Surface Water Quality Regulation in Moldova: Policy Aspects of the Reform

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EXECUTIVE SUMMARY

The project "Support for Convergence with EU Water Quality Standards in Moldova" seeks to assist the Government of Moldova in revising its system of surface water quality standards (SWQSs) in light of international best practices and domestic capabilities. This reform would make SWQSs technically feasible and enforceable and respond to Moldova's commitment to converge with the EU environmental legislation, including the Water Framework Directive.

This report builds on the detailed technical justification of the proposed new SWQS system and analyses the policy aspects of its implementation, elaborates recommendations for legal and institutional changes to introduce this reform, and outlines the key aspects of the implementation process.

Moldova's current system of surface water quality regulation contains standards for a large number of parameters while the number of those actually monitored is much smaller. Even more importantly, it imposes the same stringent standards on all surface waters in the country without consideration of actual, or realistically planned, water uses.

In most OECD countries, water bodies used for different purposes have different water quality requirements, and SWQS are differentiated in a transparent and coherent way. The report proposes that a similar approach be applied in Moldova, involving the specification of five different *use classes*, with each class defining which uses are supported by certain surface water quality. The proposed new SWQS system covers a clearly outlined and relatively small number of specific pollutants. Numerical values of SWQSs are proposed on the basis of international benchmarks in order to reflect water use designation.

Like the current Moldovan SWQS system, the proposed one contains surface water quality requirements to support the principal water uses – drinking water supply, fish breeding/protection and recreation. At the same time, it introduces a principally new approach to water quality management.

The new scheme is designed as a flexible *water management planning tool* in order to optimise public environmental expenditure and focus it where the current water quality falls short of the requirements for vital water uses. The water quality planning process should comprise the following stages:

1. Definition of all water bodies;
2. Identification of, and agreement on, desirable water uses for each water body;
3. Assessment of the existing water quality conditions;
4. Affordability analysis of measures necessary to achieve the desired use class; and
5. Assignment of a target use class to the water body and adoption of a water quality management programme to achieve and/or maintain it.

The new system will enable the integration of all uses, parameters and quality standards into one regulatory framework in an explicit and transparent way. It also allows long-term planning to gradually improve surface water quality across the country.

The implications of the introduction of a new SWQS system for effluent regulation will primarily concern wastewater treatment plants (WWTPs) which are the only sources of direct point source pollution discharges in Moldova. It is recommended that Moldova follow the combined approach to regulating discharges from WWTPs: apply the requirements of the European Union's Urban Waste Water Treatment Directive (91/271/EEC) but check compliance with the new SWQSs when setting plant-specific Effluent Limit Values (ELVs) in permits. This would allow Moldova to set realistic, achievable effluent requirements in accordance with local water quality objectives and to prioritise its limited funding allocations for investments into municipal wastewater treatment.

The proposed system of SWQS does not entail fundamental changes in the current surface water quality monitoring programmes, but a number of adjustments would be needed, including increasing sampling and analysis frequencies, extending the laboratory capacity, and targeted selection of monitoring parameters per water body (limiting the analysis to parameters relevant for the designated uses).

The draft Water Law of August 2007 submitted to the Government by the Apele Moldovei Agency is largely consistent with this project's proposal for a new system of surface water quality standards in Moldova. However, some of its provisions require further elaboration.

Building on the existing institutional capacity, it is recommended that the proposed new system of surface water quality management be implemented via three institutional elements: (a) an authority in charge of water quality planning and monitoring; (b) an authority in charge of water and wastewater regulation, permitting and enforcement, and (c) improved surface water quality monitoring services.

The creation of a Water Resources Management Authority (WRMA) will require integration of water quantity/use and quality management functions from a river basin planning perspective, possibly on the institutional basis of the Apele Moldovei Agency. The WRMA would be responsible for determination of water resources management priorities, objectives and principles; water management planning; and regulation and authorisation of different types of water use. The functions of permitting and monitoring wastewater discharges and enforcing effluent requirements are presently exercised by the State Ecological Inspectorate. Maintaining this structure would preserve the existing institutional capacity. In setting permit conditions for wastewater discharges into water bodies, the agency would use SWQSs corresponding to the classes assigned to each water body by the WRMA. The institutional responsibilities for surface water monitoring would need to be optimised between the Hydro-meteorological Service and the National Centre for Preventive Medicine.

The changes required in Moldova's legal framework to reform the country's surface water quality regulation and water resources management in general will be needed at two levels: primary laws and implementing regulations. Apart from the promulgation of a new Water Law, amendments would have to be made to a number of existing legal acts to harmonise them with the new regulatory approach. Following the adoption of the new Water Law, it will be a priority to develop and promulgate new Rules for Protection of Surface Waters (RPSW). The new RPSW should be an *integrated* regulation addressing all water uses requiring certain water quality (via the proposed classification system).

The barriers to the reform of the SWQS system in Moldova include stakeholder misperceptions, limited institutional capacity, and scarce funding.

- The stringency of the current SWQSs appeals to many environmental and health officials and some NGOs who see in them a reflection of commitment to high environmental quality. Addressing this misperception will require informing and involving the public and promoting awareness of the reform's benefits through educational workshops and mass media.

- There is not only a general lack of staff but also insufficient competence in the modern concepts and tools of water resources management. This gap should be addressed through a substantial capacity development effort.

- Increased budget allocation for improved water management should be the principal source of funding for the reform. However, if the Moldovan government demonstrates its strong commitment to the reform, it may be able to attract donor support as well, primarily for the capacity building efforts.

The new system of SWQSs can be implemented relatively rapidly, within a period of four years. The first year would be marked by the adoption of a transition strategy and a new Water Law. In the second year, the institutional changes would be implemented. The new SWQSs will enter into force in the third year of the process, together with the assignment of target water quality classes to all Moldova's water bodies in accordance with a use-based classification system. Finally, in the fourth year, the applicable SWQSs would be used to set permit requirements for direct wastewater discharges.

ABBREVIATIONS AND ACRONYMS

BAT	Best available technique
BOD	Biochemical oxygen demand
COD	Chemical oxygen demand
DEFRA	Department for Environment, Food and Rural Affairs (United Kingdom)
EAP TF	Task Force for Implementation of the Environmental Action Programme for Eastern Europe, Caucasus and Central Asia
EECCA	Eastern Europe, Caucasus and Central Asia
EC	European Commission
ELV	Effluent limit value
EQS	Environmental quality standard
EU	European Union
GoM	Government of Moldova
Hydromet	State Hydro-meteorological Service
HR	Hygienic Regulation
ICPDR	International Commission for the Protection of the Danube River
IPPC	Integrated pollution prevention and control
MAC	Maximum allowable concentration
MAFP	Ministry of Agriculture and Food Production
MENR	Ministry of Ecology and Natural Resources
MHSP	Ministry of Health and Social Protection
NCPM	National Centre of Preventive Medicine (also referred to as Sanepid)
OECD	Organisation for Economic Cooperation and Development
p.e.	population equivalent

RPSW	Rules for Protection of Surface Waters
SEI	State Ecological Inspectorate
SWQS	Surface water quality standard
UNECE	United Nations Economic Commission for Europe
WFD	Water Framework Directive (EU)
WRMA	Water Resources Management Authority
WWTP	Wastewater treatment plant

1. INTRODUCTION

1.1. Context and Need for Reform of Surface Water Quality Management in Moldova

The protection of water resources is one of the key priorities established in the Concept of the Environmental Policy of the Republic of Moldova (2001), which also calls for the "revision of existing laws and regulations, convergence with European norms, and adjustment or elaboration of necessary mechanisms for their implementation." The same orientation is expressed in the EU-Moldova Action Plan signed in 2005, which also calls for Moldova's active participation in the Danube-Black Sea Task Force to implement the trans-boundary approach to water management and the EU Water Initiative. Moldova is party to the Danube River Protection Convention (1994) and a subsequent inter-governmental agreement with neighbouring Romania (1997) which emphasises the harmonisation of legislation and technical standards in the water sector. These commitments give an additional impetus to Moldova's convergence with the EU environmental norms, which were recently adopted by Romania.

