EU4GREEN

SURFACE WATER MONITORING DEVELOPMENT PLAN, KOSOVO

EU 4 Green Recovery:
Support the implementation of the Green Agenda for the Western Balkans

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ABBREVIATIONS

ADA	Austrian Development Agency
BQE	Biological Quality Element
CA	Competent Authority
CIS	Common Implementation Strategy
DRB	Danube River Basin District
EC	European Commission
EEA	European Environment Agency
EIONET	European Environmental Information and Observation Network
EQR	Ecological Quality Ratio
EQS	Environmental Quality Standard
EU	European Union
EU ETS MRVA	EU Emissions Trading System Monitoring, Reporting, Verification and Accreditation
GAWB	Green Agenda for the Western Balkans
GC-MS	Gas Chromatography–Mass Spectrometry
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
ISO	International Organization for Standardization
IWRM-K	Integrated Water Resources Management in Kosovo (Project)
KEPA	Kosovo Environmental Protection Agency
KHMI	Hydrometeorological Institute of Kosovo
LIMS	Laboratory Information Management System
MAC	Macrophytes
MDP	Monitoring Development Plan
MESPI	Ministry of Environment, Spatial Planning and Infrastructure
MZB	Macrozoobenthos
PAH	Polycyclic Aromatic Hydrocarbon
PFAS	Per- and Polyfluoroalkyl Substances
PHP	Phytoplankton
PHB	Phytobenthos
QA/QC	Quality Assurance / Quality Control
RBD	River Basin District
RBDA	River Basin District Authority
RBMP	River Basin Management Plan
RBSP	River Basin Specific Pollutant
RWC	Regional Water Company
SKAT	Swiss Resource Centre and Consultancies for Development
SOP	Standard Operating Procedure
SWB	Surface Water Body
UBA	Umweltbundesamt (Environment Agency Austria)
WIS	Water Information System
WFD	Water Framework Directive
WISE	Water Information System for Europe

1. EXECUTIVE SUMMARY

This **Surface Water Monitoring Development Plan (MDP)** provides a structured and practical roadmap for the development, implementation, and operation of a **Water Framework Directive (WFD)-compliant surface water monitoring system in Kosovo**. Developed within the framework of the EU4Green initiative, the plan supports Kosovo's transition towards **sustainable water management**, improved environmental governance, and alignment with EU acquis under Chapter 27.

The primary objective of the MDP is to establish a monitoring system capable of **reliably assessing the ecological and chemical status**, detecting trends and pressures, and evaluating the effectiveness of measures under River Basin Management Plans (RBMPs). Monitoring is recognised as a **core pillar of river basin management**, providing the data necessary for evidence-based decision-making and compliance with WFD requirements.

The document outlines the **technical and methodological foundations** for WFD-compliant monitoring, including the definition of biological quality elements (BQEs), supporting hydromorphological and physico-chemical parameters, and chemical substances such as Priority Substances and River Basin Specific Pollutants (RBSPs). It describes the three monitoring types required by Annex V—**surveillance, operational, and investigative monitoring**—each fulfilling distinct roles in status assessment, pressure analysis, and problem identification.

A central component of the MDP is the **phased implementation framework**, covering:

- baseline analysis and water body characterisation (Article 5),
- monitoring programme design (Article 8 and Annex V),
- operational implementation,
- data management and quality assurance,
- status assessment and reporting, and
- adaptive review and optimisation.

This phased approach is aligned with the **six-year WFD planning cycle**, ensuring a structured transition from planning to full system operation.

The Monitoring Development Plan (MDP) for Kosovo builds on the existing foundation set by the River Basin Management Plans (RBMPs) and the 2025–2028 Surface and Groundwater Monitoring Programme, while addressing key gaps in implementation, data quality, and institutional coordination. **Kosovo has made significant progress in aligning its water management framework with EU requirements**, including basin-based planning and WFD-consistent methodologies such as DPSIR analysis and structured monitoring approaches. The new monitoring programme represents a major step forward by expanding spatial coverage and integrating biological, physico-chemical, and chemical parameters. However, **the monitoring system remains only partially operational**, with uneven coverage, limited long-term datasets, and continued reliance on project-based activities.

The gap analysis confirms that **planning and legal alignment are relatively advanced, but operational implementation remains the main weakness**. Monitoring networks are not yet fully developed, laboratory and QA/QC systems require strengthening, and data management is fragmented due to the absence of an integrated Water Information System (WIS). As a result, **status assessments are still partly provisional and not fully WFD-compliant**. Additional systemic challenges include infrastructure deficits (especially wastewater treatment), limited institutional coordination, and financial and technical constraints.

The current monitoring system is largely based on pilot-phase implementation developed under the **Integrated Water Resources Management in Kosovo (IWRM-K), funded by Swiss Resource Centre and Consultancies for Development (SKAT)**, which represents a critical step towards establishing a comprehensive WFD-compliant monitoring framework but has not yet reached full institutional maturity.

To address monitoring challenges in Kosovo, the MDP outlines a phased implementation pathway aligned with the WFD six-year planning cycle. **The roadmap (2026–2030) provides a clear transition from system design to full implementation and optimisation**, structured around five key steps: system completion, capacity and infrastructure strengthening, full monitoring implementation, data integration and assessment, and optimisation within the next RBMP cycle.

Key strategic priorities include expanding the monitoring network, achieving full WFD-compliant parameter coverage, establishing a functional WIS, and strengthening laboratory capacity and QA/QC procedures. Furthermore, enhancing institutional coordination and securing sustainable financing are critical preconditions for long-term success. Equally important is improving the linkage between monitoring results and the Programme of Measures, ensuring that monitoring data effectively supports decision-making.

By 2030, the implementation of this roadmap is expected to result in **a fully functional, reliable, and WFD-compliant monitoring system**, capable of supporting robust status classification and evidence-based water management. Ultimately, **the MDP provides a clear pathway for Kosovo to move from formal alignment toward effective implementation**, contributing to improved water quality, sustainable resource management, and progress in the EU integration process.

2. INTRODUCTION AND SCOPE

EU4Green is an important element of the continuous support by the European Union to empower and assist the Western Balkans' transition to modern, resource-efficient and competitive economies where growth is decoupled from emissions of greenhouse gases, resource use and waste generation and where climate resilience is pursued. It is the general objective of the project to support the Western Balkans in the implementation of the Green Agenda, thus in the development and transformation towards sustainability and reaching climate neutrality by 2050. Accordingly, EU4Green is a very broad initiative building on the combined expertise and cooperation within the thematic areas EU ETS MRVA, Circular Economy, Depollution Water, Depollution Air, Depollution Soil, Biodiversity, Sustainable Agriculture, Communication, Green Education, Stakeholder participation and Green Finance.

River basin management is based on monitoring of **surface water and groundwater resources** and plays a central role in any River Basin Management Plan (RBMP).
Surface water monitoring consists of ecological and chemical monitoring in accordance with the requirements of the Water Framework Directive (WFD). Ecological monitoring includes the assessment of biological quality elements (BQEs), supported by hydromorphological and physico-chemical elements, while chemical monitoring focuses on Priority Substances and other pollutants. These monitoring components are required to supplement and validate the characterization and risk assessment, to establish the status of surface water bodies (SWBs), and to evaluate the effectiveness of the measures implemented to achieve and maintain good ecological and chemical status.

In addition, surface water monitoring is needed to detect long-term trends in water quality, identify emerging pressures, and support the design and adjustment of programmes of measures under evolving environmental and climate conditions.

Sound monitoring is a fundamental instrument for good **surface water governance**. It provides all stakeholders with up-to-date and reliable information on the status and trends of surface waters within a river basin and enables informed decision-making for water management and the implementation of programmes of measures aimed at achieving the environmental objectives laid down by the Water Framework Directive (WFD).

This **Surface Water Monitoring Development Plan (MDP)** addresses the requirements for ecological and chemical monitoring of surface waters in line with the WFD. The comparison with the current situation provides the basis for identifying gaps, drawing conclusions, and formulating options for the progressive development and successful implementation of a WFD-compliant surface water monitoring system.

3. WFD COMPLIANT MONITORING

3.1. WFD monitoring principles

Article 8 of the Water Framework Directive (WFD) establishes the requirements for monitoring the status of surface waters, groundwater, and protected areas. Monitoring programmes are designed to provide a **coherent and comprehensive overview of water status** within each river basin district.

