SURFACE WATER QUALITY REGULATION IN EECCA COUNTRIES: DIRECTIONS FOR REFORM

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This paper has been prepared by the EAP Task Force Secretariat in connection with the expert meeting on reforming surface water quality regulation in countries of Eastern Europe, Caucasus and Central Asia (EECCA) which took place in Kiev, Ukraine on 27 May 2008. The paper presents a brief overview of the main features of the existing EECCA systems of surface water quality standards and the need to improve them, describes the key conceptual directions for reform based on OECD and EECCA country experience, and summarises the main issues discussed at the expert meeting.

1. CURRENT STATE AND NEED FOR REFORM OF SURFACE WATER QUALITY REGULATION IN EECCA

The main purpose of water regulation is to protect water resources from degradation, maintain and enhance their quality, and ensure the sustainability of their use. All EECCA countries have comprehensive water laws and regulations, most of which have been recently updated to introduce elements of integrated water resources management. However, according to the countries' own national standards, most rivers and lakes in the region are characterised as "moderately polluted"[1], which shows the limited effectiveness of the present regulatory regime. The objectives of water quality and instruments for their achievement have not been reviewed in light of these environmental realities.

The central instrument of water quality regulation – the system of surface water quality standards (SWQSs) – has remained virtually unchanged since its establishment in the 1960s and 1970s. Its main element, a Maximum Allowable Concentration (MAC) is defined as a concentration of a substance in water above which the water is unsuitable for one or several types of water use.

Water bodies are categorised according to three designated uses: fishery, drinking water abstraction, and other water abstraction and recreation. Two types of MAC standards are applied in relation to these categories:

- If a water body is used for drinking water supply, recreation and household/industrial purposes, sanitary MACs are applied;
- If a water body is used for fishery purposes, fishery MACs are used.

Sanitary MACs represent the maximum concentration, which does not affect (directly or indirectly) human health of present and future generations and does not impact adversely the sanitary conditions of water use. Fishery MACs represent a maximum concentration not affecting fishery operations in a water body or reducing its capacity to support a viable commercial fishery.

[1] *Europe's Environment: The Fourth Assessment*, European Environmental Agency, Copenhagen, 2007.

This classification system of water bodies dates back to the late 1950s and does not reflect the current environmental situation or existing water uses. Practically all surface waters in the EECCA region are designated as (potentially) suitable for fishery and have to comply with the more stringent MACs for fishery waters, without consideration of their actual use.

Other principal weaknesses of the existing system include:

- **Lack of realism:** Compared with equivalent EU regulations, EECCA countries generally apply more stringent standards (MACs) to surface water quality for water bodies to be used for abstraction of drinking water, for protection/breeding of freshwater fish, and for recreation. This is primarily because the standards are determined on the basis of zero impact on human health and ecosystems. In determining the standard, consideration was not given to the technical or economic feasibility of meeting it, which often becomes a problem when the standards are translated into effluent requirements for pollution sources. At the same time, the MACs for fishery waters for several parameters are quite comparable with the standards defined for Priority Substances in the EU Water Framework Directive (2000/60/EC).

- **Mismatch between the scope of regulation and government resources for regulatory monitoring:** The EECCA systems of SWQSs contain a substantially larger number of parameters (over a thousand) regulated than the equivalent EU Directives. However, the Water Framework Directive (WFD) Priority Substances are covered for about one-third of the parameters only. Compared to the large number of regulated parameters, the number of actually monitored parameters is rather small. For example, in Moldova, only 81 parameters are monitored out of at least 1,000 regulated (this ratio is even smaller in many other EECCA countries). Notably, toxic pollutants are poorly covered in the current monitoring programmes. In addition, laboratories in EECCA are not always able to analyse monitored micro-pollutants at concentration levels corresponding to the MACs.

The drawbacks of the SWQS systems in EECCA impede improvements in related areas of environmental management. Since SWQSs are the determinant factor in setting effluent limit values in permits for individual installations, their excessive stringency imposes requirements that cannot be achieved even by applying best available techniques (BAT). This hinders the reform of the permitting systems and the introduction of integrated permitting based on BAT. The imposition of effluent limit values (ELVs) for a list of parameters, most of which cannot be measured, also runs contrary to making a permitting system more effective and efficient. In addition, the fact that wastewater treatment plants in EECCA are faced with unrealistic effluent requirements drives away investors in the sanitation sector, which has a direct negative impact on surface water quality.