Moldova's existing system of surface water quality standards (SWQSs) is comprehensive and ambitious, covering hundreds of pollutants and mandating very low concentrations of contaminants. To date, some reform of the system has been carried out but it is still based primarily on the approach established under the Soviet Union. 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.

1.2. Project Description

The project "Support for Convergence with EU Water Quality Standards in Moldova" is supported by the UK Department for Environment, Food and Rural Affairs and implemented by the EAP Task Force Secretariat (located at the OECD Environment Directorate in Paris) in the framework of its programme for environmental policy reform in Eastern Europe, Caucasus and Central Asia (EECCA). While Moldova's Ministry of Ecology and Natural Resources is the project's main beneficiary, other important stakeholders include the State Hydro-meteorological Service (Hydromet), the National Centre of Preventive Medicine (under the Ministry of Health and Social Protection), the Apele Moldovei water management agency, etc.

The *project's objective* is to make Moldova's surface water quality regulation fairer, more economically feasible and realistic, bringing it closer to the respective approaches used in the European Union. In the project's first phase, following an analysis of the current Moldovan system of surface water quality standards (SWQS) and a number of benchmarks (relevant EU Directives, the system in neighbouring Romania, and recommendations of various international organisations), the project team developed a proposal for an improved SWQS system. As described in detail in the Technical Report "Proposed System of Surface Water Quality Standards for Moldova", this new SWQS system comprises three principal components:

- a use-base hierarchical (i.e., ranked in order of decreasing water quality) classification of water bodies into five classes;

- a list of 77 water pollution parameters to be regulated, consistent with the intended use(s) of water bodies and taking better account of the existing monitoring capacity; and

- numerical values of water quality standards for each class of water quality.

In Phase 2 of the project, the proposed SWQS system's implications were tested through pilot studies in two locations: (1) on the Dniester River between the Dubasari dam and the town of Vadul-lui-Voda, passing by the town of Criuleni; and (2) on the Bic River between the town of Calarasi and the Ghidigichi reservoir. The report "Reform of Surface Water Quality Standards in Moldova: Pilot Study of Key Implementation Aspects" addresses the reform's ramifications for water quality planning and monitoring as well as effluent requirements and compliance costs for wastewater treatment plants, Moldova's principal point source of water pollution.

This report represents the third, final phase of the project.

1.3. Purpose and Outline of the Report

The purpose of this report is to:

1. analyse the policy aspects of the implementation of the new proposed SWQS system;

2. elaborate recommendations for legal and institutional changes to introduce this reform;

3. outline the key steps of the implementation process.

Chapter 2 gives an overview of the existing legal and institutional framework for water resources management in Moldova. *Chapter 3* discusses the policy framework necessary for the implementation of the proposed SWQS system, including water quality planning and monitoring and effluent regulation. *Chapter 4* outlines suggestions for an improved institutional structure for water quality management that would be complementary to the reformed regulatory framework and contains recommendations for the changes in Moldova's legislation to enable the reform of surface water quality regulation. Finally, *Chapter* 5 addresses the transition to the new system by outlining the main steps and principal constraints of the reform process.

2. EXISTING LEGAL AND INSTITUTIONAL FRAMEWORK FOR WATER MANAGEMENT

This chapter briefly describes the key Moldovan legislation relevant to water quality management and respective responsibilities of the country's existing governmental bodies and points out their main weaknesses. The Government of Moldova is currently considering a draft a new Water Law as part of its strategy of convergence with the EU legislation. The new Water Law is likely to change the regulatory and institutional arrangements for water management. Its draft provisions are considered in connection with this project's legal and institutional recommendations to implement the proposed reform of SWQSs.

2.1. Current Water Quality Legislation

The Water Code (1993, last amended in 2005) contains very general provisions with respect to water quality management. It stipulates that discharge of wastewater is allowed only if it does not increase the concentration of pollutants in ambient water to the levels higher than the maximum allowable concentrations (MACs) which are defined in implementing regulations. The Water Code also lists the main uses of Moldova's surface waters but does not provide for a use-based classification of water bodies or a mechanism for taking account of their use in defining water quality requirements.

The Law on Sanitary-Epidemiological Safety of the Population (1993, amended in 1996), requires that the quality of raw water used for communal/domestic (drinking) and recreational purposes be in accordance with hygienic requirements. The Law on Drinking Water of 1999 indicates that protection of drinking water sources is obligatory and should be done in accordance with sanitary-ecological requirements, by applying pollution prevention and other measures.

In addition, the legislation governing fisheries has serious implications for water management in Moldova. The Law on the Animal Kingdom of 1995 (Annex II) stated that "all water bodies… located on the territory of the country, which are or potentially can be used for breeding and catching of fish and other aquatic organisms… are designated as *fishery waters*." The Law on Fish Reserve (Fund), Fishing and Fish-farming (August 2006) defines natural and artificial "fish management water bodies" and contains a respective list of ponds, lakes, fish breeding stations, which practically includes all Moldova's surface waters of any significance.

In addition to the primary legislation, Moldovan ministerial regulations have defined surface water quality standards for three designated uses:

- water abstraction for drinking and domestic needs of population and food industry;
- different varieties of recreation activities (socio-cultural use) and for irrigation of crops, which are consumed without thermal pre-treatment;
- commercial fishery and fish farming, including protection of any aquatic organisms.

The actual surface water quality standards are stipulated in:

- the Rules for Protection of Surface Waters (RPSW) of 1991 (adopted by the State Committee for Environmental Protection of USSR) for fishery water bodies; and

- the Hygienic Regulation (HR) No. 06.6.3.23. of 3 July 1997 "Protection of Water Bodies against Pollution" issued by the Ministry of Health of the Republic of Moldova for water bodies used for drinking water supply and recreation.

The current system of surface water quality standards in Moldova was analysed in detail and compared with the respective EU system in the Technical Report "Proposed System of Surface Water Quality Standards for Moldova". This analysis reached the following main conclusions:

a) Compared with equivalent EU regulations, Moldova generally applies 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. 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).

b) Since all Moldovan surface waters are designated as (potentially) suitable for fishery, surface water bodies that are merely used for abstraction of drinking water or recreation also have to comply with the more stringent MACs for fishery waters.

c) The Moldovan system of SWQS contains a substantially larger number of parameters (over a thousand) expected to be regulated than the equivalent EU Directives. However, the Water Framework Directive (WFD) Priority Substances are covered for about one-third of the parameters only.

d) Compared to the large number of regulated parameters, the number of actually monitored parameters is rather small (81). Notably, the toxic pollutants are poorly covered in the current monitoring programmes. In addition, the main central laboratories are not always able to analyse monitored micro-pollutants at concentration levels corresponding to the MACs.

2.2. Water Management Institutions

The basic institutional framework for water resources management in Moldova is laid out in the Law on Environmental Protection (1993) and the Water Code. They give the policy and regulatory authority for "water protection" to the environment ministry, presently the *Ministry of Ecology and Natural Resources* (MENR). The MENR is in charge of developing water quality management policies and legislation (however, the new Water Law is being developed by the Ministry of Agriculture). The MENR, which has undergone severe staff cuts over the last decade, has only one or two people dealing water quality issues at the Division of Environmental Pollution Prevention.

The *State Ecological Inspectorate* (SEI), an autonomous subdivision of the MENR with the status of a legal entity, issues permits for water abstraction and wastewater discharges ("special water use") in consultation with other statutory stakeholders, including the water management authority (Apele Moldovei) and health authorities. It also monitors compliance with effluent requirements and imposes administrative sanctions for violation of environmental legislation. At the sub-national level, these functions are performed by district (rayon) offices. A Fishery Service is an institutional part of the

SEI, responsible for monitoring fish populations and controlling fishery activities in the Dniester and Danube/Prut river basins.

