



**Environmental Protection of International River Basins Project**  
**Contract No. ENPI/2011/279-666**

**Surface Waters Monitoring Programme  
in the Chorokhi-Adjaritskali River basin**

**Georgia**

January 2015

## 1. INTRODUCTION

The two key environmental objectives of the Water Framework Directive (Directive 2000/60/EC; WFD) for surface waters are:

- to prevent deterioration of the status of all bodies of surface water;
- achieving good surface water status.

The status of surface waters is determined by both its *ecological* status and its *chemical* status.

Monitoring programmes and assessment is required in order to substantiate where the objectives are achieved. The surface water monitoring programme for the Chorokhi-Adjaritskali River basin covers:

- surface water categories: rivers and lakes;
- the protected areas as defined in Article 6 of the WFD;
- artificial and heavily modified water bodies.

The structure and content of this monitoring programme represents the outcome of the activities conducted under the EPIRB Project as part of the River Basin Management Plans for the Chorokhi-Adjaritskali River basin.

## 2. DEVELOPMENT OF A WFD COMPLIANT MONITORING PROGRAMME

The monitoring programme outlined here is designed to meet the stated requirements of the WFD and related CIS Guidance Documents. The WFD sets out three types of monitoring programmes: surveillance, operational and investigative. These programmes will be explained further in the sections below.

In the process of monitoring programme development the data and information from the JFS-I, JFS-II and national monitoring programmes conducted in the pilot Chorokhi-Adjaritskali River basin were used. Furthermore, the Typology Report, the Pressure – Impact Analysis and Risk Assessment Reports were used as basic documents in selecting the sampling locations for the Operational Monitoring.

### 2.1 Surveillance Monitoring Programme of Surface Waters

The objectives of Surveillance Monitoring (SM) Programme for surface water are as follows:

- supplementing and validating the impact assessment procedure detailed in Annex II of the WFD,
- the efficient and effective design of future monitoring programmes,
- the assessment of long-term changes in natural conditions, and
- the assessment of long-term changes resulting from significant anthropogenic activities.

### 2.1.1 Sampling locations

The selection of sampling locations and the design of the SM programme is based on sub-networks each related to fulfil one or more of the main objectives of SM as presented above. The sub-networks of the SM programme for rivers include the following ones:

- **SM1:** to be representative of the overall surface water status;
- **SM2:** detection of long-term trends (the assessment of long-term changes in natural conditions and the assessment of long-term changes resulting from the anthropogenic activities);
- **SM3:** supplementing and validating risk assessments;
- **SM4:** Large rivers and significant cross border river water bodies.

*Note: Nine types of the surface water bodies were identified in the Chorokhi-Adjaritskali River basin and one sampling location per identified type with reference conditions is included in the SM Programme of the pilot river basin.*

The sampling locations for the SM Programme of the pilot Chorokhi-Adjaritskali River basin are summarized in the Table 1 and shown in Figure 1. All together 11 sampling locations were selected to be representative for the SM Programme.

Table 1 Surveillance Monitoring sampling locations in the Chorokhi-Adjaritskali River basin (rivers)

<b>No.</b>	<b>River name</b>	<b>Character of WB</b>	<b>Expected status/potential</b>	<b>Location name</b>	<b>Risk category</b>	<b>SM sub-network</b>
1	Dekhva	NWB	RC	Bobokvati	NR	SM1
2	Boloko	NWB	RC	Zeda Tkhlinari	NR	SM2
3	Skurdidi	NWB	RC	Skurdidi	NR	SM1
4	Akavreta	NWB	RC	Namonastrevi	NR	SM1
5	Kintrishi	NWB	RC	Mouth	NR	SM1
6	Kintrishi	NWB	RC	Below NP	NR	SM2
7	Machakhela	NWB	RC	Kokoleti	NR	SM2
8	Chvanitskali	NWB	RC	Tskhemlisi	NR	SM1
9	Adjaritskali	NWB	Moderate	Adjaritskali	PR	SM2
10	Chorokhi*	HMWB	Bad EP	Kirnati	R	SM4
11	Chorokhi*	HMWB	Bad EP	Mouth	R	SM1