Water quality standards need to be revised in light of international best practices and domestic capabilities to technically feasible and enforceable levels, striking a balance between what is desirable from an environmental point of view and what is feasible from a technical and economic standpoint. The number of polluting substances regulated should be limited to those that pose the greatest risk to human health and/or the environment and that can be effectively monitored with the limited technical capacity and human resources available.

There is now widespread recognition of the need to reform the SWQS system in the EECCA region. In some countries, the initial steps of the reform process have been taken, but new standards have not been introduced, so the old ones continue to be used for regulatory purposes such as setting effluent limits for individual polluters. For example, in Armenia, the 2002 Water Code states that the National Water Programme sets water quality standards for each water basin management area (Art. 16), and that they may vary depending on local specifics (Art. 66). However, such standards have not been promulgated six years after the adoption of the Water Code. In Russia, there have been several attempts to improve the system of water quality regulation, but so far they have not proven their effectiveness (see Section 4).

The most serious obstacle to the reform is the relative acceptability of the current system to the major stakeholders, resulting in resistance to changes. For example, health authorities insist that relaxation of some SWQSs would compromise public health, while environmental authorities are concerned about losing a part of revenues from pollution charges which are significant in case of non-compliance. The general public is misled by the argument that more stringent standards lead to better health and environmental protection and has little opportunity to participate in the regulatory process. The technical complexity of the subject matter and the lack of qualified specialists who would develop an alternative system are additional challenges. Finally, there are not enough financial resources to perform the analysis of water pollution sources, impacts on water quality and existing water uses which are the necessary first steps in the implementation of a new SWQS system.

2. PRINCIPAL APPROACHES TO REFORM IN EECCA

This section of the paper addresses the main approaches to surface water quality regulation that are being considered as part of the reform process in EECCA countries. One such approach (pursued, for example, in Moldova) is to establish a flexible framework of water quality objectives and standards that would allow countries to prioritise their environmental investments, taking account of the limited availability of financial resources. An alternative approach, under development in Russia and several other EECCA countries, is to complement the existing SWQS system by regulation of total anthropogenic impact on water bodies. Both approaches are briefly described and analysed below.

2.1. Differentiation of SWQS Based on Designated Use of Water Bodies

Water Quality Objectives and Standards

In EECCA, water quality objectives and standards have been mistakenly interpreted to mean the same thing. In OECD countries, they have a very different meaning:

- **Surface water quality objectives** are thresholds to be maintained or achieved within a certain time period through phased pollution control requirements and water resources management measures. Objectives are set by a competent authority responsible for achieving them, in the context of territorial planning. It is, therefore, in the competent authority's interest to define objectives that it has a reasonable expectation of achieving.

  Surface water quality objectives can be expressed in a variety of ways, for example:

  – Water quality should be suitable for a specific water use (e.g., abstraction of drinking water, recreation, etc.);

– Water quality should be suitable for the support and reproduction of certain fish species; or

– A water body should attain a specified pre-defined condition (or class) by a certain date.

- A **surface water quality standard** is a condition, expressed as a limit value, that a particular parameter is required to meet in order to achieve a surface water quality objective.

Use-based Classification of Water Bodies

Since water bodies used for different purposes may have different water quality requirements, this differentiation should be reflected in a transparent and coherent system of SWQSs. Such differentiation can be achieved by distinguishing different ***use classes***, with each of the classes defining which uses are supported given certain surface water quality. Water quality management through use-based classification of water bodies and establishing target classes for each water body would optimise the public environmental expenditure and focus it where the current water quality falls short of the requirements for vital water uses.

In the framework of the project "Support for Convergence with EU Water Quality Standards in Moldova" (2006-2007)[2], the EAP Task Force Secretariat proposed a surface water use classes scheme which is summarised in Table 1.