Apele Moldovei is a water resources management agency responsible for managing water uses and quantitative allocation of water abstraction, water supply and sanitation planning, as well as delivery of irrigation services. Apele Moldovei also maintains the State Water Cadastre which identifies river basins and individual water bodies and classifies water uses by economic sector. It was subordinated to the Ministry of Agriculture and Food Production (MAFP) until July 2007 when it was made an autonomous government agency and put in charge of water supply and sanitation planning, earlier a competence of the Regional Development Agency. Its sub-national structure comprises inter-district associations that are involved in both water management and irrigation (water supply and sanitation are municipal services).

The *National Centre for Preventive Medicine* (NCPM or "Sanepid") under the Ministry of Health and Social Protection (MHSP) is responsible for monitoring compliance with sanitary water quality requirements for water bodies used for drinking water abstraction and recreation.

Finally, the *State Hydro-meteorological Service* (Hydromet), also institutionally subordinated to the MENR, is in charge of monitoring hydrological and quality parameters of Moldova's surface waters.

The current institutional framework for water resources management is characterised by a number of handicaps:

- Fragmentation of policy, planning, and control functions between different government bodies – MENR, Apele Moldovei, SEI and health authorities;
- Separation between water quality management and management of water uses and quantitative allocations;
- Absence of a strategic, river basin approach to water management and predominance of uncoordinated measures at the level of small administrative districts;
- Problems with access to water quality information collected but poorly managed by Hydromet and Sanepid; and
- Lack of human, technical, and financial resources in all the stakeholder institutions.

3. KEY POLICY ASPECTS OF REFORMING SURFACE WATER QUALITY REGULATION

In 2003, Moldova's Parliament adopted a Concept of the National Policy in Water Resources Management which outlines main directions for reform of Moldova's water management policy framework. It gives a critical assessment of the current system of water quality management, pointing out that:

- the current water legislation is fragmented;
- the existing institutional framework for water resources management is ineffective;
- water resource planning and decision-making is not consistent with the river basin approach; and
- the regulatory base for water resources management (including water quality standards) is obsolete.

The Concept calls for integrated water resources management, including the creation of an appropriate regulatory basis. Importantly, the document suggests a reduction in the number of regulated water quality parameters (based on risk analysis), making water quality standards more realistic while simultaneously strengthening of compliance monitoring and enforcement.

In addition, the Concept justifies the need to develop a national strategy to implement EU concepts of classification of water bodies and differentiation of water quality requirements based on the type of water use (abstraction for drinking water supply, fishery, recreation, irrigation, industrial use, etc.). It also promotes a "pragmatic" approach to managing Moldova's water resources. The proposal of a new system of surface water quality standards for Moldova developed by this project fully conforms to these guiding principles of reform.

The following sections summarise the proposed new SWQS system in the context of Moldova's water management policy and demonstrate what the reform's implications would be for different aspects of surface water quality management in Moldova.

3.1. Main Features of the Proposed SWQS System

Since water bodies used for different purposes may have different water quality requirements, SWQS should also be diversified in a transparent and coherent way. This is proposed to be achieved by distinguishing five different *use classes*, with each of the classes defining which uses are supported given certain surface water quality. Besides distributing the different uses and requirements into five classes, this approach is an important step in convergence with the EU requirements, including the Water Framework Directive (WFD).

The proposed surface water use classes scheme and the corresponding water quality standards are described in the Technical Report. It is summarised in Table 1 with respect to key of water uses supported by water quality conditions of each class.

Table 1. Proposed Use Classes Scheme for Surface Waters

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 (equivalent to WFD's "high status") corresponds to a virtually undisturbed, natural aquatic system. All intended uses are supported by waters of this use class.

- 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. One can expect a deterioration of the aquatic ecosystem.

- 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. In WFD terminology these would be waters of a "bad status".

Like the current Moldovan SWQS system, the proposed one contains surface water quality requirements to support the principal water uses – drinking water supply, fish breeding/protection and recreation. At the same time, it introduces a principally new approach to water quality management, with the following key features:

- The new scheme is designed as a flexible *water management planning tool* in order to optimise the public environmental expenditure and focus it where the current water quality falls short of the requirements for vital water uses. It also allows long-term planning to gradually improve surface water quality across the country.

- The new system will enable the integration of all uses, parameters and quality standards into *one regulatory framework* in an explicit and transparent way (as opposed to the present duplication between environmental and health regulations). It is also fully consistent with the integrated water management approach as a whole.

- The proposed new SWQS system covers a *clearly outlined and relatively small number of specific pollutants*. Instead of more than 1000 pollutants regulated presently, 77 parameters of potential interest are included, 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 are proposed on the basis of international benchmarks (including EU Directives and the classification scheme of the International Commission for the Protection of the Danube River) in order to reflect water use designation. 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 Maximum Allowable Concentrations for fishery water bodies.

3.2. Water Quality Planning Using the Classification System

As mentioned above, the proposed use class scheme should become a water quality management tool. This means that rather than serving only assessment and statistical purposes ("the water of the river in a certain year was of Class III quality"), the system would allow competent authorities to set priorities for water uses and for investments in drinking water treatment and water pollution reduction measures.

The water quality planning process should comprise the following stages (see Figure 1):

1. ***Define all water bodies*** in each of Moldova's two river basins (the Dniester and the Prut) based on the analysis of the characteristics of the river basin, of pressures, impacts on water quality, and existing water uses. Rivers can be divided into several sections, with each section considered separately.

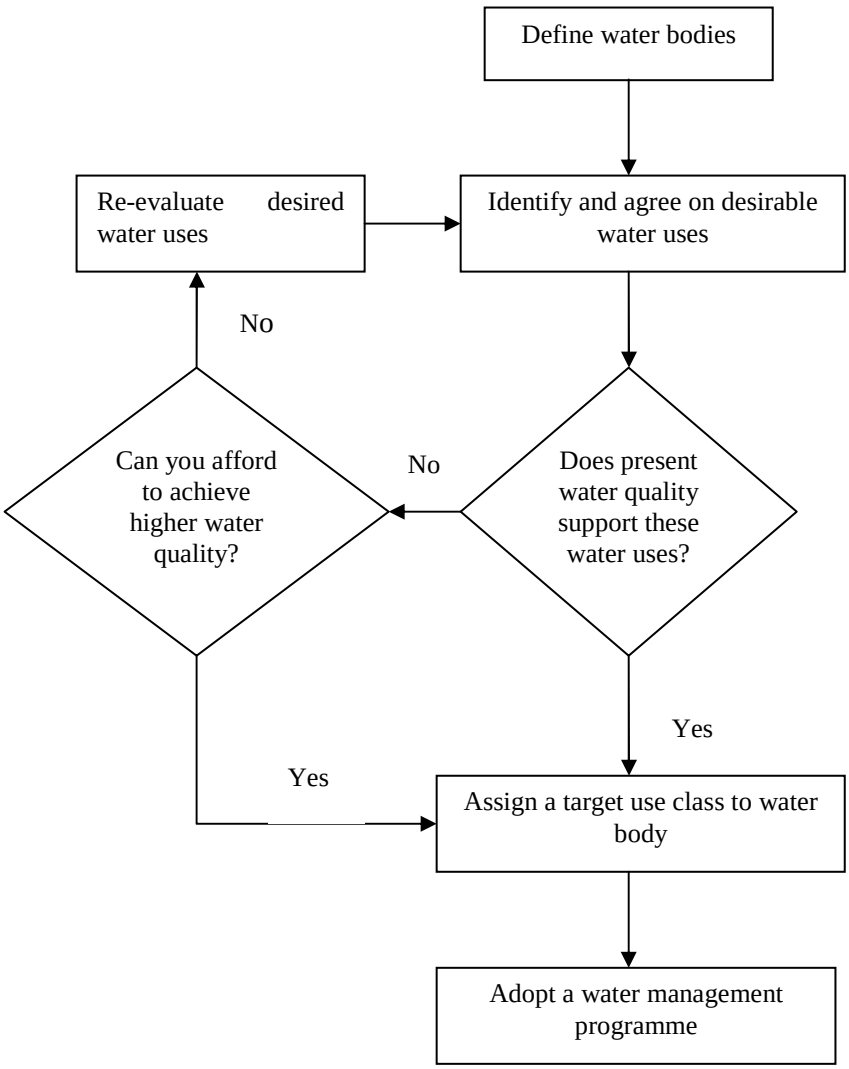
2. ***Explicitly identify and agree desirable water uses*** for each water body. For example, at this stage it could be decided that it is desirable to maintain cyprinid fishery, recreation, and irrigation in a given section of the river (Stages 2 ands 3 are also illustrated by a specific example of a section of the Dniester River in Box 1).