According to Annex V of the WFD, monitoring of surface waters is required to support the following objectives:

- Classification of ecological and chemical status;
- Supplementing and validating the risk assessment carried out under Annex II;
- Supporting the efficient and effective design of future monitoring programmes;
- Assessing long-term changes in natural conditions and those resulting from widespread anthropogenic activity;
- Estimating pollutant loads transferred across international boundaries or discharged into seas;
- Assessing changes in the status of water bodies identified as being at risk, particularly in response to implemented measures;
- Identifying the causes of failure to achieve environmental objectives where these are not yet known;
- Determining the magnitude and impacts of accidental pollution events;
- Supporting intercalibration exercises (comparison with neighbouring countries);
- Assessing compliance with the objectives and standards for protected areas; and
- Quantifying reference conditions for surface water bodies where these exist.

The results of monitoring programmes are reported within River Basin Management Plans (RBMPs) through **maps of monitoring networks, status assessments, and estimates of the confidence and precision** achieved by the monitoring systems.

Under the WFD, waters to be monitored are assigned to specific geographical and administrative units, in particular **river basins, river basin districts, and individual water bodies**, which form the fundamental units of assessment. Monitoring the status of these water bodies provides the basis for evaluating progress towards achieving the environmental objectives of the Directive.

Before monitoring programmes can be implemented, several preparatory steps must be completed:

- Delineation of surface water bodies;
- Identification of water body types (rivers, lakes, transitional and coastal waters);
- Definition of type-specific reference conditions for all biological quality elements.

Where such information is not yet fully available, particularly at national scale, **pressure analysis combined with expert judgement and/or modelling approaches (risk assessment)** can be used as an interim basis.

Annex V of the WFD distinguishes three main types of surface water monitoring: **surveillance monitoring, operational monitoring, and investigative monitoring**. These are complemented by additional monitoring requirements for protected areas identified under Article 6.

3.2. Recent update

Directive (EU) 2026/805 is a **recent update of the EU water policy framework** that amends the Water Framework Directive(2000/60/EC), the Groundwater Directive (2006/118/EC), and the Environmental Quality Standards Directive (2008/105/EC). It aims to strengthen protection of surface water and groundwater by updating the list of regulated pollutants, introducing stricter environmental quality standards, and enhancing monitoring and reporting requirements. The Directive places particular emphasis on emerging contaminants such as PFAS, pharmaceuticals, and microplastics, and promotes more advanced methods, including cumulative risk assessment and effect-based monitoring, in line with the EU's Zero Pollution ambition.

3.3. Precision and confidence

According to Annex V of the Water Framework Directive (WFD), monitoring results shall achieve appropriate levels of **precision and confidence**. What is considered "acceptable", "adequate", or "sufficient" will directly influence key design aspects of the monitoring programme, including:

- the number of water bodies included in the different types of monitoring;
- the number of monitoring stations required to assess the status of each water body; and
- the frequency at which parameters representing quality elements are measured.

The Directive does not prescribe fixed quantitative thresholds for precision and confidence. Nevertheless, it is clear that the levels achieved must be sufficient to enable **robust and meaningful assessments of water status**, both spatially and temporally.

In practice, many Member States begin by evaluating their **existing monitoring networks and datasets** to determine the level of precision and confidence that can be achieved with available resources. Monitoring system design is therefore typically an **iterative process**, involving ongoing adjustment and optimisation of networks, parameters, and sampling frequencies in order to reach levels that support reliable classification and decision-making.

In addition, **expert judgement** often plays an important role, particularly in assessing the risk of misclassification. For example, in cases where a water body may be incorrectly classified as being "at risk", responsible authorities will typically seek to reduce uncertainty through additional investigations before committing to costly measures. This approach helps ensure that management decisions are both **scientifically robust and proportionate**.

3.4. Biological quality elements for surface water

The basis of the classification of surface water bodies are the Biological Quality Elements (BQE) consisting of fish, macroinvertebrates, phytobenthos, phytoplankton, and macrophytes, while physico-chemistry and hydromorphology act as supporting elements.

- Biology
  - Macroinvertebrates (all rivers)
  - Phytobenthos (in small rivers only)
  - Phytoplankton (in very large rivers and lakes/reservoirs only)
  - Fish and macrophytes will be classified by expert judgment or by using local information (fishermen). If no information is available, these BQE will be included in a later phase. The same is true for macroinvertebrates and phytobenthos in lakes.
- Supporting elements
  - General physico-chemical parameters (all rivers and lakes)
  - Hydromorphology (based on a general classification of the river network)

"Supporting" means that the values of the physico-chemical and hydromorphological quality elements are such as to support a biological community of a certain ecological status, as this recognises the fact that biological communities are products of their physical and chemical environment. It is not intended that these supporting elements can be used as surrogates for the biological elements in surveillance and operational monitoring.

According the WFD, physico-chemical quality elements include 1) general physico-chemical parameters as listed in Annex V of the directive (temperature, O_2, nutrients, salinity, pH) and 2) specific pollutants to be expected in the respective water body. These River Basin Specific Pollutants (RBSP) have to be identified and selected beforehand.

3.5. Chemical quality elements for surface water

Chemical status assessment under the Water Framework Directive (WFD) is based on a defined set of quality elements, primarily focusing on the presence and concentration of chemical substances that may pose risks to aquatic ecosystems and human health. The core elements are the Priority Substances and Priority Hazardous Substances, which are regulated at EU level and subject to Environmental Quality Standards (EQS) in water, and in some cases also in biota and sediments. These substances include heavy metals (e.g. mercury, cadmium, lead), organic pollutants (e.g. pesticides, PAHs), and industrial chemicals. In addition, River Basin Specific Pollutants (RBSPs) are included at national or river basin level to address locally relevant pressures not fully covered by the EU list.

Assessment of chemical status requires monitoring across different matrices, primarily surface water, but increasingly also biota (e.g. fish tissue) and sediments, particularly for substances that accumulate in the food chain. The evaluation is based on compliance with EQS thresholds, with a strict "one out – all out" principle, meaning that exceedance of any single substance leads to failure of good chemical status. A key component of chemical monitoring is also the analysis of long-term trends, especially for substances that tend to accumulate or persist, in order to identify whether pollution is increasing or decreasing over time.

Together, these quality elements ensure a comprehensive assessment of chemical pressures on surface waters, enabling authorities to detect pollution, assess compliance with environmental objectives, and design targeted measures to reduce emissions and improve water quality.

3.6. Quality elements for groundwater and transitional and coastal waters

The Water Framework Directive (WFD) applies to all inland surface waters as well as groundwater and also defines quality elements for **transitional and coastal waters**. As Kosovo has no transitional or coastal waters they are omitted from this MDP.

For **groundwater**, EU legislation focuses on achieving **good quantitative status and good chemical status**. In addition, measures must be implemented to **prevent or limit the input of pollutants** and to **identify and reverse significant and sustained upward trends** in pollutant concentrations. For further details on groundwater, reference is made to the document "Monitoring Development Plan – Groundwater, Kosovo".

3.7. Surface Water Surveillance Monitoring

The Water Framework Directive (WFD) requires that a sufficient number of water bodies be included in the **surveillance monitoring programme** to provide a representative assessment of the overall surface water status within each catchment and sub-catchment of a river basin district. The design of the monitoring strategy should make use of all available information on **chemical pressures and impacts**, including knowledge of substance properties (as outlined in CIS Guidance Document No. 7), emission sources and data, identified pressures, and results from previous monitoring activities.

Surveillance monitoring must be undertaken for a **minimum period of one year within each six-year River Basin Management Plan (RBMP) cycle**. The Directive specifies that monitoring should be carried out at locations where water dynamics are most relevant at the scale of the river basin district, including:

- rivers with significant flow rates, particularly large rivers with catchment areas exceeding 2,500 km^2;
- large lakes and reservoirs where water volumes are significant;
- water bodies that cross Member State boundaries; and
- additional sites required to estimate pollutant loads transferred across boundaries and into the marine environment.

Within surveillance monitoring, parameters representing **all biological quality elements (BQEs), hydromorphological elements, and general as well as specific physico-chemical quality elements** must be monitored to ensure a comprehensive assessment of status.

Proposal for monitoring frequency of surveillance sites:

With regard to monitoring frequency, a harmonised and practical approach is recommended. For rivers, it is appropriate to sample chemical parameters monthly (12 times) over the course of one year, twice per RBMP cycle. For lakes, general physico-chemical parameters, River Basin Specific Pollutants (RBSPs), and Priority Substances (PS) may be sampled four times over one year, also twice per RBMP cycle (Table 1). Biological monitoring frequencies differ depending on the quality element and water category. In rivers, biological quality elements (BQEs) are typically monitored twice per RBMP cycle (Table 2). In lakes, phytoplankton is recommended to be sampled multiple times (e.g. four times) over a year, with sampling distributed across the vegetation period to capture seasonal variability.