Table 1. Proposed Use Classes Scheme for Surface Waters in Moldova

Use/function	*Use differentiation*	Use Class I	Use Class II	Use Class III	Use Class IV	Use Class V
Ecosystem functioning		√	√	-	-	-
Fish breeding/protection	*salmonid*	√	√	-	-	-
	cyprinid	√	√	√	-	
Drinking water supply	*simple treatment*	√	√	-	-	-
	normal treatment			√	-	-
	intensive treatment				√	-
Bathing/recreation		√	√	√	-	-
Irrigation		√	√	√	√	-
Industrial water use (process, cooling)		√	√	√	√	-
Power generation		√	√	√	√	√
Minerals extraction		√	√	√	√	√
Transportation		√	√	√	√	√

√ use/function supported
\- use/function not supported/allowed

The five use classes can be characterised as follows:

- Use Class I corresponds to a virtually undisturbed, natural aquatic system. All intended uses are supported by waters of this use class.

[2] The project was supported by the UK Department for Environment, Food and Rural Affairs.

- Water with quality complying with the standards for Use Class II will support all uses adequately, including properly functioning aquatic ecosystems. Simple treatment methods will suffice for the preparation of drinking water.

- Under Use Class III, simple treatment methods no longer suffice for drinking water preparation. The conditions required by salmonid fish waters may no longer be supported.

- Use Class IV will allow only for low/no quality demanding uses and will require intensive treatment of the raw surface water abstracted for drinking water production. Here even the conditions for cyprinid fish may no longer be supported.

- Use Class V waters only will suffice for no-quality demanding uses like power generation.

The principles of use-based classification of water bodies are inscribed in the draft new Water Law of Moldova and the draft Rules for Protection of Surface Waters (both are expected to be adopted in 2008).

It is important to stress that this scheme is designed not just as a passive assessment tool (to characterise the quality of water bodies) but as an active *water management and decision making tool.* The use class system would allow competent authorities to set priorities for water uses and for investments in drinking water treatment and water pollution reduction measures. The system also permits long-term planning to gradually improve surface water quality across the country.

Its implementation requires that competent authorities follow a series of steps:

1. Define all the country's water bodies based on the analysis of the characteristics of the river basin, of pressures, impacts on water quality, and existing water uses.

2. Explicitly identify and agree desirable water uses for each water body.

3. Assess the existing water quality conditions with respect to the applicable standards for the classes corresponding to the intended water uses.

4. Conduct an affordability analysis of measures that would be necessary to achieve the desired use class, if the current water quality conditions fall short of the respective requirements.

5. Assign a target use class to the water body and adopt a water quality management programme to achieve and/or maintain it.

The related water quality requirements are then determined by the national regulation setting SWQSs for each class.

Setting Numerical Values of Surface Water Quality Standards

Notwithstanding the strong analytical capacity of scientific institutions in EECCA countries, the elaboration of new SWQS would take a long time and face an uncertain outcome. One feasible option for EECCA countries to come up with numerical values for SWQSs is to use standards stipulated in EU Directives (see Box 1) as a benchmark. It is possible to do so by adopting water quality standards that correspond to individual water use classes. Other international benchmarks can be used as well.

Box 1. Surface Water Quality Regulation in the European Union

In the EU, SWQS are set in relevant Directives, traditionally based on the type of water use:

- Directive 75/440/EEC "concerning the quality required of surface water intended for the abstraction of drinking water" contains a list of 46 parameters with guide values and mandatory values for three different categories of treatment, depending on the actual surface water quality. This Directive was repealed in 2007 by the WFD.

- Directive 76/160/EEC "on the quality of bathing waters" stipulated 19 physical, chemical and microbiological (groups of) parameters and required Member States to monitor their fresh water and coastal water bathing areas according to specific sampling frequencies. Directive 2006/7/EC replaced the 1976 Directive and specified only two microbiological parameters, with others to be regulated under the Water Framework Directive.

- Directive 78/659/EEC "on the quality of freshwaters needing the protection or improvement in order to support fish life" defined guidance and mandatory values for 14 parameters for salmonid fish waters and cyprinid fish waters, along with requirements for sampling and monitoring. This Directive will be repealed at the end of 2013.