3. ***Assess the existing water quality conditions*** with respect to the applicable standards for the classes corresponding to the intended water use(s) identified in stage 2. All the available monitoring data for the prior 3-5 years should be used. At this stage, it will be clear whether the present water quality conforms to the standards and could support the desired water uses and what class would be reasonable define as a short- or medium-term target. For example, if the intended water uses require Class II water quality and the current water quality only conforms to Class IV, it could only be practicable to set Class III as a target. Unless Class II is set as a target, certain water uses (e.g., salmonid fish protection) would be regarded as unfeasible in the short or medium term. (This would mark a clear departure from the present situation where all Moldovan surface waters are designated as water bodies for potential fishery.)

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. Direct costs could involve construction or upgrades of municipal sewerage systems and wastewater treatment plants, addressing non-point pollution sources, river bed cleanup, etc. In the meantime, certain uses (such as recreation) may have to be forbidden until the relevant requirements are met, which would represent an indirect cost. Other indirect costs are those of individual pollution dischargers to comply with resulting effluent requirements. Moldova may not be able to afford the necessary investments everywhere at the same time. Therefore, prioritisation may be needed, and for some water bodies target classes would be set at the level of the existing water quality conditions so that available funds could be allocated to water bodies where target class requirements dictated by essential water uses are not met.

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.* At the end of the planning period (usually five or six years), the achievement of the target use class should be evaluated. The competent authority may consider setting a more ambitious target for the next planning period, in accordance with national water management objectives, if resources are available to invest in its achievement.

Figure 1. Water Quality Planning Process



Box 1. Target Use Class Designation Process for a Section of the Dniester River

This exercise was conducted by the project team (without stakeholder consultation) for the section of the Dniester River between the Dubasari dam and the town of Vadul-lui-Voda, passing by the town of Criuleni, as part of the pilot case study of key implementation aspects of the proposed reform.

The following water uses and respective classes of water quality requirements have been identified:

- Abstraction for drinking water supply of Chisinau, normal treatment conditions – requires minimum Class III;
- A recreation zone Vadul-lui-Voda of national significance – requires Class III;
- Several dilapidated irrigation systems, could be restored – require Class IV;
- Limited fishery (cyprinid species) – requires Class III.

The conclusion from the analysis of water quality data for 2003-2005 is that both at Dubasari and Vadul-lui-Voda the water quality conformed to Class III (with dissolved oxygen, ammonia, nitrites, oil products, phenols, and pH as limiting parameters).

The study suggested Class II as a target for this pilot area given the trans-boundary status of the Dniester. While the approximate costs of upgrading the wastewater treatment plant at Criuleni to comply with Class II and Class III requirements were estimated, the overall affordability analysis (which should be done at the national level) was not undertaken.

Source: Reform of Surface Water Quality Standards in Moldova: Pilot Study of Key Implementation Aspects.

The entire water quality planning process should be led by the national water resources management authority collecting and incorporating the views of all government stakeholders, water users, and NGOs (see Section 4.2 for the institutional analysis and recommendations).

The new system of SWQS offers the needed flexibility in setting water management options for the long term as well. The system can be used as an instrument to set Moldova's water management objectives, e.g., "All water bodies should comply with Use Class III quality requirements by the year 2015 and with Use Class II quality requirements by the year 2025". The implementation of a water use classification scheme would allow realistic planning, regular performance assessment, and continuous improvement of water quality in Moldova based on optimised expenditure of public funds.

In cases of trans-boundary waters (with Ukraine or Romania), the assignment of target classes of water quality and development and implementation of measures to achieve them should be done in the framework of bilateral inter-governmental agreements. The draft "Agreement of Cooperation in the Protection and Sustainable Development of the Dniester River Basin" currently under preparation between Moldova and Ukraine already envisages consultations on these issues (Article 8).

3.3. Effluent Regulation

This section primarily addresses the regulation of point source water pollution in Moldova. However, for some pollutants point sources have a relatively minor impact: for example, they contribute just 8-10% of all nutrient loads on average across the country[1] (in areas of major municipal wastewater discharges this share is obviously higher). In addition, individual domestic discharges are a major source of BOD: about 70% of Moldovan households are not connected to a sewerage system.

[1] Moldova Facts and Figures, ICPDR, http://www.icpdr.org/icpdr-pages/moldova.htm

Non-point pollution sources must be addressed through other, more comprehensive water quality management measures.

In Moldova, effluent regulation is done via "water use" permits that stipulate both the volume of water that can be used and set effluent limit values (ELVs) for discharges into water bodies based on the ambient water quality requirements. All the country's industrial facilities discharge their wastewater into municipal sewerage systems or wastewater treatment plants (WWTPs), which are in turn the only sources of direct pollution discharges. Therefore, the *implications of the introduction of a new SWQS system for point source effluent regulation will primarily concern wastewater utilities*.

Under the existing water quality legislation, the fishery standards are so stringent that compliance with the respective ELVs would require very expensive wastewater infrastructure investments which Moldova cannot afford. In fact, foreign donors and investors interested in supporting the rehabilitation and upgrading of the rundown sanitation sector[2] balk at the clearly unreasonable present requirements. For years, environmental authorities have been setting "temporary" (less stringent) ELVs in permits for WWTPs, implicitly recognising that the surface water quality requirements are unrealistic.

In addition to the reform of water quality management, the Government of Moldova is considering the introduction of technique-based requirements in environmental permits as part of convergence with EU environmental legislation. Given important linkages between these two reforms, there are several options to regulate discharges from WWTPs.

1. ***Integrated Permitting.*** The introduction of integrated permitting in Moldova, using the approach of the EU Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC), would make best available techniques (BAT) the primary basis for determining case-by-case permit conditions for large industrial installations (as mentioned above, they are indirect wastewater dischargers). Such installations would no longer receive a separate permit for wastewater discharges but an integrated permit that would, along with ELVs, also cover effluent minimisation and treatment techniques, discharges into the sewerage system (currently regulated by agreements between the installation and the municipal wastewater utility), self-monitoring and reporting requirements, etc. Technique-based regulation would also become the means to address numerous toxic water pollutants for which SWQSs would no longer be established. For pollutants regulated by SWQSs, ELVs in integrated permits would have to comply with both BAT and local surface water quality requirements.

   The categories of installations that would be required to obtain integrated permits should be defined in the law. Therefore, *the issue is whether WWTPs should be one of such categories*. While municipal WWTPs are major water polluters, they are considered in the EU as end-of-pipe facilities and not production installations and, therefore, are not subject to integrated permitting[3]. In addition, making municipal WWTPs subject to integrated permitting and BAT requirements would impose a heavy, unfeasible financial burden on the state and municipal budgets.

