin	ng/g wet flesh	15	50
DDE	ng/g wet flesh	30	100
DDD	ng/g wet flesh	30	100
g-HCH	ng/g wet flesh	10	30
PCB	ng/g wet flesh	300	1000
a-HCH	ng/g wet flesh	10	30
Toxaphene	ng/g wet flesh	300	1000
Trace metals			
Silver	mg/kg dry flesh	1.0	3.0
Silver (soluble)	∞g/l		0.3
Arsenic	mg/kg dry flesh	30	100
Arsenic (soluble)	∞g/l		20
Cadmium	mg/kg dry flesh	5	15
Cadmium (soluble)	∞g/l		1.0
Chromium	mg/kg dry flesh	6	20
Chromium (soluble)	∞g/l		10
Copper	mg/kg dry flesh	15	30
Copper (soluble)	∞g/l		5
Mercury	mg/kg dry flesh	1.0	3.0
Mercury (soluble)	∞g/l		0.1
Nickel	mg/kg dry flesh	5	15
Nickel (soluble)	∞g/l		5
Lead	mg/kg dry flesh	15	50
Lead (soluble)	∞g/l		5
Zinc	mg/kg dry flesh	250	500
Zinc (soluble)	∞g/l		10
Faecal coliforms	Coliforms/100ml	Directive	

Appendix 3: Shellfish Microbiological Standard

In July and October 2008 the Shellfish Association of Great Britain (SAGB) held meetings to highlight their concerns on the loss of the microbiological standard and other issues on the WFD in relation to the revoked Shellfish Waters Directive. Defra, WAG, Seafish, Environment Agency, Scottish Government and Cefas were in attendance.

SAGB raised their concerns with the Commission and in December 2008 a response from the Directorate-General Environment indicated that the microbiological parameter for faecal coliforms should be included:

‘The RBMP must establish specific objectives for those water bodies that, in addition to those set by WFD (good ecological and good chemical status), offer at least the same level of protection as the Shellfish Waters Directive. In particular this includes the microbiological parameter faecal coliforms. This level of protection for these existing areas should be maintained for the subsequent updates of RBMP.’

A further communication from the Commission (Directorate-General Mare) in relation to the Sustainable Development on Aquaculture was received by SAGB in May 2008. This reinforced the earlier letter in relation to the retention of the ‘Faecal Indicator’ standard. However, despite these reassurances from the Commission that the continuation of current protection levels should include Faecal Indicator status the mechanism to take this forward are not clear. The options are (David Lees, Cefas, Personal Comment):

1. A continuation of the present EU shellfish standard (guideline of 300 FCs in shellfish flesh and fluid). This requires the EU to take action.
2. An alternative EU standard, or variety of standards, in either shellfish or water. This also requires the EU to take action.
3. For the EU to pass the responsibility to Member States to set a standard, or variety of standards, in either shellfish or water in their national legislation. This requires both the Commission and Member States to take action.

As a result the SAGB have written to the Commission seeking clarification. The early indications are that the option 3. is likely, i.e. that the Commission will pass the responsibility to member states. This may weaken our ability to use standards as statutory drivers in directing investment through the Water Industry Periodic Review and Asset Management Planning processes. Without that the necessary investment for maintenance and continuing improvement of microbiological quality of shellfish waters may not be in place. Costs and benefits would need to be considered in setting up the legislation. Furthermore as the current standard is a guideline, it is questionable as to what status it would have if it were established domestically or as other EU legislation.

There is no requirement in the SWD for Water column sampling for microbiology. The US EPA use a water column as opposed to a flesh standard to assess their equivalent of Shellfish Hygiene Classes. Water column standards would be useful for WFD Programmes of Measures, to inform setting of discharge consents. An interim standard of 110 faecal coliforms per 100ml water (as a geometric mean) has been adopted by the respective agencies to assist discharge consenting. This relationship was derived based on the achievement of Class B under the Food Hygiene Regulations (2006) and needs to be updated for the achievement of the current guideline Faecal Coliform standards in Shellfish Flesh.

Data so far suggests that the relationship between faecal coliforms in the water column and in flesh is variable, and may be dependent on local site conditions as examined in the 2008 Pollution Reduction Plans.

A 2 year Defra funded research and development project on 'Factors affecting the Microbial quality of shellfish' has recently started in July 09. The contractors are Cefas and CREH. The aims of the project are to conduct post scheme investment appraisals to determine the effectiveness of previous water company investment; to provide information on the site-specific factors that influence the take-up of Faecal Indicator Organisms (FIOs) by shellfish in Shellfish Waters and to examine how strong the link is between shellfish flesh quality and water quality, and why the ratios apparently differ so widely from one site to another. This work will form part of the evidence to establish if there should be an additional microbiological water quality standard for shellfish waters following the repeal of the Shellfish Waters Directive or whether the Water Column standard should replace the Flesh Standard.

We propose that in order to modernise the microbiological standards when set that *Escherichia coli* (*E. coli*) should replace Faecal Coliforms as the future microbiological standard. This standard applied in the Water Column would better tie in with the standards of the Revised Bathing Water Directive. As a flesh standard, this would match better with the existing Food Hygiene Regulations (2006) where numbers of *E. coli* in Shellfish flesh are monitored and give rise to the Hygiene Class.

Water column sampling for faecal coliforms has been carried out by EHS, SEPA and the Agency as part of a project to try and establish the relationship between faecal coliforms in shellfish flesh and in the water column. Currently the Agency samples 4 times per annum at all 124 sites for faecal coliforms along with the Water Column monitoring and has a programme planned for additional samples to be taken below the surface at the Shellfish flesh monitoring sites. This additional sampling may give better microbiology data as a result of the closer spatial link between the water column and shellfish flesh.

In 2008 the monitoring of Shellfish Flesh in England and Wales has been contracted to Cefas who co-ordinate this programme alongside the Hygiene Monitoring Programme.

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