*\* In case of the Chorokhi River only phytobenthos, physico-chemical and hydromorphological quality elements will be monitored.*

*NWB means Natural Water Body*

*Note: There are no lakes in the Chorokhi-Adjaritskali River basin.*

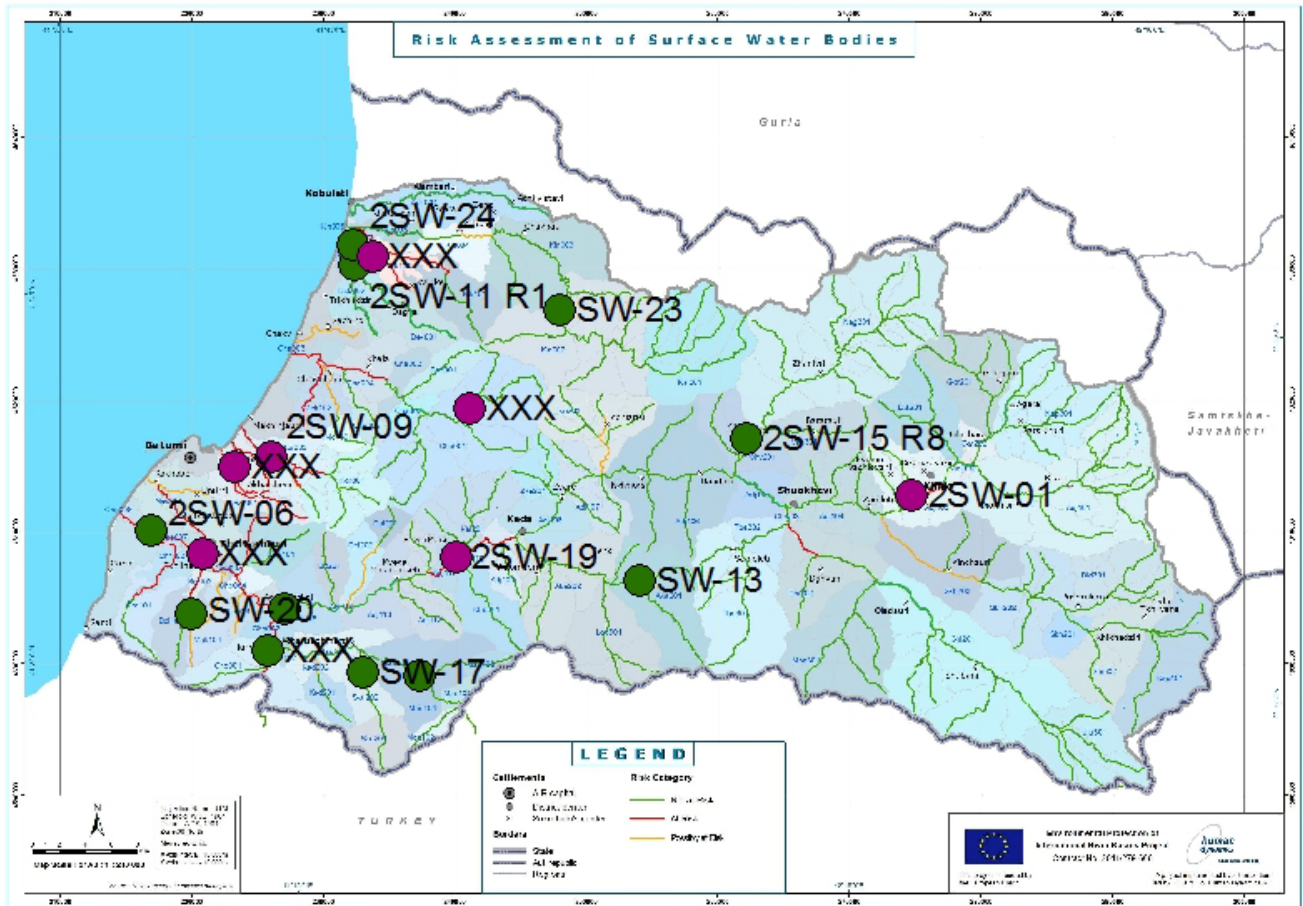


Figure 1 Sampling locations for the SW Monitoring Programme in the Chorokhi-Adjaritskali pilot river basin (GE). (Note: This map is the first draft, the final one will be developed after comments from the national team and based on the coordinates assigned to the sampling locations by the national experts).