[2] Of the 580 WWTPs with biological treatment that existed in Moldova in the early 1990s, only 104 were still working in 2003. In many of those, biological treatment is now dysfunctional, further reducing their performance (Republic of Moldova, Second Environmental Performance Review, UNECE, 2005).

[3] In cases where the same operator runs an industrial installation and an industrial wastewater treatment facility directly connected to it, that facility must be treated as a part of the whole installation, and permit conditions should be set for wastewater treatment in an integrated permit.

At the same time, if Moldova introduces integrated permitting, it would affect major polluters such as food processing industry, as permit conditions would limit pollution discharges into municipal sewerage systems. It would also help reduce non-point source water pollution from large livestock farms, which would have to apply best management practices.

2. ***Nationwide technology-based effluent standards.*** The Government of Moldova has recently adopted a Strategy for Water Supply and Sanitation that aims to implement EU requirements for wastewater discharges, i.e., those stipulated by the Urban Waste Water Treatment Directive (91/271/EEC) and presented in Table 2.

Table 2. EU Requirements for Effluent Quality from Urban Wastewater Treatment Plants

Parameter	Concentration in the effluent, mg/l	Comment
Biochemical oxygen demand (BOD_5)	25	
Chemical oxygen demand (COD)	125	
Total suspended solids	35	
Total phosphorus	2	For sensitive areas subject to eutrophication, 1 mg/l for WWTPs of more than 100,000 p.e.
Total nitrogen	15	For sensitive areas subject to eutrophication, 10 mg/l for WWTPs of more than 100,000 p.e.

Source: Urban Waste Water Treatment Directive (91/271/EEC), Annex I

As demonstrated by the analysis in the Pilot Case Study report (see Box 2), while the uniform application across Moldova of the EU standards for non-sensitive areas is the most feasible option economically, it does not account for local water quality conditions, particularly with respect to nutrient pollutants. On the other hand, the construction of WWTPs may not be a priority in those areas where the desired water uses are not significantly affected by the existing municipal discharges as long as the resources available in Moldova for investment in the sanitation sector are very scarce. The report "Existing Situation and Baseline Scenario" produced by the EAP Task Force (OECD, February 2007) as part of the policy dialogue on developing a National Financing Strategy for Urban and Rural Water Supply and Sanitation in Moldova states that significant increases in current sector financing will be required to just maintain existing service levels with modest improvements of efficiency.

3. ***Combined technique-and surface water quality-based approach.*** The applicable SWQSs cannot serve as the only limiting factor in determining ELVs for WWTPs because they are always built with standard technologies allowing a certain degree of pollutant removal. However, even when complying with technology-based standards, effluents from any point source of pollution should not lead to exceedance of established SWQSs for the receiving water body (corresponding to a certain use class under the proposed SWQS system). This is the essence of the combined approach envisaged in the Water Framework Directive. Any direct discharger should demonstrate in a permit application, with the help of a conventional mass balance model, the non-exceedance of the SWQSs for the relevant key parameters. If the analysis shows that the SWQSs are likely to be exceeded, other factors affecting surface water quality in the area should be considered before more sophisticated treatment of municipal discharges is required (e.g., via EU standards for sensitive water bodies). Once the new ELVs are set in permits, they

should be strictly enforced, and the lenience of "temporary" limits should no longer be allowed.

It is recommended that Moldova follow the combined approach to regulating discharges from WWTPs by applying the requirements of the EU Directive 91/271/EEC but checking compliance with the new SWQSs to set plant-specific ELVs in permits. This would allow Moldova to set realistic, achievable effluent requirements in accordance with local water quality objectives and to prioritise its limited funding allocations for investments into municipal wastewater treatment.

Box 2. Benefits of Reform: Results from the Proposed System's Pilot Testing

One of the main hypotheses with respect to the benefits of the implementation of the proposed new SWQS system in Moldova is that effluent limits for wastewater treatment plants based on the approach of surface water quality classes would require lower investment and operational costs than the limits based on current fishery standards; and the water quality with respect to water use would remain acceptable.

In order to check this hypothesis, the pilot study undertook the following calculations:

1. Calculation of the required post-treatment quality of effluents from the towns of Criuleni and Calarasi to achieve compliance with the water quality requirements under the existing and the proposed SWQS systems.

2. Identification of technological solutions for the treatment plants needed to achieve the required degree of wastewater treatment and their rough cost estimate for different scenarios (present fishery standards, proposed SWQSs, and the requirements of the EU Waste Water Treatment Directive for water bodies sensitive and non-sensitive to eutrophication).

The analysis leads to the following general conclusions:

- Current requirements for fishery water bodies are the most stringent and expensive ones to comply with out of all the scenarios considered (the difference in the investment cost per population equivalent between this and the cheapest scenario is roughly two-fold).

- Guided by purely economic considerations, Moldova can follow the route of simple mechanical and biological treatment of wastewater as required by the Urban Waste Water Treatment Directive for non-sensitive areas, which is the least costly option. However, such treatment does not address the issue of nutrient pollution reduction, which is an integral part of Moldova's international obligations. At the same time, the uniform application of the EU's WWTP effluent standards for sensitive areas would be the most costly option.

- The transition to the new SWQS system would allow Moldova to approach the surface water quality planning flexibly, setting more moderate short-term objectives and tightening the requirements in the longer run. One should also take into account the fact that measures to address pollution from livestock farms and municipalities not connected to a sewerage system should considerably reduce the burden on Moldova's water bodies and, therefore, alleviate the requirements for urban wastewater treatment.

Source: Reform of Surface Water Quality Standards in Moldova: Pilot Study of Key Implementation Aspects.

The changes in the number and stringency of effluent limits would also have implications for the pollution charges levied on WWTPs. They will be imposed on fewer parameters, and the their portion assessed for the exceedance of ELVs will be reduced. These changes are fully consistent with the reform of economic instruments for environmental protection recommended by a number of international organisations[4]. To compensate for the reduction of the charge base, the Government of

[4] Most recently, these recommendations were reiterated in the report "Going to Results: Progress in Environmental Management in EECCA Countries" prepared by the EAP Task Force Secretariat for the Belgrade Ministerial "Environment for Europe" Conference.

Moldova may decide to significantly increase the charge rates for a limited number of water pollution parameters (e.g., BOD, suspended solids, nitrogen). A broader discussion of a reform of the pollution charge system is beyond the scope of this report.

3.4. Surface Water Quality Monitoring and Assessment

The proposed system of SWQS does not entail fundamental changes in the current surface water quality monitoring programmes, but a number of adjustments will be needed.

Increased sampling and analysis frequencies. Generally, a monthly sampling frequency (12 samples per year) is recommended for the proposed system of SWQS. Currently, per location, Hydromet in principle takes 12 (monthly) samples per year, but for instance analyses heavy metals only 4 times per year. Sanepid collects surface water samples at each location four times per year (once per season). Increasing the frequency of sampling and/or analysis implies higher costs for monitoring in case the current monitoring programmes will be extended.

Extending the laboratory capacity. The proposed system envisages regulation of (relevant) WFD Priority Substances. The current capacity of the Hydromet and Sanepid laboratories for analysing these pollutants is limited. The major constraints are lack of adequate laboratory equipment, certified methods for analysis, and consumables. Because of these constraints, also the expertise for analysing the WFD Priority Substances and other specific pollutants is not yet fully developed. In order to improve this situation, a combination of investments, capacity building and training programmes will be needed. Since the proposed system of SWQS is an important step towards convergence with the EU, it may be appropriate to seek support from the EU for solving these and other issues.

Targeted selection of monitoring parameters per water body. The proposed system does not prescribe analysis of all the parameters for which SWQSs have been defined. From a cost-efficiency point of view, it is feasible to limit the parameters for analysis to those relevant for the use(s) assigned to the water body. For instance, bacteriological conditions are most critical for bathing waters. The WFD Priority Substances basically are not relevant in the case of bathing and other water contact sports. Skipping the expensive analysis of such parameters will be appropriate in such cases. The Technical Report “Proposed System of Surface Water Quality Standards for Moldova” contains a scheme supporting the selection of relevant parameters in relation to the intended uses of the water body.