Table 1: Recommendations for chemical monitoring frequency at surveillance.

<table>
<tr><th>Monitoring</th><th>SWB</th><th>Quality Elements / Group of Parameters</th><th>Frequency within the selected year of the RBMP cycle</th><th>Intervals</th></tr>
<tr><td rowspan="6">Chemical Surveillance Monitoring</td><td rowspan="3">Rivers</td><td>General Physico-Chemical Parameters</td><td rowspan="3">12x</td><td rowspan="6">at least every 3 years</td></tr>
<tr><td>River Basin-Specific Pollutants</td></tr>
<tr><td>Priority Substances</td></tr>
<tr><td rowspan="3">Lakes</td><td>General Physico-Chemical Parameters</td><td rowspan="2">4x</td></tr>
<tr><td>River Basin-Specific Pollutants</td></tr>
<tr><td>Priority Substances</td><td>12x</td></tr>
</table>

Table 2: Recommendations for biological monitoring frequency at surveillance sites.

<table>
<tr><th>Monitoring</th><th>SWB</th><th>Quality Elements / Group of Parameters</th><th>Frequency within the selected year of the RBMP cycle</th><th>Intervals</th></tr>
<tr><td rowspan="7">Biological Surveillance Monitoring</td><td rowspan="4">Rivers</td><td>Benthic Invertebrates</td><td rowspan="4">1x</td><td rowspan="7">at least every 3 years</td></tr>
<tr><td>Phytobenthos</td></tr>
<tr><td>Fish</td></tr>
<tr><td>Macrophytes</td></tr>
<tr><td rowspan="3">Lakes</td><td>Phytoplankton</td><td>4x</td></tr>
<tr><td>Fish</td><td rowspan="2">1x</td></tr>
<tr><td>Makrophytes</td></tr>
</table>

Table 3: Recommendations for hydromorphological monitoring frequency at surveillance sites.

Monitoring	SWB	Quality Elements / Group of Parameters	Frequency / Intervals
Hydro-morphological Surveillance Monitoring	Rivers	Continuity	once in 6 years
		Hydrology	continuously
		Morphology	every 6 years
	Lakes	Continuity	-
		Hydrology	Monthly
		Morphology	once in 6 years

3.8. Surface Water Operational Monitoring

The objectives of **operational monitoring** are to:

- establish the status of water bodies identified as being at risk of failing to meet their environmental objectives; and
- assess changes in the status of these water bodies resulting from the implementation of programmes of measures.

Operational monitoring must be carried out for all water bodies identified as being at risk of failing the relevant environmental objectives. In addition, it is required for water bodies into which **priority substances** are discharged. However, it is not necessary to monitor every individual water body, as the Directive allows for **grouping of similar water bodies** and representative monitoring, provided that the approach ensures reliable status assessment.

Operational monitoring is **targeted and pressure-specific**, focusing on those parameters and quality elements that are most sensitive to the dominant pressures affecting a water body. For example, where organic pollution is a key pressure in a river, **benthic invertebrates** may serve as the most sensitive biological indicator for assessing ecological impacts.

Proposal for monitoring frequency of operational sites:

With regard to monitoring frequency, a practical and structured approach is recommended. General physico-chemical parameters should be sampled monthly (12 times per year) in rivers and four times per year in lakes, with monitoring carried out in two separate years within the six-year RBMP cycle (Table 4). For biological quality elements (BQEs), the most indicative quality elements in relation to the present pressures must be chosen to assess the water body at risk of failing the good ecological status. BQEs are typically monitored twice per RBMP cycle in rivers, while in lakes, phytoplankton is recommended to be sampled multiple times (e.g. four sampling events) within a single year, repeated twice within the RBMP cycle. These sampling events in lakes should be distributed across the vegetation period to adequately capture seasonal dynamics (Table 5). However, if the BQE results do not allow for a clear status assessment due to the dynamics of natural systems and unpredictable events, the monitoring period should be extended by one additional year.

Where point source or diffuse pollution is identified, suspected Priority Substances and River Basin Specific Pollutants (RBSPs) should also be monitored, following comparable frequencies (e.g. 12 times per year in rivers and four times per year in lakes, repeated twice per RBMP cycle).

Table 4: Recommendations for chemical monitoring frequency at operational sites.

<table>
<tr><th>Monitoring</th><th>SWB</th><th>Quality Elements / Group of Parameters</th><th>Frequency within the selected year of the RBMP cycle</th><th>Intervals</th></tr>
<tr><td rowspan="6">Chemical Operational Monitoring</td><td rowspan="3">Rivers</td><td>General Physico-Chemical Parameters</td><td>12x</td><td rowspan="6">at least every 3 years</td></tr>
<tr><td>River Basin-Specific Pollutants</td><td>12x*</td></tr>
<tr><td>Priority Substances</td><td>12x*</td></tr>
<tr><td rowspan="3">Lakes</td><td>General Physico-Chemical Parameters</td><td>4x</td></tr>
<tr><td>River Basin-Specific Pollutants</td><td>4x*</td></tr>
<tr><td>Priority Substances</td><td>12x*</td></tr>
</table>

** If the risk assessment finds the SWB to be affected by point source or diffuse pollution, chemical analysis of the suspected substances should also be conducted. – Rivers: 12x; Lakes: 4x.*

Table 5: Recommendations for biological monitoring frequency at operational sites.

<table>
<tr><th>Monitoring</th><th>SWB</th><th>Quality Elements* / Group of Parameters</th><th>Frequency within the selected year of the RBMP cycle</th><th>Intervals</th></tr>
<tr><td rowspan="7">Biological Operational Monitoring</td><td rowspan="4">Rivers</td><td>Benthic Invertebrates</td><td rowspan="4">1x</td><td rowspan="7">at least every 3 years</td></tr>
<tr><td>Phytobenthos</td></tr>
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<tr><td>Macrophytes</td></tr>
<tr><td rowspan="3">Lakes</td><td>Phytoplankton</td><td>4x</td></tr>
<tr><td>Fish</td><td rowspan="2">1x</td></tr>
<tr><td>Makrophytes</td></tr>
</table>

** Choose the most indicative quality element to the present pressures to assess the status of the water body at risk.*

Table 6: Recommendations for hydromorphological monitoring frequency at surveillance sites.

Monitoring	SWB	Quality Elements / Group of Parameters	Frequency / Intervals
Hydro-morphological Operational Monitoring	Rivers	Continuity	once in 6 years
		Hydrology	continuously
		Morphology	every 6 years
	Lakes	Continuity	-
		Hydrology	Monthly
		Morphology	once in 6 years

Choosing operational monitoring sites:

The following schemes A, B, and C (Figure 1, Figure 2, Figure 3) are adapted from a publication on implementing the Austrian Ordinance on the Monitoring of the Quality of Water Bodies (BMLFUW, 2008) illustrate the step-by-step approach on operational monitoring site selection:

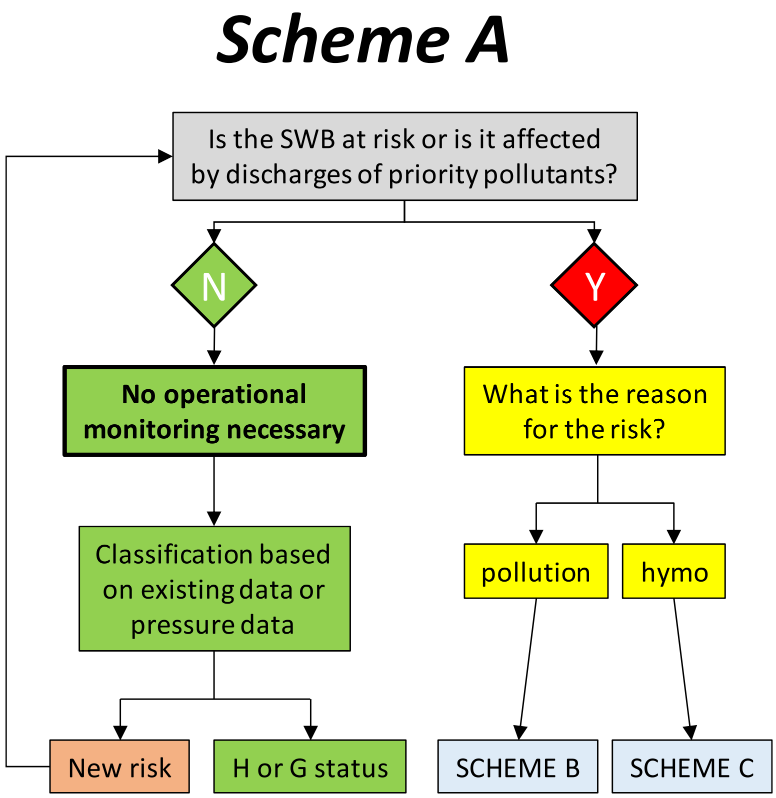

Figure 1: Scheme A of decision tree for choosing operational monitoring sites.