**2.1.2 Quality Elements**

According to WFD Annex V.1.3.1, Surveillance Monitoring Programme shall be performed at each selected surveillance monitoring location for a period covered by a RBMP for (see Table 2):

- parameters indicative of all biological quality elements;
- parameters indicative of all hydromorphological quality elements;
- parameters indicative of all general physico-chemical quality elements;
- priority list pollutants which are discharged into the river basin or sub-basin;
- other specific pollutants discharged in significant quantities in the river basin or sub-basin (pilot river basin specific pollutants).

**Sampling methods** and devices based on the European Standards will be used in the monitoring programmes (exception ichthyofauna).

The **biological quality elements** incorporate for rivers:

Macroinvertebrates, Phytobenthos, Macrophytes and Fish;

for lakes:

Macroinvertebrates, Phytoplankton, Macrophytes and Fish.

The water samples will be identified for the abundance and composition for all biological quality elements up to Genus/Species level. Individual metrics (indices) will be applied to the biological quality elements (for ichthyofauna only migratory fish species will be described).

The **physico-chemical quality elements** include for both rivers and lakes:  
 General conditions;  
 Specific both synthetic and non synthetic pollutants.  
 EN, ISO and other international standards will be applied for the analysis of the water samples.

The **hydromorphological quality elements** will incorporate the following elements:  
 Hydrological regime;  
 River continuity;  
 Morphological conditions.  
 Hydromorphological field and assessment protocols as used during the JFS in the EPIRB project will be applied.

Table 2 List of the quality elements monitored for the Surveillance Monitoring Programme in the Chorokhi-Adjaritskali River basin (rivers)

	<b>Parameter</b>	<b>Unit</b>	<b>SM</b>
<b>Physico-chemical Quality Elements</b>			
<b>General conditions</b>			
	Temperature – in situ	°C	X
	Dissolved Oxygen – in situ	mgO <sub>2</sub> /l	X
	pH – in situ	pH units	X
	Conductivity – in situ	µS/cm	X
	Hardness	mg/l CaCO <sub>3</sub>	X
	Colour – in situ	visual	X
	o-Phosphate	mg P/l	X
	Nitrate	mg N/l	X
	Ammonium	mg N/l	X
	Chloride	mg/l	X
	Sulphate	mg/l	X
	Total suspended solids	mg/l	X
	Biochemical oxygen demand (BOD <sub>5</sub> )	mg O <sub>2</sub> /l	X
	Chemical oxygen demand (COD - dichromide)	mg O <sub>2</sub> /l	X
	Oil substances – in situ	visual	X
<b>Other specific pollutants**</b>			
	Copper	µg/l	X
	Zinc	µg/l	X
<b>Priority Substances and Certain Other Pollutants</b>			
	All 'Priority substances and certain other pollutants' that can be analysed with the existing laboratory capacity		X

<b>Biological Quality Elements</b>			
	Macroinvertebrates	Metrics	X
	Macrophytes*	Metrics	X
	Phytobenthos	Metrics	X
	Fish	Migratory fish species	X
<b>Hydromorphological Quality Elements</b>			
	River morphological conditions	HM protocol	X
	River flow	Daily Mean Flow (m <sup>3</sup> /s)	X

\* *Macrophytes will be monitored only in the lowland parts of the pilot river basin (small rivers).*

\*\* *to be monitored in water bodies where are discharged in significant quantities*

For more details see also the Appendix 1 of this report.

## 2.2 Operational Monitoring of Surface Waters

The Operational Monitoring (OM) Programme is focussed on monitoring the effect of supporting measures aimed at achieving the objectives of the WFD in the water bodies (possibly) at risk. It is designed to provide targeted information on the effectiveness of specific measures taken within the Chorokhi-Adjaritskali River basin.