Identification of WFD Priority Substances and other additional pollutants to be regulated. The inclusion of water quality standards for WFD Priority Substances and other specific pollutants into the new system does not imply that all these parameters will actually have to be monitored. For instance, the WFD prescribes monitoring of pollutants that are discharged into the river basin. It requires additional efforts (including discharge inventories) to determine which pollutants are indeed discharged into the river basin, including those in other countries upstream. Experiences gathered in the EU Member States will definitely facilitate these activities.

Modified principles for water quality assessment. The current compliance checking procedure compares the maximum concentration against the water quality standard (MAC). The proposed system of SWQS recommends using compliance checking against the 95-percentile, a statistical calculation principle recurring in several EU Directives and, for instance, applied by the International Commission for the Protection of the Danube River (ICPDR). While being a mere mathematical procedure, it imposes additional requirements to the (software based) processing of the surface water quality data.

4. LEGAL AND INSTITUTIONAL IMPROVEMENTS TO IMPLEMENT THE REFORM

While the Concept of the National Policy in Water Resources Management (see Chapter 3) stated the need to develop a new Water Law already in 2003, the work on it started only recently. The draft Water Law of August 2007 submitted to the Government by Apele Moldovei builds to a large degree on the principles expressed in the Concept. While some of the provisions of the draft Water Law are consistent with this project's proposal for a new system of surface water quality standards in Moldova, others would have to be modified in order to implement this system. This will be discussed in the following sections of the report.

4.1. Proposed Provisions of a New Water Law

The draft Water Law makes a number of important steps in the direction of integrated water resources management that is the cornerstone of the EU Water Framework Directive. Its main institutional provisions are the following:

- The territory of Moldova would be divided into the Danube and Dniester river basins.
- The environment ministry would be responsible for the development of water resources management policies and design of relevant regulations. It would also be assigned a responsibility to maintain the Water Cadastre.
- A "water management authority" would be created under the auspices of the environment ministry (currently, the MENR) and charged with the implementation of water resources management policies.
- The water management authority would comprise two river basin agencies (for the Danube and Dniester basins).
- Each river basin agency would have a consultative "Basin Committee" of 15 members representing different stakeholders, including health authorities, enforcement authority, local authorities, water users, and NGOs.
- A "water inspectorate" would be created under the SEI to conduct inspections of water bodies and water polluters in accordance with guidance and plans developed in consultation with the water management authority and approved by the environment ministry.
- Surface water quality monitoring would continue to be conducted by a specialised agency under the environment ministry (Hydromet).

In terms of surface water quality management, the draft Water Law is consistent with both the WFD and this project's SWQS reform proposal for Moldova. It contains the following management provisions:

- Water management programmes would be developed every 6 years by the environment ministry (and adopted by the Government) for each of the two river basins.

- Detailed action plans would be developed by the water management authority to implement water management programmes.

- All waters in Moldova would be divided into classes, based on each water body's "ecological condition" and functions (uses), by the environment ministry.

- A target status/class would be defined for each water body in the country in respective river basin management programmes and be achieved gradually (but according to a set timeframe) as part of such plans' implementation.

- Water quality standards would be determined for individual classes in a "water protection regulation".

The draft Water Law also contains important provisions on effluent regulation. It states that permits for "water use" would be issued by the water management authority for a term of up to 12 years and recorded in the Water Register (not to be confused with the Water Cadastre containing information on the country's water bodies). It is not clear whether the permits for water abstraction and wastewater discharges currently issued by the SEI would be replaced by these combined permits. At the same time, the draft Law envisages the adoption by the Government of statutory effluent limits (in terms of concentration of pollutants in the effluent), to be proposed jointly by the environment and health ministries.

It is also stipulated that effluent regulation should combine the consideration of best available technologies (or best practices for non-point sources) and maximum permissible loading of pollution into water bodies. The mechanism of application of all these instruments is not clear from the draft.

4.2. Recommendations for Improving the Institutional Structure

Moldova's Concept of the National Policy in Water Resources Management (2003) envisaged the creation of a unique government body that would combine all water resources management functions and would coordinate the development and implementation of national policies in this domain, as well as two river basin authorities (for the Dniester and Danube basins) where different stakeholder agencies would be represented.

Taking up some of these provisions, the draft Water Law stipulates a complex institutional structure for water resources management, with separate policy and regulation, planning and management, monitoring and enforcement authorities.

In Moldova's current institutional framework for water resources management (see Section 2.2), there are three key institutions with significant human capacity that should be fully utilised in the reform process:

- the Apele Moldovei Agency, including two newly created water basin departments, with responsibilities for water use planning and regulation – the draft Water Law is unclear about its future role;

- Hydromet (under the MENR) and Sanepid (under the MHSP) – the draft law does not address the issue of coordinating their monitoring systems; and

- the SEI (under the MENR) with responsibilities for water use and wastewater permitting and enforcement – the draft law stipulates the creation of a specialised water inspectorate.

Building on this existing institutional capacity, it is recommended that the proposed new system of surface water quality management be implemented via three institutional elements:

1. An authority in charge of water quality planning and monitoring that would be responsible for the implementation of use-based classification of water bodies by river basin and development and execution of programmes to ensure achievement of applicable SWQSs; and

2. An authority in charge of water and wastewater regulation, permitting and enforcement.

3. Improved surface water quality monitoring services.

Water Resources Management Authority

The creation of a water resources management authority (WRMA) will require integration of water quantity/use and quality management functions from a river basin planning perspective. The former function currently resides in Apele Moldovei while the latter is dispersed between the MENR, Hydromet, and Sanepid.

The recently reorganised Apele Moldovei Agency could become such a water resources management authority. For this, its irrigation service functions would need to be transferred to the MAFP, consistent with the general recommendations for public administration reform in Moldova. In addition, to ensure the consistency of integrated water resources management, Apele Moldovei would be best made an autonomous entity under the auspices of the MENR[5].

Under such institutional setup, the WRMA would be responsible for:

- Determination of priorities, objectives and principles of the management of water resources;

- Water management planning: designation of water bodies and assignment of target classes to them, development and implementation of water management programmes and/or action plans (including measures to address non-point source pollution);

- Regulation and authorisation of different types of water use;

- Water supply and sanitation planning;

- Resolution of conflicts related to water use in the river basins; and

- Maintenance of the Water Cadastre.

The WRMA would carry out its water management planning functions following the general process outlined in Section 3.2. The WRMA would be in charge of managing both the Danube/Prut

[5] The project team considers that the July 2007 reorganisation separating Apele Moldovei from MAFP and giving it a water supply and sanitation portfolio did not fully accomplish Moldova's stated objective to establish a water management authority. It also made necessary further institutional reform more difficult in the near future.

and the Dniester River Basins (via respective departments in charge of water management programme implementation, as recently established in Apele Moldovei) but have only one stakeholder committee to avoid double representation.

The stakeholder committee would be charged with assignment of use classes to water bodies and oversight of the implementation of water management programmes. This committee would be chaired by a minister or deputy minister of environment and comprise representatives of a number of sectoral ministries (e.g., health, agriculture, energy), SEI, Hydromet, water user associations (e.g., Apa Canal association of water utilities), and NGOs. Being too numerous, local authorities would not be permanent members of the stakeholder committee but would be consulted on a case-by-case basis.

Discharge Regulation and Monitoring Authority

The functions of permitting and monitoring wastewater discharges and enforcing effluent requirements are presently exercised by the SEI, along with responsibilities for air emission regulation and monitoring, waste management and soil protection. It would be advisable to maintain this structure in order to preserve the existing institutional capacity[6]. In setting permit conditions for wastewater discharges into water bodies, the SEI would use SWQSs corresponding to the classes assigned to each water body by the WRMA. There is no justification for the creation of an autonomous water inspectorate, particularly in view of the need for more cross-media integration of compliance monitoring activities.