Scheme B

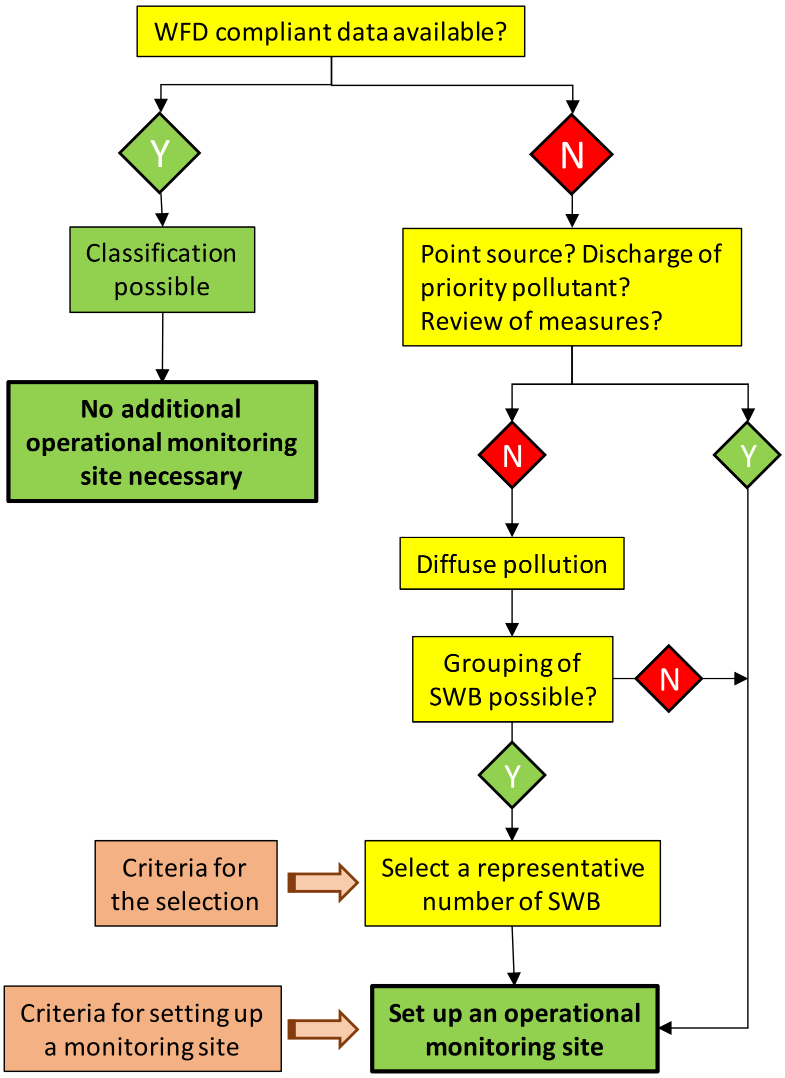

Figure 2: Scheme B of decision tree for choosing operational monitoring sites.

Criteria for the selection of representative water bodies from the group:

- Pollution from diffuse sources
- for successive SWB
  - diffuse load is uniform
  - monitoring site situated in the last SWB (most downstream)
  - Classification results can be applied to the SWB above (upstream)
- for SWB in different regions
  - diffuse load is uniform
  - SWB belong to the same type
  - SWB are comparable in terms of agricultural use

- Affected SWB of the group are affected by the same substance or combination of substances
- At least 25% of the SWB in a group are selected as representatives

Criteria for the setting up a monitoring site in rivers

- one site per SWB which is representative for the pollution
- Preferably at the lower end of the SWB
- Beware dilution effects of tributaries
- Distance to possible additional point sources should be at least 1 km or – if the river breadth is >100 m – at least the 10-fold of the river breadth

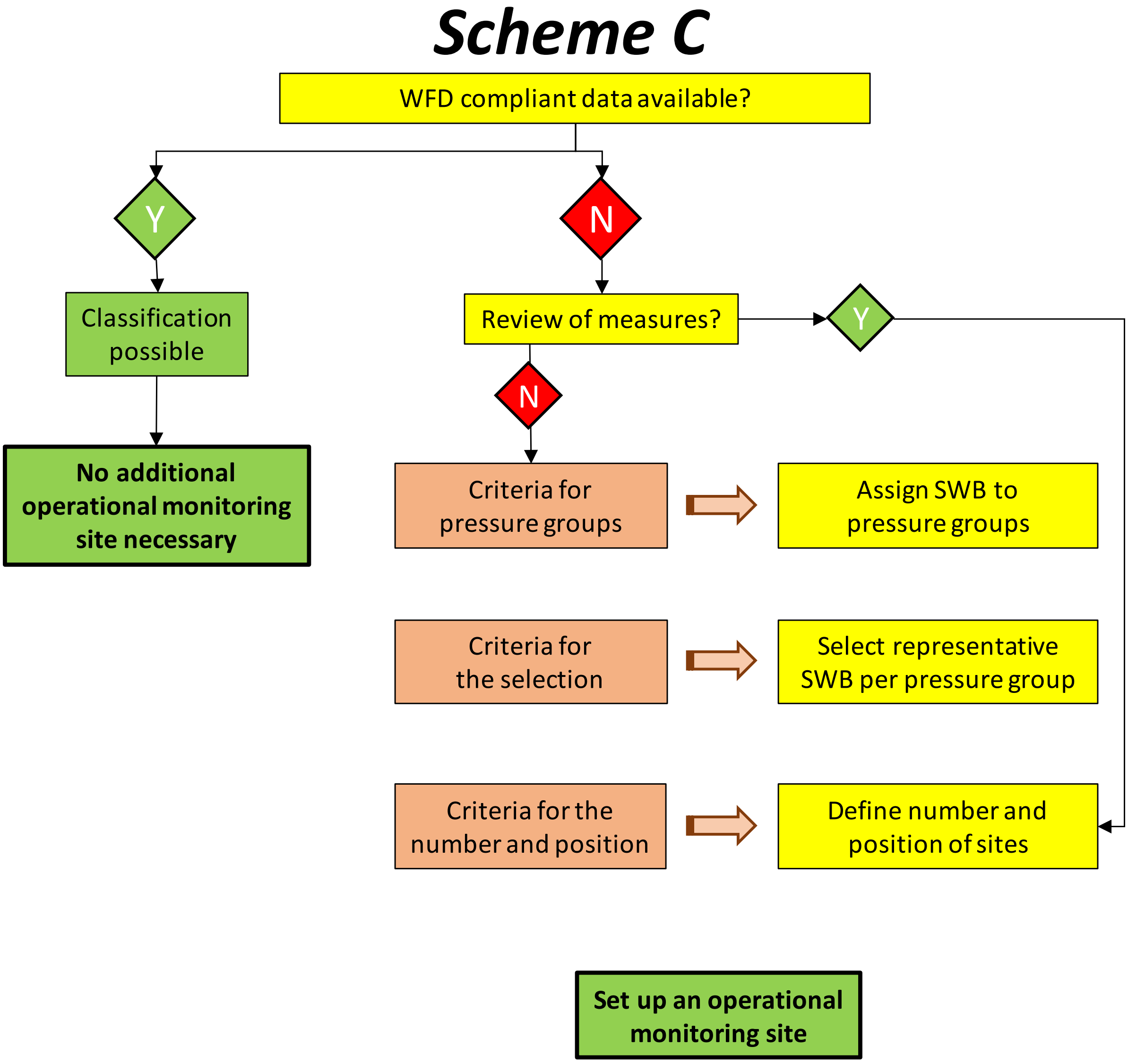

Figure 3: Scheme C of decision tree for choosing operational monitoring sites.