- Directive 76/464/EEC "on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community" and several "daughter Directives" require Member States to control emissions of listed dangerous substances by a permit system. These Directives will be repealed at the end of 2012.

The Water Framework Directive 2000/60/EC introduced new water management approaches, including the overall goal of achieving "good status" for all EU waters by 2015. For surface waters, "good status" is determined by both the ecological status (reflected by hydro-biological parameters) and the chemical status. For the latter, the WFD defined a group of 33 "Priority Substances" whose presence in the waters must be progressively reduced or, in the case of hazardous substances, phased out (most Priority Substances were listed in Directive 76/464/EEC). In July 2006, the European Commission adopted a Proposal for a Directive "on environmental quality standards in the field of water policy and amending Directive 2006/60/EC" which contains SWQS for all 33 Priority Substances and eight "other" pollutants, such as DDT.

The number of regulated parameters should be limited to those that can be effectively monitored with the limited technical capacity and human resources available. The SWQS system proposed for Moldova under the EAP Task Force project covers a clearly outlined and relatively small number of specific pollutants. Instead of more than 1000 pollutants regulated presently in Moldova, 77 parameters of potential interest were included in the proposed new system, among which all Priority Substances of the Water Framework Directive (see Annex 1). Since for some of these parameters there is currently no laboratory analysis capacity or expertise (which is also the case for a vast majority of pollutants regulated now), the Government of Moldova should decide which of the Priority Substances should indeed be regulated.

Numerical values of SWQSs were recommended so as to reflect water use designation. Each use class has a set of SWQS characterising the respective water quality. In several cases, the concentration levels of the relevant use class boundaries are comparable to the current standards, notably those for drinking water supply. However, the values of the proposed SWQSs are in many cases higher (less stringent) even for use classes I and II than the existing MACs for fishery water bodies.

It is important that the EU or other international norms be adapted, as appropriate, to local conditions (e.g., particularities of the natural environment). For example, water quality data for two pilot areas indicated that Moldovan surface waters were rather alkaline, with pH values frequently between 8.5 and 9, so the recommended standards were adjusted accordingly[3].

A key advantage of the EU-inspired system proposed for Moldova is that it enables the integration of all uses, parameters and quality standards into one regulatory framework for integrated water management in an explicit and transparent way (as opposed to the present duplication between environmental and health regulations). It is fully consistent with the integrated water resources management approach.

2.2. Regulation of Total Impact on Water Bodies

Over the last 10 years, there has been a clear trend in Russia to try to regulate the total impact on water bodies from pollution (chemical, physical, bacteriological, and radioactive), water abstraction, as well as engineering projects. Some other EECCA countries, including Kazakhstan, have followed Russia's approach but have not advanced far in its implementation. This is why this section essentially analyses Russia's approach and demonstrates some of its shortcomings.

Already in 1999, Russia's Ministry of Natural Resources (MNR) issued "Methodological Guidance for the Development of Maximum Allowable Harmful Impacts (MAHI) on Surface Water Bodies" on the basis of the previous Water Code (1995). Maximum Allowable Harmful Impacts (MAHI) limits were intended to represent threshold values for the carrying capacity of a water body. MAHI were supposed to be elaborated for individual water bodies and used for water quantity and quality planning, environmental impact assessment, licensing of water abstraction, and permitting of wastewater discharges[4].

In 2002-2003, the Russian Research Institute of Water Management developed a detailed methodology for the calculation of MAHI. It included recommendations for the delimitation of water bodies, hierarchy of water uses, and development of location-specific water quality standards. It was suggested to calculate maximum allowable impacts with the help of special software based on a water quality forecast model. In 2005-2006, several demonstration projects were carried out (e.g., on the Vyatka River) to test this approach. The methodology was supposed to be officially approved by the MNR in September 2006, but the promulgation of the new Water Code in June 2006 (74-FZ) interfered with this process.