The objectives of OM programme are defined as follows:

- to establish the status of those bodies identified as being at risk of failing to meet their environmental objectives;
- to assess any changes in the status of such bodies resulting from the programmes of measures.

Because the protection of high and good status from deterioration is required by the WFD, OM programme must also provide information on whether the POMs, aimed at maintaining such status, are effective. Therefore, even water bodies that are not categorized to be at risk in the Risk Assessment Report prepared are included in the OM programme because measures are required to maintain them at their current high or good status regardless of existing risk category.

Risk Assessment Analysis has identified 20 water bodies “at risk” and 8 ones “possible at risk” in the Chorokhi-Adjaritskali River basin. These results were transferred into the OM programme.

### 2.2.1 Sampling locations

Sampling locations for OM programme are assigned to one or more sub-networks each related to fulfil one or more of the main objectives of the OM programme.

The sub-networks of the OM programme for rivers include the following ones:

- OM1: to assess the effect of measures that have been aimed at improving the impact of individual and combined point sources (organic pollution, eutrophication impacts and priority substances);

- **OM2:** to assess effectiveness of the measures related to diffuse pollution sources;
- **OM3:** To assess effectiveness of measures to reduce hydromorphological alterations;
- **OM4:** To monitor high and good status sites currently not categorized to be at risk in order to assess the effectiveness of POMs aimed at maintaining high and good status water bodies;
- **OM5:** to monitor protected areas which are at risk.

*Note: Several water bodies with the same type were identified to be “at risk” due to the same pressure type (hydropiking, point sources of pollution). Therefore, some of sampling locations for the OM programme were selected to be representative for the group of water bodies.*

All together 8 sampling locations for rivers were identified to be monitored under the OM for the Chorokhi-Adjaritskali River basin and results are summarized in the Table 3.

Table 3 Operational Monitoring sampling locations in the Chorokhi-Adjaritskali River basin (rivers)

<b>No.</b>	<b>River name</b>	<b>Character of WB</b>	<b>Expected status/potential</b>	<b>Location name</b>	<b>Risk category</b>	<b>OM sub-network</b>
1	Adjaritskali	NWB	Moderate	Khulo	R	OM3
2	Adjaritskali	NWB	Moderate	Makhuntseti	R	OM3
3	Chorokhi	HMWB	Bad	Kirnati	R	OM3
4	Boloko	NWB	Moderate	Mouth	R	OM2
5	Korokitskali	NWB	Poor	Ortabatumi	R	OM3
6	Chakvitskali	NWB	Poor	Mouth	R	OM2
7	Bartskhana	NWB	Poor	Mouth	R	OM1
8	Kinkhisha	NWB	Poor	Mouth	R	OM2

### 2.2.2 Quality Elements

In order to assess the magnitude of the pressure to which the surface water bodies are exposed in the Chorokhi-Adjaritskali River basin those quality elements are monitored that are indicative of the identified pressures. The following quality elements will be monitored as relevant (see Table 4):

- parameters indicative of the biological quality elements, most sensitive to the pressures to which the water bodies are subject;
- all other specific pollutants discharged in significant quantities into the river basin or sub-basin;
- parameters indicative of the hydromorphological quality elements most sensitive to the pressure identified.

Table 4 List of the quality elements monitored for the Operational Monitoring Programme in the Chorokhi-Adjaritskali River basin (rivers)

	<b>Parameter</b>	<b>Unit</b>	<b>OM</b>
<b>Physico-chemical Quality Elements</b>			
<b>General conditions</b>			
	Temperature – in situ	°C	X
	Dissolved Oxygen – in situ	mgO <sub>2</sub> /l	X
	pH – in situ	pH units	X
	Conductivity – in situ	µS/cm	X
	Hardness	mg/l CaCO <sub>3</sub>	X
	Colour – in situ	visual	X
	o-Phosphate	mg P/l	X
	Nitrate	mg N/l	X
	Ammonium	mg N/l	X
	Chloride	mg/l	X
	Sulphate	mg/l	X
	Total suspended solids	mg/l	X
	Biochemical oxygen demand (BOD <sub>5</sub> )	mgO <sub>2</sub> /l	X
	Chemical oxygen demand (COD - dichromate)	mgO <sub>2</sub> /l	X
	Oil substances – in situ	visual	X
<b>Other specific pollutants **</b>			
	Copper	µg/l	X
	Zinc	µg/l	X
<b>Biological Quality Elements</b>			
	Macroinvertebrates	Metrics	X
	Macrophytes*	Metrics	X
<b>Hydromorphological Quality Elements</b>			
	River flow	Daily Mean Flow (m <sup>3</sup> /s)	X