Criteria for pressure groups in rivers

A group of SWB

- with same river type,
- affected by the same pressure,
- which can be investigated and classified by the same indicative biological quality element

Criteria for the selection within each pressure group

- Ideally 1/3 of SWB within each pressure group
- Hydrological context: if possible, select sites within a hydrological subbasin
- No additional pressure (if possible)
- Easy to reach

Criteria for the number and position

- Morphology: one site in the longest uniform section
- Water abstraction: one site directly below the abstraction
- Continuum: one or two sites, above the weir or dam; if there is series of several weirs or dams, another one below the lowest one
- Impoundment: one site beginning (source) of the impoundment, optionally another site directly above the dam

3.9. Surface Water Investigative Monitoring

Investigative monitoring may be required in specific situations as defined in Annex V of the Water Framework Directive (WFD), including:

- where the reasons for exceedances of environmental objectives are unknown;
- where surveillance monitoring indicates that objectives are unlikely to be achieved and operational monitoring has not yet been established; or
- to determine the magnitude and impacts of accidental pollution events.

Investigative monitoring is therefore **problem-oriented and case-specific**, and its design must be tailored to the particular issue being addressed. In many cases, it involves **more intensive sampling strategies**, higher monitoring frequencies, and a focused selection of relevant water bodies, sub-areas, and quality elements.

In addition, investigative monitoring may include components of **alarm or early warning systems**, for example to protect drinking water abstractions from accidental pollution. Such systems may rely on **continuous or semi-continuous measurements** of selected parameters, including key physico-chemical indicators (e.g. dissolved oxygen) and, where appropriate, biological indicators.

Given its targeted and flexible nature, investigative monitoring is essentially an **"on-demand" approach**, triggered by specific problems or knowledge gaps. As a result, it is not possible to define standard monitoring sites, parameters, or frequencies in advance; instead, monitoring programmes must be **designed dynamically**, based on the specific objectives and pressures under investigation.

3.10. Sampling site selection in surveillance and operational monitoring

Surveillance monitoring sites should be strategically located to provide a representative and long-term overview of surface water status across the river basin district. These sites should remain **consistent across multiple RBMP cycles**, allowing for the assessment of trends and long-term changes in water quality and ecological conditions.

In contrast, **operational monitoring sites** should be applied in a more flexible manner and should not be considered part of a fixed, permanent monitoring network. Instead, their selection should directly reflect the need to assess **water bodies identified as being at risk** of failing environmental objectives.

Once the ecological status of a water body has been reliably determined through operational monitoring, it is advisable to **shift monitoring efforts to other at-risk water bodies in subsequent monitoring campaigns**. This approach allows for a more efficient use of resources and supports the progressive improvement of knowledge across the river basin district, ultimately contributing to a more comprehensive and targeted understanding of pressures and impacts.

3.11. Sampling and analysis

The representativeness of monitoring programmes begins with **careful and well-informed planning**, making full use of all available data and knowledge within the river basin. A crucial first step is to clearly define the **objectives of monitoring**—that is, the specific questions the monitoring programme is intended to answer.

An equally important aspect is the **planning and execution of sampling**. Errors introduced at the sampling stage—whether through inadequate design or improper field procedures—cannot be corrected by even the most advanced analytical methods. Therefore, it is essential to ensure the use of **appropriate equipment**, accurate selection of sampling locations, correct application of standardised methods, and the deployment of **properly trained personnel**. Effective communication with laboratories is also critical, particularly regarding sampling requirements, sample handling, preservation, and transport, in order to prevent any alteration or degradation of samples before analysis.

A number of international standards define the principles and requirements for ensuring high-quality monitoring and laboratory performance. In particular, **ISO/IEC 17025** provides a widely recognised framework for the competence of testing and calibration laboratories. This standard offers guidance on the key elements required to produce reliable and traceable results, including proper laboratory infrastructure, equipment management, and operational procedures. It emphasises the need for **safe handling, transport, storage, and maintenance of equipment**, as well as the management of consumables to prevent contamination or deterioration.

Quality assurance (QA) is therefore a fundamental component of monitoring systems, ensuring that results are **valid, reliable, and comparable**. It must be embedded as a continuous and evolving process within laboratory operations, supporting the ongoing improvement of analytical performance and the overall quality of monitoring data.

3.12. Data management, maintenance and reporting

Purpose of monitoring is to provide sound data on the current burden of pollution of water bodies, demonstrate long term changes (as result of measures or changes of pressures) as basis for fact-based decision making. Monitoring produces a high amount of data and requires, thus, a consolidated and uniform definition of requirements and format of data. This starts with the output of raw data and their plausibility, storage and maintenance. Full power of data can only be withdrawn, when a complete and consistent set of data is available in a well-maintained database. Pre-requisite is a solid and operational network including a powerful server, which connects all involved institutions.

Collaboration between institutions and entities is key to spreading relevant information and gaining added value from data. This regards checking raw data for plausibility and interpretation of data from different users' angles.

3.13. Sustainable Budget

Any form of monitoring requires sustainable budget to guarantee a meaningful set of data. The WFD provides a concept, which needs to be adapted to the needs of every economy to best suit its demands. This encompasses resources for already existing structures in the competent authorities, Ministries and entities to coordinate and administer the concept of the WFD, but also additional expenses for sampling, analysis and data maintenance. Thus, a high degree of awareness about the tasks and obligations at high level is needed to streamline the activities related to the implementation of the WFD.

- There is need for governmental understanding of the necessity, importance and benefits of water monitoring and for strong commitment of sufficient sustainable financing of water monitoring.
- Detailed cost estimations are needed, covering all aspects of monitoring. The estimate should distinguish between
    - sufficient <u>one-time budget</u> to cover the investment costs like infrastructure, equipment etc.;
    - sufficient and guaranteed permanent <u>long-term</u> budget to cover maintenance of infrastructure and equipment; and
    - <u>operational costs</u> for staff, training and consumables.
- It is necessary to demonstrate the political decision makers the benefits of monitoring. The costs of monitoring should be compared with the national economic

benefits gained from e.g. water industries and water related tourism. Such a comparison could strongly convince decision makers of the importance of comprehensive water monitoring.

4. WORKPLAN FOR IMPLEMENTATION

The following chapter gives an overview of prerequisites and steps that can be used as a checklist for establishing a WFD-compliant surface water monitoring system. It covers the governance structure and roles of responsible authorities, the design of the monitoring system based on river basin characterisation, and the development of monitoring programmes including selection of parameters, sites, and frequencies. The chapter further describe the implementation of field and laboratory activities, the establishment of data management and QA/QC systems, and the processes for status assessment, classification, and reporting.

4.1. Governance, Scope, and Responsibilities

4.1.1. Institutional Setup

- Designation of the **Competent Authority** (CA)
- Definition of roles:
    - Monitoring authority / agency
    - Laboratory services
    - Data management authority
    - Reporting authority
- Establish coordination mechanisms with:
    - River basin authorities
    - Nature conservation bodies
    - Stakeholders (where applicable)

4.1.2. Scope Definition

- River basin district(s)
- Surface water categories:
    - Rivers
    - Lakes
    - Transitional waters
    - Coastal waters
- Monitoring cycle aligned with the **6-year WFD planning cycle**

4.2. Phase 1 – Baseline Analysis and System Design

4.2.1. Characterisation of Surface Waters (Article 5)

- Delineation and typology of surface water bodies
- Review of existing data and monitoring programmes
- Identification of:
    - Significant pressures and impacts
    - Waters at risk of failing good status

Deliverables:

- Typology and water body register
- Pressure and impact assessment

4.2.2. Definition of Monitoring Objectives

Biological Elements:

- Establish a compliant sampling method
- Establish a compliant lab method
- Gather data on biology in a consolidated database
- Establish a pressure-response-relationship
- Define criteria for type-specific reference (benchmark) conditions (E)
- Set class boundaries (EQR)
- Compile all methods to a binding guidance document (as a basis for the monitoring)

Chemical Elements:

- Establish a pressure-response-relationship
- Which chemical pollutants and indicators are already monitored?
- Which chemical pollutants are missing?
- Establish a compliant lab method

Define objectives for each monitoring type:

- **Surveillance monitoring**
- **Operational monitoring**
- **Investigative monitoring**

Ensure consistency with:

- Ecological quality ratios (EQRs)
- Environmental Quality Standards (EQS)

Deliverables:

- Monitoring strategy document

- Type-specific EQRs
- National sampling and assessment guidances

4.3. Phase 2 – Monitoring Programme Development (Article 8 & Annex V)

4.3.1. Selection of Monitoring Types

Monitoring type	Purpose
Surveillance	Long-term trends, baseline status
Operational	Status of water bodies at risk
Investigative	Causes of failure or incidents

4.3.2. Parameter Selection

4.3.2.1. Ecological elements:

- Biological quality elements (BQEs):
    - Phytoplankton
    - Macrophytes and phytobenthos
    - Benthic invertebrates
    - Fish fauna
- Supporting elements:
    - Hydromorphology
    - Physico-chemical parameters