Article 35 of the new Water Code states that *"norms of allowable impact on water bodies"* are based on maximum allowable concentrations of chemical substances, radioactive substances, micro-organisms and other water quality indicators. It also introduced the notion of *water quality targets* which are developed by the federal government for river basins or their sections, taking into account target uses of the relevant water bodies (however, it does not say how those targets should be set). The norms of allowable impact (NAI) represent essentially the same concept as MAHI.

The new Russian Government Resolution No. 881 of 30.12.2006 "On the Procedure for Adoption of Norms of Allowable Impact on Water Bodies" defined NAIs on water bodies as the allowable cumulative impact from all sources. NAIs for chemical and suspended mineral substances are defined

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[3] Further "fine-tuning" of the proposed SWQSs to the local conditions could not be accomplished within the framework of the EAP Task Force project in Moldova.

[4] The concept of MAHI was also incorporated into the Water Code of Kazakhstan of June 2003 and the Kazakh Government Resolution of 19.01.2004 on the procedure for the development of MAHI.

as the total mass of the inflow of the regulated substances over a given time period (g/hr, t/yr, etc.). NAIs are set for critical hydrological conditions, under which the regulated impact is the greatest.

The Federal Water Resources Agency has been given the responsibility to develop NAIs in collaboration with other relevant federal agencies. The "Methodological Guidance on the Development of Norms of Allowable Impact on Water Bodies" was adopted by a ministerial decree of 12.12.2007.

The NAI Guidance states that NAIs are developed and approved for individual water bodies or their sections in accordance with the hydrographic and water use designation. The target water use designation is supposed to be stipulated in a regulation[5]. The total mass of input of chemical and other pollutants into a water body should be calculated on the basis of a mass balance considering all sources of impact, characteristics of the substances' migration and transformation, and the water body's assimilative capacity.

The Guidance stipulates a procedure for the determination of NAIs for water bodies, which includes, among others:

1. Designation of sections of water bodies with specific priority water uses;

2. Data collection on the water body and main activities having an impact on water quality, and identification of impacts to be regulated;

3. Retrospective analysis of existing monitoring data for hydro-biological and hydro-chemical parameters to determine local background conditions;

4. Analysis of the monitoring data to identify substances to be regulated in the given water body;

5. Assessment of the actual conditions in the water body in relation to the background concentrations and SWQSs for different categories of water uses; and

6. Calculation of NAIs for individual types of impact (e.g., industry, agriculture, urban areas) for certain periods of time (a year, a specific season), using the formulas given in the Guidance.

While there have been experiments with the development of NAIs at the sub-national level in Russia, a nationwide system described in the NAI Guidance is yet to be established. Recognising the complexity of the development of NAIs, many Russian experts now advocate setting NAIs only for priority parameters for most important water bodies.

While the NAI approach is said to be linked to water uses, it is still primarily tied to the old system of MACs. For example, the NAI Methodological Guidance states that for highly dangerous substances NAIs should be based on MACs for fishery water bodies. For microbiological parameters, NAIs correspond to sanitary norms.

More generally, NAIs represent a pollution control system that is relatively simple to describe but difficult to implement. It requires a great amount of scientific data and knowledge about the paths of

[5] The Guidance distinguishes only three categories of water uses: specially protected natural areas, drinking water abstraction, and fisheries.

pollutants across media and ecosystems, about their ecological impacts and effects in the food chain. This information is often not available in EECCA and is limited by the insufficient understanding of the complexity of ecosystem processes[6]. The development of NAIs will be burdensome and very demanding in terms of resources, capacity, and time. This process is expensive, site-specific, heavily reliant on science and on monitoring and almost completely dependent on the ability and political will of regulators to carry it out. The difficulties with the practical implementation of this system in Russia support these concerns.

A similar concept was introduced in the United States under the Clean Water Act which required states to identify waters that fail to meet the applicable water quality standards and develop Total Maximum Daily Loads (TMDLs) for them. A TMDL specifies the maximum amount of a pollutant that must be reduced to meet the water quality standard and allocates pollution loadings among point and non-point sources in a watershed. TDMLs are expected to provide a scientific and policy basis for taking actions needed to restore the water body. However, due to the complexity of this approach, relatively few TDMLs have been developed since 1972[7].