\* *Macrophytes will be monitored only in the lowland parts of the pilot river basin (small rivers).*

\*\* *to be monitored in water bodies where are discharged in significant quantities*

*Note: In case of the sampling locations in the Chorokhi River only physico-chemical parameters (general and others pollutants discharged in significant quantities) and river flow (continuous) will be monitored due to complete degradation of the river habitat (HPPs in the territory of Turkey disturbed the hydrological regime).*

For more details see also the Appendix 1 of this report.



### 2.3 Investigative monitoring

The WFD includes a third type of monitoring called Investigative Monitoring (IM). The WFD states that this type of monitoring is required for situations when the surface water body is at risk with a very specific manner that causes of water bodies failing to achieve the required environmental objectives under the WFD. The list of parameters in this case will be dynamic and its validity in time should be limited, in order to respond to new information on the potential risks posed by emerging pollutants and any others alterations. However, it is not expected to conduct the IM in the Chorokhi-Adjaritskali River basin in this stage of the monitoring programme.

### 2.4 Frequency of monitoring programme

Sample frequency will vary depending on the monitoring programme and the individual sub-networks and the quality element. The WFD outlines the minimum requirements for frequency of monitoring, as it is presented in Table 5.

Table 5 Monitoring frequencies according to WFD Annex V.1.3.4

	Rivers	Lakes
<b>Biological quality elements</b>		
Phytoplankton	6 months	6 months
Other aquatic flora	3 years	3 years
Benthic invertebrate fauna	3 years	3 years
Fish	3 years	3 years
<b>Hydromorphological quality elements</b>		
Continuity	6 years	
Hydrology	continuous	1 month
Morphology	6 years	6 years
<b>Physico-chemical quality elements</b>		
Thermal conditions	3 months	3 months
Oxygenation	3 months	3 months
Salinity	3 months	3 months
Nutrient status	3 months	3 months
Acidification status	3 months	3 months
Other pollutants	3 months	3 months
Priority substances	1 month	1 month

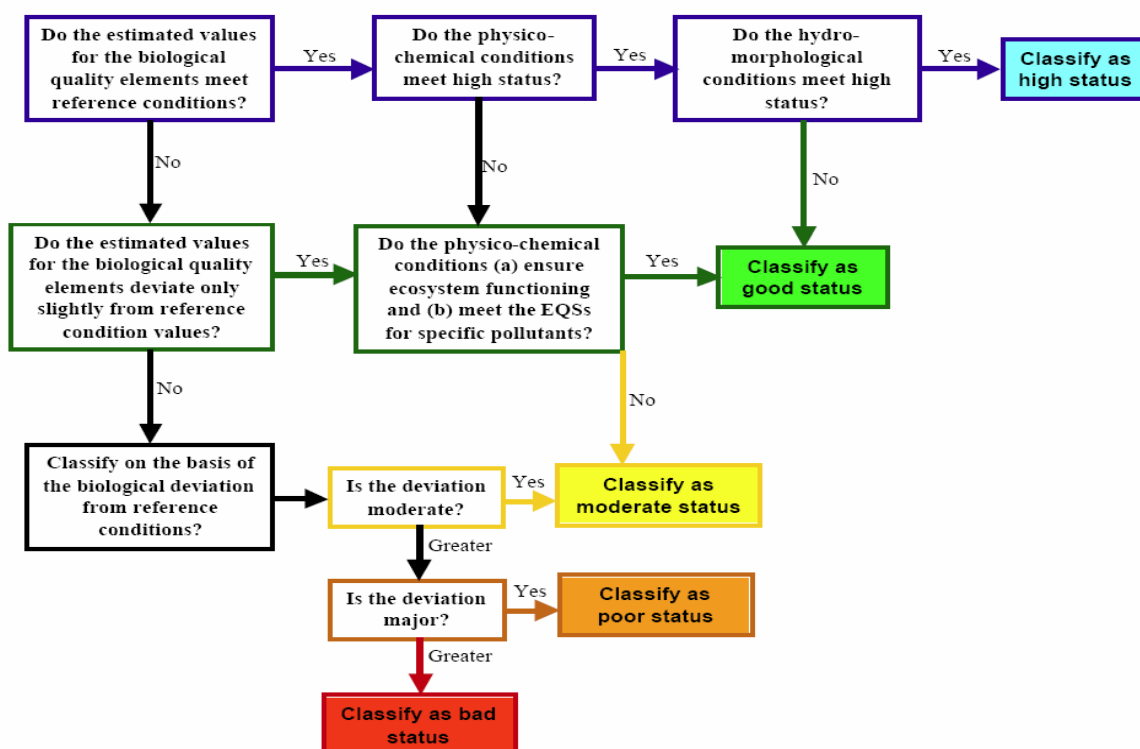
Long-term trend monitoring locations will require high frequency sampling. The sites required for supplementing and validating the risk assessment will be monitored with different frequencies depending on the importance of the risk, details of the frequency of monitoring required for each of the individual river sub-networks are given in Appendix 1 \_EPIRB\_River\_MP\_ Chorokhi-Adjaritskali River basin\_.