4.3.2.2. Chemical elements:

- Priority substances
- River Basin Specific Pollutants (RBSPs)

Deliverables:

- Parameter list by water category & monitoring type

4.3.3. Monitoring Network Design

- Selection of monitoring sites:
    - Representative sites
    - Risk-based site selection
- Spatial and temporal coverage
- Sampling frequency according to Annex V

Deliverables:

- Monitoring network maps
- Sampling schedules

4.4. Phase 3 – Operational Implementation

4.4.1. Field Sampling and Measurements

- Development of Standard Operating Procedures (SOPs)
- Training of field personnel
- Implementation of sampling campaigns

4.4.2. Laboratory Analysis

- Use of accredited laboratories
- Compliance with QA/QC requirements
- Intercalibration where applicable

Deliverables:

- SOPs
- Sampling and analysis reports

4.5. Phase 4 – Data Management and Quality Assurance

4.5.1. Data Management System

- Establishment or adaptation of a central database
- Metadata documentation
- Data validation and plausibility checks

4.5.2. Quality Assurance & Quality Control

- Internal QA/QC procedures
- Participation in interlaboratory comparisons
- Audit and review mechanisms

Deliverables:

- Validated monitoring datasets
- QA/QC reports

4.6. Phase 5 – Assessment, Classification, and Reporting

4.6.1. Status Assessment

- Calculation of ecological quality ratios (EQRs)
- Status classification (high → bad)
- Chemical status compliance check

4.6.2. Trend and Pressure Analysis

- Temporal trend analysis
- Linkage with pressures and measures

4.6.3. Reporting

- Input to RBMPs and Programmes of Measures
- Reporting to the European Commission (WISE)

Deliverables:

- Status classification results
- Assessment reports
- WFD reporting datasets

4.7. Phase 6 – Review and Adaptive Improvement

- Evaluation of monitoring effectiveness
- Review of site selection, parameters, and frequency
- Integration of new methods (e.g. continuous sensors, eDNA)
- Update monitoring programme for next cycle

Deliverables:

- Monitoring programme review
- Updated workplan for next WFD cycle

4.8. Indicative Timeline (6-Year Cycle)

Table 7: Indicative timeline for WFD Monitoring

Year	Key activities
1	Characterisation, design, network setup
2–5	Monitoring implementation & QA
4–5	Status assessment & trend analysis
6	Reporting, review, and redesign

4.9. Key Risks and Mitigation Measures

- **Data gaps** → risk-based prioritisation

- **Resource constraints** → phased implementation
- **Method changes** → harmonisation and documentation
- **Climate impacts** → adaptive monitoring strategies

5. CURRENT WATER MONITORING SITUATION IN KOSOVO

5.1. National Legal and Institutional Framework – Kosovo

5.1.1. River Basin Management Structure

Kosovo applies a **river basin–based management approach** aligned with the EU Water Framework Directive (WFD). All four RBMPs (Drin, Ibër, Lepenc, Morava e Binçës) follow the principle of **Integrated Water Resources Management (IWRM)** at the basin level. The country is divided into **four main river basin districts**:

- Drini i Bardhë (Adriatic basin)
- Ibër (Danube basin)
- Morava e Binçës (Danube basin)
- Lepenci (Aegean basin)

Each river basin in Kosovo is managed through a structured approach that combines both administrative and stakeholder-oriented mechanisms. At the core of this structure is the **River Basin District Authority (RBDA)**, which operates within the Ministry of Environment, Spatial Planning and Infrastructure and is responsible for the coordination and implementation of river basin management activities. In parallel, a **River Basin Platform** is established for each basin, serving as a collaborative forum that brings together key stakeholders, including governmental institutions, municipalities, water utilities, and other relevant actors, to support participatory planning and decision-making.

Governance is organised across three distinct coordination levels. **Level A** refers to the transboundary or international dimension of river basin management, reflecting the shared nature of Kosovo's river basins; however, this level is still under development and requires further institutionalisation and cooperation mechanisms. **Level B** comprises the national and inter-ministerial level, where policy-making, coordination, and strategic oversight are carried out by central authorities. **Level C** represents the local implementation level, involving municipalities, Regional Water Companies (RWCs), and irrigation entities, which are responsible for operational management and service delivery within sub-basins.

The planning framework follows the principles of the EU Water Framework Directive, with River Basin Management Plans (RBMPs) being developed in **six-year cycles**. These plans are structured around several core components, including the **characterisation of the river basin**, the **identification of Significant Water Management Issues (SWMIs)**, the **establishment of monitoring systems and status assessments**, and the definition of a

Programme of Measures (PoM) that outlines the actions required to achieve environmental objectives.

Despite this structured framework, river basin management across all basins in Kosovo remains at an early stage of implementation. While the institutional structures and planning processes are in place, the current RBMPs represent the first planning cycle, and key elements—particularly monitoring systems, data availability, transboundary cooperation, and implementation of measures—are still being developed and operationalised.

5.1.2. Institutional Responsibilities

Water management in Kosovo is characterized by a multi-level institutional setup, with responsibilities distributed across national, regional, and local stakeholders.

The **Ministry of Environment, Spatial Planning and Infrastructure (MESPI)** is the central authority responsible for water policy and the implementation of the EU Water Framework Directive (WFD) in Kosovo. It leads the preparation and approval of River Basin Management Plans (RBMPs), develops the national legal and policy framework, and ensures cross-sectoral coordination among relevant ministries and institutions. MESPI plays a strategic role in aligning national water management with EU requirements and overseeing the overall governance of water resources.

The **River Basin District Authority (RBDA)** functions as the operational arm of MESPI at the river basin level. It is responsible for implementing RBMPs, coordinating activities within each basin, and facilitating cooperation among stakeholders. The RBDA also supports monitoring and reporting activities, contributing to the assessment of water status and progress toward environmental objectives.

The **Kosovo Environmental Protection Agency (KEPA)** is responsible for environmental monitoring and reporting, including the collection and management of water quality data. It carries out environmental assessments and contributes to the evaluation of ecological and chemical status of water bodies. KEPA plays a key role in ensuring that environmental data are available to support planning, reporting, and compliance with national and EU requirements.

The **Hydrometeorological Institute of Kosovo (KHMI)** operates the country’s hydrological and meteorological monitoring networks. It provides essential data on river flows, precipitation, droughts, and floods, which form the basis for water resource assessments, risk management, and planning. KHMI’s data are critical for understanding hydrological dynamics and supporting both operational and strategic decision-making.

The **Regional Water Companies (RWCs)** are responsible for the provision of drinking water supply and the management of wastewater services. They play a key operational role in the water sector and are an important source of data on water abstraction, distribution, and discharge. Their performance directly affects water availability, service quality, and the level of pressure on water bodies.

Municipalities and irrigation companies are responsible for the local implementation of water-related measures. Municipalities are involved in land-use planning, local environmental protection, and infrastructure development, while irrigation companies manage water use in agriculture. Together, they play a crucial role in translating national policies and basin-level plans into concrete actions on the ground.

Overall, the institutional framework is characterized by a **significant fragmentation of responsibilities**, with multiple actors involved across different levels. Although coordination mechanisms, such as the Inter-Ministerial Water Council, are in place, they are still evolving and not yet fully effective in practice, particularly in terms of integrated data sharing, joint planning, and coordinated implementation.

5.1.3. Legal Framework

The legal framework for water management in Kosovo is primarily based on **Law No. 04/L-147 on Waters of Kosovo (Official Gazette, 2013)**, which serves as the main legal foundation for the sector. This law establishes the river basin approach in line with EU principles and defines key objectives for the protection, management, and sustainable use of water resources. It also introduces obligations related to water status monitoring and the development of River Basin Management Plans.

This core law is complemented by several **supporting laws** that address specific aspects of water management. These include the **Law on Irrigation**, the **Law No. 02/L-79 on Hydrometeorological Activities**, the **Law No. 02/L-78 on Public Health**, and the **Law No. 05/L-042 on the Regulation of Water Services**. Together, these legal acts provide the regulatory framework for water use, monitoring, public health protection, and service delivery within the water sector.

In addition, a set of **Administrative Instructions (AIs)** translates the main law into more detailed and operational provisions. Key examples include **Administrative Instruction MESP No. 16/2017 on the Classification of Surface Water Bodies**, **Administrative Instruction MESP No. 17/2017 on the Classification of Groundwater Bodies**, and **Administrative Instruction MESP No. 15/2017 on Criteria for Determining Sanitary Protection Zones of Water Resources**. These instruments define classification systems, protection requirements, and monitoring-related criteria aligned with WFD principles.