In the EU, no Member State has legislation using the concept of maximum allowable pollution loads for regulatory purposes. Exercises to calculate mass balances and consecutive maximum loads may be carried out as a support tool for water managers in order to obtain a better understanding of the overall situation, get an indication about which would be the major sources of pollution, and prioritise pollution abatement measures.

3. REGIONAL EXPERT MEETING

The regional expert meeting "Reforming Surface Water Quality Regulation in EECCA" brought together representatives of nine EECCA countries and Romania (as a lead country of the EU Water Initiative EECCA Working Group), international organisations, and consultants.

The expert meeting participants confirmed that in all EECCA countries the old system based on Soviet-era MACs is still in place, and the countries have been either unwilling to reform it or lacked expertise and resources to do it.

The speakers presented two different approaches to the reform of SWQSs in EECCA countries: one inspired by the EU legislation and proposed for Moldova, the other evolved in the Russian Federation. The EU-inspired approach puts an emphasis on water use-based classification of water bodies and implies a radical reduction in the number of regulated parameters compared to the present number of MACs in EECCA. It allows the adaptation of already existing standards to country-specific conditions but, on the other hand, necessitates the introduction of technique-based permitting of effluents to prevent discharges of pollutants not included in the SWQS system and ensure continuous

[6] For instance, it is very difficult to determine the natural background concentration of physico-chemical parameters. The assessment of loads from non-point sources like agriculture or atmospheric deposition is complicated and requires well-tuned (calibrated) models and extensive data, e.g., on the application of fertilisers or pesticides.

[7] Recently, NGOs began to take legal actions to compel the states and the U.S. EPA to develop TDMLs.

improvement. The Russian approach relies heavily on water quality monitoring data and scientific analysis of each water body's assimilative capacity.

The participants discussed the main advantages and challenges of each of the two approaches. The fact that Moldova is pursuing the implementation of a use classification-based SWQS system was seen as encouraging by other EECCA countries. The ongoing technical assistance projects with activities on water quality regulation in western EECCA countries and Central Asia[8] are likely to further build on the approach proposed for Moldova. At the same time, the approach of setting norms of allowable impact on water bodies adopted in Russia, while conceptually interesting, may be very difficult to implement in EECCA due to its data intensity and analytical complexity.

The participants also emphasised the linkages between the reform of surface water quality regulation and wastewater discharge regulation, water pollution charges, etc., creating a need for concerted efforts in environmental regulatory reform. It was reaffirmed at the meeting that special stakeholder interests, low public awareness, insufficient human resources, and funding deficit represent important barriers to this reform. In addition, to effectively reform the SWQS system, it will be crucial to improve the current surface water quality monitoring programmes through targeted selection of monitoring parameters per water body, extending the laboratory capacity, and increased sampling and analysis frequencies.

[8] The EU Tacis project "Water Governance in Western EECCA" (2008-2010), the EU Tacis project "Environmental Collaboration for the Black Sea" (2007-2009), and the UNECE project "Water Quality in Central Asia" (2008-2011).