### 3. QUALITY CONTROL AND QUALITY ASSURANCE

It is important for the surface water monitoring programme to ensure that data generated by WFD physico-chemical and biological monitoring parts are reliable and representative. Furthermore, as it is known a data should allow the assessment of the impacts of Programs of Measures on the water body status. Therefore, Quality Management Programme should be prepared for all steps of the monitoring programme from sampling via analysis to the data management and interpretation. It is expected that sampling and analysis (physico-chemical and biological quality elements) will be conducted in accordance with ISO Standards (other International Standards) and laboratories will meet the requirements of the ISO 17025 Standard.

### 4. ECOLOGICAL STATUS ASSESSMENT

The WFD defines ecological status in the high, good and moderate classes for each of the ecological quality element for each of the surface water categories. It describes the biological and hydromorphological parameters and the physico-chemical and relevant pollutants required in the overall ecological assessment. The overall ecological status assessment is shown on the scheme below.



All biological quality elements must be taken into account when assigning water bodies to any of the ecological status or ecological potential classes. For each biological element the set of the metrics (or indices) will be selected to be indicative for the given pressures. The

status of each of the biological elements for natural water bodies is determined by measuring the extent of the deviation, if any, of the observed condition from the **reference condition** established for that type of water body. Reference conditions are the conditions established for the biological elements in the absence of pollution or disturbance (or at least minimum disturbance).

Ecological status assessment system will be expressed numerically as *ecological quality ratios* (EQR) in the range between 1 (high status) and 0 (bad status). The EQR scale for the assessment system for each surface water category is divided into the five classes by assigning a numerical value to each of the boundaries between the classes.

The physico-chemical and hydromorphological quality elements are supporting elements of the biological assessment for the purpose of the overall ecological status assessment. Therefore, based on the existing data from the JFS and national monitoring programmes statistical analysis will be conducted to express numerically boundary for the classes.

## 5. CHEMICAL STATUS ASSESSMENT

The chemical status of surface water bodies is linked with the WFD Annex X pollutants. The latest EU directive specifying both the pollutants (*‘Priority substances and certain other pollutants’*) and their environmental quality standards (EQS), is the Directive 2013/39/EU *“amending Directives 2000/60/EC and 2008/105/EC as regards Priority substances in the field of water policy”*.

The Directive 2013/39/EU has defined EQSs for in total 45 (groups of) substances, comprising four metals (cadmium, lead, mercury and nickel) and a wide array of organic micropollutants.

In principle, two (complementary) environmental quality standards are defined; both EQSs are to be met in order to qualify as ‘good chemical status’:

- annual average – environmental quality standard (AA-EQS), applying to the arithmetic mean of one year of data, with monthly sampling presumed;
- maximum concentration – environmental quality standard (MAC-EQS), applying to the maximum concentration in the annual set of data.