The **strategic framework** further supports implementation through long-term planning documents, notably the **Kosovo National Water Strategy 2017–2036**, adopted by the Government of Kosovo, and related Environmental Protection Strategies and Action Plans. The Water Strategy provides a comprehensive policy framework for sustainable water use, protection, and governance, and sets long-term objectives for the sector.

Overall, Kosovo’s legal and strategic framework demonstrates strong **alignment with EU water legislation**, particularly the **Water Framework Directive (2000/60/EC)**, as well as the Groundwater Directive, the Urban Waste Water Treatment Directive, and the Nitrates Directive, which collectively define requirements for water status monitoring, pollution control, and river basin management. At this point, it should be mentioned that the recently passed **Directive 2026/805** amends the WFD, the Groundwater Directive, and the EQS

Directive. Among other things, this amendment expands and revises priority substances, adds certain emerging pollutants and introduces stricter threshold values and has to be taken into consideration when working on WFD implementation.

Despite this alignment on paper, significant challenges remain in terms of **practical implementation, enforcement, and institutional capacity**, particularly with regard to the establishment of comprehensive monitoring systems, consistent data collection, and effective inter-institutional coordination.

5.1.4. Observations and Considerations

Based on the analysis of all four River Basin Management Plans (RBMPs) and the newly developed Surface and Groundwater Monitoring Programme for 2025–2028, several cross-cutting issues and developments can be identified.

Monitoring system limitations and ongoing improvements

The monitoring system in Kosovo remains incomplete and unevenly distributed, although the 2025–2028 programme represents a significant step toward its consolidation. Monitoring networks are still partially under development and, in some basins, remain pilot-based. Previously identified gaps—such as limited chemical and ecological data, insufficient groundwater monitoring, and the lack of continuous long-term datasets—are being addressed through the new programme. It introduces a structured three-year monitoring cycle, expanded spatial coverage, and inclusion of biological, physico-chemical, and priority substances monitoring. Furthermore, groundwater monitoring is being strengthened through the use of existing stations and additional monitoring points, including private wells where needed. However, despite these improvements, important challenges remain:

- Monitoring is still not fully operational nationwide
- Long-term datasets are only beginning to be established
- Data remains fragmented across institutions (KEPA, HMI, and others)

As a result, the classification of water body status is still often uncertain or provisional, and robust trend analysis and WFD compliance remain constrained, although expected to improve over time.

Incomplete but progressing WFD implementation

The RBMPs and the monitoring programme in Kosovo are broadly aligned with the methodology of the Water Framework Directive (WFD), incorporating elements such as DPSIR analysis, status assessment, and the application of surveillance, operational, and investigative monitoring. The 2025–2028 monitoring programme reflects clear progress toward practical implementation, as it structures monitoring according to WFD-defined types, includes all key quality elements—biological, physico-chemical, and priority substances—and adopts a phased, basin-by-basin approach followed by targeted operational monitoring. However, despite these advancements, several limitations persist: many components remain at a conceptual or early implementation stage, monitoring activities are still largely pilot- and project-based, and the Programmes of Measures are only partially operational and not yet effectively linked to monitoring outcomes. Overall, this indicates that Kosovo is moving from conceptual alignment with the WFD toward practical implementation, but full compliance has not yet been achieved.

Institutional coordination challenges

The monitoring framework in Kosovo involves multiple stakeholders, including MESPI, RBDA, HMI, and KEPA, with clearer roles and responsibilities defined under the new programme. In this structure, HMI is responsible for the implementation of monitoring activities, while the RBDA uses the collected data to support planning and status assessment processes. Despite these improvements, several institutional challenges persist, including partially overlapping mandates among institutions, limited data sharing, and weak vertical coordination between national and local levels. In addition, a fully functional and integrated water information system is not yet in place. As a result, even with the improved design of the monitoring system, the effective use of data for policy-making and water management remains constrained.

Infrastructure and operational gaps

Significant infrastructure and operational deficiencies continue to affect the water sector in Kosovo, including the lack of wastewater treatment plants, high levels of non-revenue water losses, and limited metering and control of water abstractions. Although the new monitoring programme improves the capacity to assess water quality, the monitoring of pressures—such as wastewater discharges and water abstractions—remains weak. As a result, the linkage between pressures, impacts, and corresponding measures is still insufficiently developed. This indicates that improvements in monitoring are not yet fully matched by progress in infrastructure development and effective pressure manageme

Financial and capacity constraints

The monitoring programme includes detailed cost estimates and reflects improved planning capacity; however, several important constraints remain. Funding for monitoring activities is still limited and often dependent on externally financed projects, while sustained financing for long-term monitoring and maintenance has not yet been secured. In addition, technical capacity is insufficient in key areas, including advanced monitoring techniques, laboratory analysis, and data processing and modelling. There is also a continued reliance on external expertise to carry out specialised tasks. As a result, the monitoring system remains both financially and technically constrained, which affects its long-term sustainability and scalability.

Transboundary dimension

The monitoring programme confirms that all river basins in Kosovo are international, with monitoring activities covering the Drini i Bardhë, Ibër, Lepenc, and Morava e Binçës basins. However, despite this transboundary context, monitoring is still planned and implemented primarily at the national level. Data exchange and coordination with neighbouring countries remain limited, and a fully institutionalised transboundary monitoring framework has not yet been established. As a result, although the international nature of the river basins is recognised, the transboundary dimension of water management remains a critical but still underdeveloped component.

Summary

Kosovo has established a solid legal and institutional foundation aligned with EU water policy, including basin-based planning, a modern RBMP structure, and a clear strategic orientation toward compliance with the Water Framework Directive (WFD). The new monitoring programme for the period 2025–2028 represents a significant step forward, providing a structured and WFD-compliant monitoring framework, expanded spatial and thematic coverage, integration of surface and groundwater monitoring, and the initial development of systematic and comparable datasets.

Despite this progress, the system remains in a transitional phase, characterised by monitoring networks that are still developing and only partially operational, continued reliance on pilot- and project-based implementation, and limited availability of long-term data. In addition, challenges persist in terms of institutional coordination and data integration, as well as financial and technical capacity constraints.

Overall, strengthening monitoring systems, improving data integration, enhancing institutional coordination, and ensuring sustainable financing will be critical for moving from planning toward effective and fully operational water management.

5.2. Human Resources and Capacity Requirements – Biological Monitoring

5.2.1. General Principles

To ensure successful implementation of WFD-compliant biological monitoring, **trained and experienced experts are essential**. Monitoring teams must be capable of covering all Biological Quality Elements (BQEs) and supporting hydromorphological assessments in accordance with **Annex V requirements**.

The staffing levels presented below represent **minimum requirements per sampling campaign**. Field teams should consist of **at least two persons** to ensure safety, quality control, and validation of results. Efforts should be made to promote **gender balance** in staffing.

5.2.2. Minimum Staffing Requirements per Biological Quality Element

Table 8: Minimum staffing requirements per BQE.

Biological Quality Element	Number of Staff	Prerequisites
MZB (macrozoobenthos)	3 (min. two hydrobiologists + one chemist)	Coverage of all macroinvertebrate groups at required taxonomic resolution; strong coordination between field and laboratory; chemist responsible for physico-chemical measurements

PHB / PHP (phytobenthos, phytoplankton)	1	Experienced algae specialist (especially diatoms); laboratory capacity required for chlorophyll-a analysis
MAC (macrophytes)	1	Specialist in aquatic vegetation; diving skills may be required depending on site conditions
FIS (fish)	4 (1 expert + 3 trained staff)	Expertise in river-type-specific sampling methods (e.g. electrofishing); high level of experience required, particularly in large rivers
HYMO (hydromorphology)	2	One expert in hydrology and one expert in morphology; understanding of river processes and habitat structure

Abbreviations: MZB = macrozoobenthos (invertebrates); PHB = phytobenthos (diatoms); PHP = phytoplankton; MAC = macrophytes; FIS = fish; HYMO = hydromorphology

5.2.3. Competence and Qualification Requirements

- Staff must have **relevant academic backgrounds** (e.g. hydrobiology, ecology, environmental sciences, chemistry)
- Taxonomic expertise is critical, particularly for:
    - macroinvertebrates
    - diatoms
    - macrophytes
    - fish fauna
- Laboratories must be equipped and staffed for **specialised analyses**, including chlorophyll-a and biological sample processing
- Competence must be aligned with **intercalibration requirements** and WFD classification systems