ANNEX 1. PROPOSED SURFACE WATER QUALITY STANDARDS FOR MOLDOVA

Parameter (*group*)		**Acronym**	**Unit**	**Use Class I**	**Use Class II**	**Use Class III**	**Use Class IV**	**Use Class V**
GENERAL CONDITIONS								
Thermal conditions								
Water temperature		T_{water}	[°C]	*natural temperature variations*	cold waters: 20 °C summer, 5 °C winter warm waters: 28 °C summer, 8 °C winter	cold waters: 20 °C summer, 5 °C winter warm waters: 28 °C summer, 8 °C winter	cold waters: >20 °C summer, >5 °C winter warm waters: >28 °C summer, >8 °C winter	cold waters: >20 °C summer, >5 °C winter warm waters: >28 °C summer, >8 °C winter
Oxygenation conditions								
Dissolved oxygen		O_2	[mg O_2/l]	≥7 (*or BG*)	≥7	≥5	≥4	<4
Biochemical oxygen demand (5 days)		BOD_5	[mg O_2/l]	3 (*or BG*)	5	6	7	>7
Chemical oxygen demand, permanganate method		COD_{Mn}	[mg O_2/l]	<7 (or BG)	7	15	20	>20
Nutrient conditions								
Total nitrogen		N_{tot}	[mg N/l]	1.5 (*or BG*)	4	8	20	>20
Nitrate		NO_3	[mg N/l]	1 (*or BG*)	3	5.6	11.3	>11.3
Nitrite		NO_2	[mg N/l]	0.01 (*or BG*)	0.06	0.12	0.3	>0.3
Ammonium		NH_4	[mg N/l]	0.2 (*or BG*)	0.4	0.8	3.1	>3.1
Total phosphorus		P_{tot}	[mg P/l]	0.1 (*or BG*)	0.2	0.4	1	>1
Ortho-phosphates		PO_4	[mg P/l]	0.05 (*or BG*)	0.1	0.2	0.5	>0.5
Salinity								
Chloride		Cl^-	[mg/l]	200 (*or BG*)	200	350	500	>500
Sulphates		SO_4	[mg/l]	<250 (*or BG*)	250	350	500	>500
Total mineralization		Min_{tot}	[mg/l]	<1000 (*or BG*)	1000	1300	1500	>1500
Acidification status								
pH		pH	[-]	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	<6.5 or >9.0
Other parameters								
Floating materials			*[visual inspection]*	absent	absent	absent	absent	might be present
Total iron		Fe_{tot}	[mg/l]	<1 (*or BG*)	1	3	5	>5
Manganese		Mn	[mg/l]	<0.1 (*or BG*)	0.1	1	2	>2
Odour (20 °C and 60 °C)			[point]	*<2 (or natural smell)*	2	2	4	>4
Colour			[grade]	*<35 (or natural colour)*	35	120	200	>200
Phenols			[mg/l]	0.001 (*or BG*)	0.001	0.005	0.1	>0.1
Oil products			[mg/l]	0.05	0.1	0.5	1	>1
TRACE METALS								
Cadmium	total (*SS= 30 mg/l*)	Cd_{tot}	[µg/l]	<1 (*or BG*)	1	5	5	>5
	dissolved	Cd_{diss}	[µg/l]	<0.2 (*or BG*)	0.2	1	1	>1
Lead	total (*SS= 30 mg/l*)	Pb_{tot}	[µg/l]	<50 (*or BG*)	50	50	50	>50
	dissolved	Pb_{diss}	[µg/l]	<2.5 (*or BG*)	2.5	2.5	2.5	>2.5
Mercury	total (*SS= 30 mg/l*)	Hg_{tot}	[µg/l]	<1 (*or BG*)	1	1	1	>1
	dissolved	Hg_{diss}	[µg/l]	<0.2 (*or BG*)	0.2	0.2	0.2	>0.2
Nickel	total (*SS= 30 mg/l*)	Ni_{tot}	[µg/l]	10 (*or BG*)	25	50	100	>100
	dissolved	Ni_{diss}	[µg/l]	8 (*or BG*)	20	40		
Copper	total (*SS= 30 mg/l*)	Cu_{tot}	[µg/l]	<50 (*or BG*)	50	100	1000	>1000
	dissolved	Cu_{diss}	[µg/l]	<20 (*or BG*)	20	40	400	>400
Zinc	total (*SS= 30 mg/l*)	Zn_{tot}	[µg/l]	<300 (*or BG*)	300	1000	5000	>5000
	dissolved	Zn_{diss}	[µg/l]	<70 (*or BG*)	70	233	1163	>1163
BACTERIOLOGICAL PARAMETERS								
Lacto positive bacteria			[№/l]	1,000	10,000	50,000	>50,000	>50,000
Colifages			[№/l]	absence	100	100	100	>100