## **Annex 1**

### **Recommended List of Standards and Guidelines**

ISO 10870: 2012 Water quality - Guidelines for the selection of sampling methods and devices for benthic macroinvertebrates in fresh waters (ISO 10870:2012).

ISO 5667-1: 2007 – Water quality - Sampling - Part 1: Guidance on the design of sampling programmes and sampling techniques (ISO 5667-1:2006)

ISO 14996: 2007 – Water quality - Guidance on assuring the quality of biological and ecological assessments in the aquatic environment.

ISO 8689-1: 2000 – Water quality - Biological classification of rivers - Part 1: Guidance on the interpretation of biological quality data from surveys of benthic macroinvertebrates. (ISO 8689-1:2000).

ISO 8689-1: 2000 – Water quality - Biological classification of rivers - Part 1: Guidance on the interpretation of biological quality data from surveys of benthic macroinvertebrates. (ISO 8689-1:2000)

ISO 16150:2012 – Water quality - Guidance on pro-rata Multi-Habitat sampling of benthic macro-invertebrates from wadeable rivers.

ISO Project AQEM, 2002. Manual for the application of the AQEM System (Asterics 3.3.1, [www.aqem.de](http://www.aqem.de))

EC, 2003. Guidance Document No. 7 Monitoring under the Water Framework Directive, Luxembourg: Office for Official Publications of the European Communities.

ISO 15843:2010 Water quality. Guidance standard on determining the degree of modification of river hydromorphology, CEN, 2010.

ISO 14614:2004 Water Quality - Guidance standard for assessing the hydromorphological features of rivers, CEN, 2004.

ISO Water Sampling Standards 5667 (series).

**Appendix 1:**

EU WFD compliance monitoring for the Adjaritskali/Chorokhi Pilot Basin (Rivers)

List of Quality Elements for rivers

Sampling Frequency for rivers

## EU WFD compliance monitoring for the Adjaritskali/Chorokhi Pilot Basin (Rivers)

No.	Water body number	River name	Character of water body	Expected status/potential	Location	Latitude	Longitude	Area (km2)	Surveillance monitoring sites	SM1 Overall status	SM2 Long-term trends	SM3 Supplementing and validating IA	SM4 Large rivers and significant cross border RWBs	Operational monitoring sites	OM 1 Point Source Risk	OM 2 - Diffuse Risk	OM 3 - Hydromorphology	OM 4- Measures to protect High/Good Status	OM 5 - Protected Areas	Risk category
1		Dekhva	WB	RC	Bobokvati				1	1										NR
2		Boloko	WB	RC	Zeda Tkhlarni				1		1									NR
3		Skurdidi	WB	RC	Skurdidi				1	1										NR
4		Akavreta	WB	RC	Namonastrevi				1	1										NR
5		Kintrishi	WB	RC	Mouth				1	1										NR
6		Kintrishi	WB	RC	Below NP				1		1									NR
7		Machakhela	WB	RC	Kokoleti				1		1									NR
8		Chvanitskali	WB	RC	Tsemlisi				1	1										NR
9		Adjaritskali	WB	Moderate	Adjaritskali				1		1									PR
10		Chorokhi*	HMWB	Bad	Mouth				1	1										R
11		Adjaritskali	WB	Moderate	Khulo									1			1			R
12		Adjaritskali	HMWB	Moderate	Makhuntseti									1			1			R
13		Chorokhi*	HMWB	Bad	Kirmati				1			1								R
14		Boloko	WB	Moderate	Mouth									1		1				R
15		Korokitskali	WB	Poor	Ortabatumi									1			1			R
16		Chakvitskali	WB	Poor	Mouth									1		1				R
17		Bartskhana	WB	Poor	Mouth									1	1					R
18		Kinkhisha	WB	Poor	Mouth									1		1				R

\* For the Chorokhi River only phytobenthos, physico-chemical and hydromorphological quality elements will be monitored