Surface Water Monitoring Institutions

The institutional responsibilities for surface water monitoring would need to be optimised, especially since upgrading laboratory capacity to analyse WFD Priority Substances would require investments in an order of magnitude of hundreds of thousands of euros. While presently Hydromet and Sanepid have different tasks and responsibilities, there is a certain overlap and duplication of their surface water monitoring programmes. A clearer division of responsibilities and better coordination would be advisable:

- Surface water sampling networks would need to be revised in order to avoid duplication between ambient water monitoring (with increased sampling frequencies, see Section 3.4) by Hydromet and Sanepid.

- Establishing only one qualified laboratory for analysis of water samples for WFD Priority Substances and other chemical pollutants will substantially reduce the costs of monitoring. Bacteriological analyses could continue to be performed by the (regional) Sanepid laboratories. Another reason to strongly recommended to concentrate the analysis of samples is to obtain unambiguous data for assessment and comparison of the water quality of water bodies, as different laboratories normally produce different results, even when analysing the same sample. Still, the laboratory practices would need to be improved and harmonised in both organisations.

[6] The report "Support to Central Public Administration Reform in the Republic of Moldova" commissioned by the Moldovan government recommended that the SEI be converted into an *Environmental Protection Agency* in order to better delineate its regulatory development, permitting, compliance monitoring, and enforcement responsibilities.

- Significant improvements are needed in information sharing between Hydromet, Sanepid, and other stakeholder agencies, as well as in its disclosure to the public. The better management of surface water quality monitoring data would contribute to more effective, transparent decision-making by the MENR and the WRMA.

4.3. Recommended Legislative Changes to Enable the Reform

The changes required in Moldova's legal framework to reform the country's surface water quality regulation and water resources management in general will be needed at two levels: primary laws and implementing regulations. Apart from the promulgation of a new Water Law and a "water protection regulation" it envisages, amendments would have to be made to a number of existing legal acts to harmonise them with the new regulatory approach.

Primary Legislation

The adoption of a new Water Law (and the simultaneous repeal of the 1993 Water Code) will be the most significant step in reforming water quality management in Moldova. In general, the draft law is consistent with the proposed reform. However, with respect to the August 2007 draft available at the time of the writing of this report, several key changes are recommended regarding provisions on effluent regulation:

- In Chapter X on permitting for water use it should be stated that permits for water abstraction and wastewater discharges are issued by a competent environmental permitting authority, which is presently the SEI, and not by the water management authority (see the justification in Section 4.2). The Water Register (essentially, a permit register) should be maintained by the permitting authority.

- Chapter XIII, Article 79 on the Water Cadastre should give the responsibility for its maintenance to the WRMA.

- Chapter XVI on water protection should be revised and clarified to reflect the introduction of (a) requirements of best available techniques for large industry to be subject to integrated environmental permitting; (b) statutory effluent limits for point sources not covered by integrated permitting; and (c) best management practices for non-point sources. The requirement of non-exceedance of applicable SWQSs should be maintained for all point sources of water pollution (see Section 3.3).

In addition, the law should be clearer on the composition of the reformed institutional framework for water resources management (Chapter XVIII, Articles 132-136 of the August 2007 draft). Article 133 states that the water management authority would be created *within* the "central body in charge of natural resources and the environment". As described in Section 4.2, the present report recommends the creation of an autonomous water resources management authority and the preservation of the permitting and enforcement functions with respect to water pollution in the SEI. Article 136 of the draft law on the creation of a "water inspectorate" as part of the SEI should be deleted. In addition, Article 129 on water monitoring should be clarified to better define Hydromet's responsibilities.

The adoption of the new Water Law should happen simultaneously with the amendment of other primary laws relevant to water quality regulation. Notably, the Law on the Animal Kingdom (1995) and the Law on Fish Reserve (Fund), Fishing and Fish-farming (2006) should be amended to eliminate automatic designation of virtually all surface waters of Moldova as those intended for fishery. Such designation in accordance with the new use classification system should be made by the Water Resources Management Authority via the process outlined in Section 3.2 of this report.

New Rules for Protection of Surface Waters

As mentioned in Section 2.1, the two implementing regulations on surface water quality protection containing the *de facto* applied SWQSs are:

- the Rules for Protection of Surface Waters (RPSW) of 1991; and
- the Hygienic Regulation (HR) "Protection of Water Bodies against Pollution" of 1997.

Officially, neither of the two regulations is legally valid: they are not part of Annex I of the Government Decree "On the Adoption of a Register for Official Acts" (No. 1030 of 03.10.05) that listed all ministerial regulations, norms, instructions, etc. having legal force in Moldova. The 1991 RPSW (but not the HR of 1997) were included in Annex IV of the same Decree as a document that should be re-authorised and published in the Official Monitor. The draft new Water Law also mentions a "water protection regulation" that would include new water quality standards defined by use class.

Therefore, following the adoption of the new Water Law, it will be a priority to develop and promulgate new Rules for Protection of Surface Waters. It should be developed by the WRMA under the stewardship of the MENR, with active participation of Sanepid and the SEI. The new RPSW should be an *integrated* regulation addressing all water uses requiring certain water quality (via the proposed classification system) as opposed to the current practice of having SWQSs for fishery waters in one regulation and those for waters used for drinking water abstraction and recreation/bathing in another.

The principal changes that should be introduced in the new RPSW in comparison with the RPSW of 1991 and the HR of 1997 are the following:

- The present requirement of regulating by "categories of water use" (e.g., drinking water supply, recreation, fishery) should be replaced by a provision establishing and describing a system of use classes.
- Surface water quality standards for each use class should be included in an annex of the new RPSW (see Annex 1 to this report).
- The provision (currently inscribed in the HR, Article 3.1.1) prohibiting discharges of polluting substances for which a SWQS (MAC) has not been established or for which there are no available laboratory analysis methods should be removed from the legislation. The polluting substances for which SWQSs will not be established should be controlled via best available techniques for point sources and best management practices for non-point sources.
- The provision in the RPSW (1991) allowing temporary ELVs in permits should not be included in the new regulation.

In addition to adopting new RSWP, the WRMA should analyse other existing relevant regulations and ministerial instructions and develop and propose amendments to harmonise them with the new RPSW.

5. TRANSITION TO A NEW SYSTEM OF SURFACE WATER QUALITY MANAGEMENT

The reform of surface water quality management in Moldova can only take place with sufficient political support of the Moldovan government. While this reform is clearly in line with the course for convergence with the EU legislation declared by the Government of Moldova, it entails substantial institutional and regulatory changes that are likely to meet resistance from some stakeholders. This chapter suggests ways to overcome potential barriers and describes the key steps of the reform process.

5.1. Measures to Address the Main Barriers to the Reform

The barriers to the reform of the SWQS system in Moldova can be divided into issues of special stakeholder interests, institutional capacity, and funding.

Increasing the Reform's Acceptability through Awareness Raising

The most serious obstacle to the reform is the acceptability of the present system to several important stakeholders from the ideological, financial, and compliance perspectives:

- The stringency (albeit unrealistic) of the current SWQSs appeals to many environmental and health officials and some NGOs who see in them a reflection of commitment to high environmental quality. A proposal to make the standards less stringent may be resisted as an attempt to reward polluters and jeopardise public health and the environment. Addressing this misperception will require informing and involving the public and promoting awareness of the reform's benefits through educational workshops and mass media.