Parameter (*group*)	Acronym	Unit	Use Class I	Use Class II	Use Class III	Use Class IV	Use Class V
Ovum of Helmintes		[-]	should not be detected	should not be detected	should not be detected	should not be detected	might be detected
Coliforms total		[№/100 ml]	500	5,000	10,000	50,000	>50,000
Coliforms faecal		[№/100 ml]	100	2,000	10,000	20,000	>20,000
Streptococci faecali		[№/100 ml]	20	1,000	5,000	10,000	>10,000
Intestinal enterococci		[cfu/100 ml]	<200	200	400	>400	>400
Escherichia coli		[cfu/100 ml]	<500	500	1,000	>1,000	>1,000
WFD PRIORITY SUBSTANCES (organic micropollutants)							
Alachlor		[µg/l]	0.3	0.5	0.6	0.7	>0.7
Anthracene		[µg/l]	0.1	0.25	0.34	0.4	>0.4
Atrazine		[µg/l]	0.6	1.3	1.7	2	>2
Benzene		[µg/l]	10	30	42	50	>50
Pentabromodiphenylether		[µg/l]	0.0005	0.001	0.0013	0.0015	>0.0015
C10-13-chloroalkanes		[µg/l]	0.4	0.9	1.2	1.4	>1.4
Chlorfenvinphos		[µg/l]	0.1	0.2	0.26	0.3	>0.3
Chlorpyrifos		[µg/l]	0.03	0.065	0.086	0.1	>0.1
1,2-Dichloroethane		[µg/l]	10	20	26	30	>30
Dichloromethane		[µg/l]	20	40	52	60	>60
Di(2-ethylhexyl)phthalate (DEHP)		[µg/l]	1.3	2.6	3.4	3.9	>3.9
Diuron		[µg/l]	0.2	1	1.5	1.8	>1.8
Endosulfan		[µg/l]	0.005	0.0075	0.009	0.01	>0.01
Fluoranthene		[µg/l]	0.1	0.55	0.82	1	>1
Hexachlorobenzene		[µg/l]	0.01	0.03	0.04	0.05	>0.05
Hexachlorobutadiene		[µg/l]	0.1	0.35	0.5	0.6	>0.6
Hexachlorocyclohexane		[µg/l]	0.02	0.03	0.036	0.04	>0.04
Isoproturon		[µg/l]	0.3	0.65	0.86	1	>1
Naphthalene		[µg/l]	2.4	4.8	6.2	7.2	>7.2
Nonylphenol		[µg/l]	0.3	1.1	1.7	2	>2
Octylphenol		[µg/l]	0.1	0.2	0.26	0.3	0.3
Pentachlorobenzene		[µg/l]	0.007	0.014	0.018	0.021	0.021
Pentachlorophenol		[µg/l]	0.4	0.7	0.9	1	1
(Benzo(a)pyrene)		[µg/l]	0.05	0.075	0.09	0.1	>0.1
(Benzo(b)fluoranthene)		[µg/l]	∑= 0.03	∑= 0.06	∑= 0.08	∑= 0.09	∑ >0.09
(Benzo(g,h,i)perylene)		[µg/l]	∑= 0.002	∑= 0.004	∑= 0.005	∑= 0.006	∑ >0.006
(Benzo(k)fluoranthene)		[µg/l]					
(Indeno(1,2,3-cd)pyrene)		[µg/l]					
Simazine		[µg/l]	1	2.5	3.4	4	>4
Tributyltin compounds		[µg/l]	0.0002	0.00085	0.00124	0.0015	>0.0015
Trichlorobenzenes (all isomers)		[µg/l]	0.4	0.8	1.04	1.2	>1.2
Trichloromethane (Chloroform)		[µg/l]	2.5	5	6.5	7.5	>7.5
Trifluralin		[µg/l]	0.03	0.06	0.078	0.09	>0.09
OTHER SPECIFIC POLLUTANTS							
DDT total		[µg/l]	0.025	0.05	0.065	0.075	>0.075
para-para-DDT		[µg/l]	0.01	0.02	0.026	0.03	>0.03
Aldrin		[µg/l]	∑= 0.010	∑= 0.020	∑= 0.026	∑= 0.030	∑ >0.030
Dieldrin		[µg/l]					
Endrin		[µg/l]					
Isodrin		[µg/l]					
Carbontetrachloride		[µg/l]	12	24	31	36	>36
Tetrachloroethylene		[µg/l]	10	20	26	30	>30
Trichloroethylene		[µg/l]	10	20	26	30	>30

BG Natural background level SS= Suspended solids