Note: PR - possibly at risk

NR - not at risk

R - at risk

## List of Quality Elements for rivers

			Surveillance monitoring s	Operational monitoring si	Protected Area site
<b>Physico-chemical Quality Elements</b>					
<b>General conditions</b>					
	Temperature - in situ	°C	1	1	
	Dissolved Oxygen - in situ	mgO <sub>2</sub> /l	1	1	
	pH - in situ	pH units	1	1	
	Conductivity - in situ	µS/cm	1	1	
	Hardness	mg/l CaCO <sub>3</sub>	1	1	
	Colour - in situ	visual	1	1	
	o-Phosphate	mg P/l	1	1	
	Total Phosphorus	mg P/l			1
	Total Nitrogen	mg N/l			1
	Nitrate	mg N/l	1	1	
	Ammonium	mg N/l	1	1	
	Chloride	mg/l	1	1	
	Sulphate	mg/l	1	1	
	Total suspended solids	mg/l	1	1	
	Biochemical oxygen demand (BOD <sub>5</sub> )	mgO <sub>2</sub> /l	1	1	
	Chemical oxygen demand (COD - dichromide)	mgO <sub>2</sub> /l	1	1	
	Oil Substances - in situ	visual	1	1	
<b>Other specific pollutants discharged in significant quantities (basin specific)**</b>					
	Copper	µg/l	1	1	
	Zinc	µg/l	1	1	
<b>Priority Substances and Certain Other Pollutants</b>					
<i>See Annex for a list of Priority Substances for Surface Water</i>					
<b>Biological Quality Elements</b>					
	Macroinvertebrates	Metrics	1	1	
	Macrophytes*	Metrics		1	
	Phytobenthos	Metrics	1	1	
	Fish	Migratory fish species	1		
<b>Hydromorphological Quality Elements</b>					
	Morphological Conditions	HM protocol	1	1	
	River flow	Daily Mean Flow	1	1	1

\* *Macrophytes will be monitored only in the lowland parts of the pilot river basin (small rivers).*

\*\* *to be monitored in water bodies where are discharged in significant quantities*

## Sampling Frequency for rivers

### Frequencies for general Physico-chemical determinands

#### Operational Monitoring

OM1	Point Pressure	4	times per year for general parameters and other pollutants discharged in significant quantities (basin specific)
OM2	Diffuse Pressure	4	times per year for general parameters and other pollutants discharged in significant quantities (basin specific)
OM3	Hydromorphological	4	times per year for general parameters
OM4	High and Good status	4	times per year for general parameters (However, not all sites in this sub-network require physico-chemical parameters to be monitored)
OM5	Protected areas (habitat)	4	times per year for general parameters

Notes:

*These are minimum sampling frequencies and more frequent sampling may be required depending on the confidence and precision required and the particular programme of measures that is being monitored under the Adjaritskali-Chorokhi Pilot river basin.*

#### Surveillance Monitoring Network

General Parameters and other pollutants discharged in significant quantities (basin specific)	12	times per year
Priority Substances	12	times per year for one year in each 6-year cycle for priority substances
Overall status Sites	12	times per year for general parameters and other pollutants discharged in significant quantities (basin specific)
Long-term Trend Sites	12	times per year for general parameters and other pollutants discharged in significant quantities (basin specific)
Supplementing and Validating the IA	6	times per year for general parameters and other pollutants discharged in significant quantities (basin specific)
Large Rivers and Significant Cross Border RWBs	12	times per year for general parameters and other pollutants discharged in significant quantities (basin specific)

Notes:

*As a principle the sub-network with the most frequent requirement should be respected for the sampling frequency*

### Biological Quality Elements

#### Surveillance monitoring

	Minimum Frequency	
Macroinvertebrates	2	time per year in each 6-year cycle
Macrophytes	1	time per year in each 6-year cycle
Phytobenthos	1	time per year in each 6-year cycle
Fish	1	time in each 6-year cycle

#### Operational monitoring

Macroinvertebrates	2	time per year in each 6-year cycle
Macrophytes	1	time per year in each 6-year cycle
Phytobenthos	1	time per year in each 6-year cycle
Fish	1	time in each 6-year cycle

#### Hydromorphological quality elements

River flow	daily	
Morphological conditions	1	time in each 6-year cycle