- However low, the pollution charges based on the existing "fishery" standards provide environmental authorities with some revenues which they fear will decrease if the standards were relaxed and enforced. In reality, revenues from all pollution charges (for water and air pollution and waste) are fairly small and account only for about 15% of the National Environmental Fund (UNECE, 2005). As mentioned in Section 3.3, the system of pollution charges would have to be reformed by focusing it on a very limited number of parameters with much higher charge rates, and the proposed reform of the SWQS system will not impede that process.

- The technical and economic unfeasibility of the present requirements presents a valid excuse for polluters (municipalities, industries, and farms) not to comply but demand regulatory and financial concessions from the government. While the strict enforcement of new norms would require investments into pollution prevention and control, investors are likely to welcome the fairness and achievability of the standards.

Meeting the Institutional Challenge with Capacity Building

Other major challenges are the limited institutional capacity of the MENR to lead the reform process and the absence of experience with water quality issues in Apele Moldovei. There is not only a general lack of staff but also insufficient competence in the modern concepts and tools of water resources management. This gap should be addressed through a substantial capacity development effort, along the following lines:

- The Government of Moldova should consider expanding the MENR staff responsible for water resources management and, in the process of establishing a WRMA, hiring a significant number of personnel to be responsible for water quality management.

- The MENR may want to contract the development of management guidance documents, based on international best practices, on a number of key issues of water resources management, including:

  - analysis of anthropogenic pressures on river basins and methodologies to assess the existing and potential impact of these pressures,

  - classification of surface water bodies and other best practices in river basin planning,

  - economic analysis in the context of water management planning,

  - water quality monitoring and assessment, and

  - information management.

- The application of the above-mentioned guidance should for the basis of an extensive training programme for government officials.

- Bilateral and multilateral international cooperation on this issue (e.g., via policy dialogue and staff exchange programmes) should continue, particularly in the framework of the EU Water Initiative.

Securing Financial Support for the Reform

There presently is a severe shortage of budget funding to conduct any environmental programmes in Moldova or even to cover costs of the existing MENR staff. Yet, resources would be needed to prepare and implement the proposed reform of water quality regulation, in particular:

- 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 the new water classification system;

- to implement the institutional reorganisation, including the creation of a water resources management authority; and

- to strengthen institutional capacity through operational support (guidance) and training.

Increased budget allocation for improved water management should be the principal source of funding. This increase is fully justified in the context of Moldova's government course toward European integration and its international commitments, including the EU-Moldova Action Plan. However, if the Moldovan government demonstrates its strong commitment to the reform, it may be able to attract donor support as well, primarily for the capacity building efforts.

5.2. Key Steps and Timeline of the Reform

The 2003 Concept of the National Policy in Water Resources Management the decision of the Government of Moldova to prepare a new Water Law can be interpreted as a political endorsement of the reform of water quality regulation. Table 3 summarises the steps the government needs to take to prepare the institutional, legal and technical basis for the new system of water quality regulation.

Table 3. Indicative Steps and Timetable for the Reform of Water Quality Regulation in Moldova

Year	Task	Responsible bodies	Cooperation with Other Stakeholders
1	Analyse the legal, institutional and information requirements of the new system, conduct a needs assessment (human, technical, financial resources)	MENR	Apele Moldovei, Hydromet, SEI, NCPM, local authorities, Apa Canal, NGOs
	Adopt an overall strategy for the transition and implementation plan	MENR	Apele Moldovei, Hydromet, SEI, NCPM, local authorities, Apa Canal
	Complete the drafting of the new Water Law	MAFP, MENR	Other government ministries
	Promulgate the Water Law and correspondingly amend other relevant existing primary legislation	Parliament	
	Discuss and determine approach for developing a water management guidance documents	MENR	Apele Moldovei, Hydromet, SEI
	Conduct an awareness raising campaign	MENR	NGOs
2	Implement institutional changes stipulated in the Water Law, create the WRMA	GoM, MENR	MAFP, MHSP
	Conduct an analysis of Moldova's water bodies, water uses, pollution impacts and existing water quality to prepare for new classification	WRMA	Hydromet, NCPM, SEI, local authorities, Apa Canal
	Review and revise the surface water quality monitoring strategy, network, and sampling schedules	WRMA	MENR, Hydromet, NCPM, SEI
	Start developing water management guidance documents	WRMA	MENR, SEI, non-government experts
	Draft new Rules for Protection of Surface Waters, including new SWQSs	WRMA	MENR, Hydromet, NCPM, SEI
	Start staff training	MENR	WRMA, SEI
3	Promulgate new Rules for Protection of Surface Waters, including new SWQSs	GoM, MENR	
	Assign target water quality classes to all water bodies	WRMA	Stakeholder Committee at WRMA
	Develop water management programmes	WRMA	Stakeholder Committee at WRMA
	Implement a new surface water quality monitoring regime	WRMA	Hydromet, NCPM
	Continue developing water management guidance documents	WRMA	MENR, SEI, non-government experts
	Continue staff training	MENR	WRMA, SEI
4	Issue effluent permits based on new SWQSs	SEI	WRMA, local authorities, NGOs

Year	Task	Responsible bodies	Cooperation with Other Stakeholders
	Start implementation of water management programmes	WRMA	Relevant government authorities, oversight by the Stakeholder Committee at WRMA
	Finalise water management guidance documents	WRMA	MENR, SEI, non-government experts
	Continue staff training	MENR	WRMA, SEI

As illustrated by Table 3, the new system of SWQSs can be implemented relatively rapidly, within a period of four years. The first year would be marked by the adoption of a transition strategy and a new Water Law, with the MENR playing a major role in both of these processes (it should be more actively participating in the drafting of the Water Law) setting a framework for the implementation. In the second year, the implementation of institutional changes (see Section 4.2) would transfer the leadership in the reform to the newly created Water Resources Management Authority. The WRMA would then launch the development of new Rules for Protection of Surface Waters under the Water Law which would actually introduce new SWQSs (see Section 4.3), as well as a new surface water quality monitoring regime and relevant procedural and technical guidance documents. Intensive training of the staff of the three main government bodies with new responsibilities for water quality management – the MENR, the WRMA, and the SEI – should also start in the second year of the implementation. The basic training programme would continue for at least three years and would later be converted into a permanent training curriculum for relevant personnel.

The new SWQSs will enter into force in the third year of the process, together with the assignment of target water quality classes to all Moldova's water bodies in accordance with a use-based classification system (see Section 3.2). Water management programmes (of a 5-6 year duration) for the two river basins would have to be put in place in order to achieve the respective target classes, and new monitoring arrangements to verify compliance with the SWQSs. Finally, in the fourth year, the applicable SWQSs would be used to set permit requirements for direct wastewater discharges, primarily for effluents from wastewater treatment plants.

The transition process will be completed when all these elements of the new regulatory framework – planning (targets and implementation programmes), standards, monitoring, and permit requirements – are fully functional. The entire system should be periodically evaluated by the MENR (it may be done at the same time as the assessment of results of the water management programmes, i.e., every 5-6 years) to ensure its continuous improvement.

ANNEX 1. PROPOSED SURFACE WATER QUALITY STANDARDS

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}	[^oC]	*natural temperature variations*	cold waters: 20 ^oC summer, 5 ^oC winter warm waters: 28 ^oC summer, 8 ^oC winter	cold waters: 20 ^oC summer, 5 ^oC winter warm waters: 28 ^oC summer, 8 ^oC winter	cold waters: >20 ^oC summer, >5 ^oC winter warm waters: >28 ^oC summer, >8 ^oC winter	cold waters: >20 ^oC summer, >5 ^oC winter warm waters: >28 ^oC summer, >8 ^oC 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 ^oC and 60 ^oC)		[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

Parameter (*group*)	Acronym	Unit	Use Class I	Use Class II	Use Class III	Use Class IV	Use Class V
BACTERIOLOGICAL PARAMETERS							
Lacto positive bacteria		[№/l]	1,000	10,000	50,000	>50,000	>50,000
Colifages		[№/l]	absence	100	100	100	>100
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