5.2.4. Training and Capacity Development

- Continuous **professional development and training programmes** are essential to maintain and upgrade skills
- Institutions should establish **formal internal and external training plans**, with proper documentation
- Regular participation in:
    - interlaboratory comparisons
    - intercalibration exercises
- Training should specifically address **RBMP-identified gaps**, including:
    - limited biological datasets
    - insufficient taxonomic resolution
    - inconsistent application of methods

5.2.5. Organisational and Institutional Requirements

- Monitoring activities should be **centrally coordinated** to avoid fragmentation and ensure consistency
- Clear **roles, responsibilities, and job descriptions** are required
- Regular communication and exchange between field teams, laboratories, and data managers is essential
- Monitoring responsibilities should not be treated as secondary tasks but require **dedicated staff and structures**

5.2.6. Staff Retention and Workforce Planning

- Adequate remuneration is necessary to attract and retain qualified staff
- High levels of motivation should be supported through:
    - clear task definition
    - recognition of expertise
    - career development opportunities
- Forward-looking workforce planning is required to:
    - ensure balanced staffing
    - avoid loss of expertise
    - promote recruitment of young professionals

5.3. Human Resources and Capacity Requirements – Chemical Status Assessment

5.3.1. Required Functions and Roles

Chemical status assessment under the WFD requires a combination of **field sampling staff, laboratory analysts, QA/QC specialists, and data experts**. Minimum functional roles include:

- **Sampling teams (2–3 persons per campaign)**:
    - Trained technicians for water, sediment, and biota sampling
    - Knowledge of WFD-compliant sampling protocols and preservation requirements
- **Laboratory analysts**:
    - Chemists specialised in trace analysis of Priority Substances
    - Expertise in organic and inorganic pollutant analysis (e.g. metals, pesticides, PAHs)
- **Instrumentation specialists**:
    - Operation and maintenance of advanced analytical equipment (e.g. GC-MS, LC-MS/MS, ICP-MS)
- **QA/QC officers**:

    - Oversight of quality systems, calibration, validation, and interlaboratory comparisons
- **Data management and assessment experts**:
    - Processing of analytical results
    - Compliance checking against Environmental Quality Standards (EQS)
    - Preparation of WISE-compatible datasets

5.3.2. Competence and Laboratory Requirements

- Laboratories must achieve and maintain **accreditation (e.g. ISO/IEC 17025)**
- Analytical methods must meet **WFD performance criteria**, including:
    - limits of quantification below EQS values
    - validated and standardised methods
- alternatively, collaboration with regional and beyond regional laboratories should be considered to overcome national limitations
- Staff must be trained in:
    - trace-level chemical analysis
    - sampling and preservation techniques
    - uncertainty estimation and quality control

5.3.3. Equipment and Technical Capacity

- Adequate infrastructure is required, including:
    - advanced analytical instruments (GC-MS, LC-MS/MS, ICP-MS)
    - laboratory information management systems (LIMS)
- Capacity for **biota and sediment analysis** must be ensured, not only water samples
- Regular calibration and maintenance of equipment is essential

5.3.4. Training and Quality Assurance

- Continuous **training in analytical methods and QA/QC procedures** is required
- Mandatory participation in:
    - interlaboratory comparison exercises
    - proficiency testing schemes
- Training should target RBMP-identified weaknesses, including:
    - incomplete monitoring of Priority Substances
    - insufficient detection limits
    - inconsistent QA/QC application

5.3.5. Organisational Considerations

- Chemical monitoring should be **institutionalised and not project-based** and sustainably budgeted
- Strong coordination between:
    - sampling teams
    - laboratories
    - competent authorities
- Clear workflows are required from sampling to reporting to ensure **data traceability and compliance**

6. GAP ANALYSIS VS. EU REQUIREMENTS (WFD IMPLEMENTATION ROADMAP)

6.1. Purpose of the Gap Analysis

The purpose of this gap analysis is to assess the current state of water management in Kosovo against the requirements of the EU Water Framework Directive (WFD), which constitutes the core of Chapter 27 (Environment and Climate Change) of the EU acquis. The WFD requires Member States to achieve good ecological and chemical status for all water bodies through integrated river basin management, comprehensive monitoring systems, and implementation of effective Programmes of Measures (PoM).

This analysis builds on the findings of the River Basin Management Plans (RBMPs), the 2025–2028 Monitoring Programme, and broader strategic and institutional assessments. It identifies discrepancies between the current situation and EU requirements, and provides a structured basis for defining a realistic implementation roadmap.

6.2. Phase-by-Phase Gap Overview

While Kosovo has largely established the planning and legal foundations of WFD-compliant monitoring, significant gaps remain across all operational phases, particularly in monitoring implementation, data integration, and status assessment, resulting in a system that is only partially functional.

Table 9: General gap overview aligned with MDP phases.

MDP Phase	WFD Requirement	Current Status in Kosovo	Gap Level
Phase 1 – Characterisation	Full typology, pressures and risk assessment	River basin characterisation completed in RBMPs using DPSIR approach; key pressures identified; however, analysis is based on limited and uneven monitoring data, with insufficient quantitative linkage between pressures and impacts	**Moderate**

Phase 2 – Programme Design	WFD-compliant monitoring (BQEs, chemicals, monitoring network)	Monitoring programme (2025–2028) aligned with WFD structure; includes biological, physico-chemical and priority substances; however, network design still evolving, with gaps in spatial coverage and pressure-related monitoring	**Moderate–High**
Phase 3 – Implementation	Regular, systematic monitoring campaigns	Monitoring implementation is improving but not yet fully operational nationwide; limited station density, inconsistent frequency, and continued reliance on pilot and project-based monitoring activities	**High**
Phase 4 – QA/QC & Data	Accredited labs, QA/QC systems, integrated databases	Laboratory and QA/QC capacities exist but are not fully harmonised; data is fragmented across institutions; lack of an integrated water information system limits interoperability and consistency	**High**
Phase 5 – Assessment & Reporting	Full classification (EQR, EQS) and WISE reporting	Status assessments carried out in RBMPs but remain partly provisional due to limited datasets; incomplete biological and chemical data prevents robust and fully WFD-compliant classification and reporting	**Very High**
Phase 6 – Adaptive Improvement	Continuous optimisation of monitoring system	Monitoring improvements ongoing through the 2025–2028 programme; however, system development is still largely project-driven, with limited feedback loops between monitoring results, PoM, and policy adjustments	**Medium–High**

6.3. Key Systemic Gaps Identified

Building on the observations in Chapter 5, the following systemic gaps are synthesised. The analysis of Kosovo's surface water monitoring system reveals a number of systemic gaps that cut across all phases of the WFD implementation cycle. These gaps are not isolated technical shortcomings but reflect structural challenges within the broader water management system, particularly in moving from formal alignment with EU legislation toward effective implementation.

A first major gap concerns the **monitoring system and data availability**. Although the 2025–2028 monitoring programme represents a significant improvement and introduces a more structured and WFD-aligned approach, the monitoring network is still not fully operational across all river basins. Spatial coverage remains uneven, monitoring frequencies are not yet consistently applied, and long-term datasets are largely absent. Current pilot monitoring activities cover a limited number of monitoring sites (approximately 20 surface water sites and 10 groundwater sites per year), which remains insufficient compared to the total number of delineated water bodies in Kosovo (over 100 surface water bodies), indicating that spatial representativity of the monitoring network is not yet fully achieved (also see IWRM-K, 2025). Furthermore, while water quality monitoring has improved, the monitoring of pressures—such as wastewater discharges, diffuse pollution, and water abstractions—remains insufficient. This limits the ability to establish clear cause-effect relationships between pressures and ecological status, which is a core requirement of the WFD. Initial results from the pilot monitoring programme already indicate significant water quality challenges, including groundwater bodies with poor chemical status (e.g. in the Ibër basin), where exceedances of nitrates, phosphates, ammonium, sulphates, and manganese have been identified.

Closely linked to this is the gap in **data management and information systems**. Monitoring data is currently fragmented across several institutions, including HMI, KEPA, and RBDA, and there is no fully functional, integrated water information system. As a result, data accessibility, interoperability, and consistency are limited. This fragmentation directly affects the reliability of status assessments, as well as the capacity to support evidence-based decision-making and reporting in line with EU standards. The absence of harmonised QA/QC procedures across all monitoring components further exacerbates these challenges.

A second major systemic gap relates to **infrastructure deficiencies and pressure management**. The lack of wastewater treatment plants, high levels of non-revenue water, and insufficient control of abstractions continue to exert significant pressure on water bodies. While monitoring improvements allow for better identification of water quality issues, they are not matched by adequate investments in infrastructure or effective regulatory enforcement. This creates a disconnect between the identification of problems and the capacity to address them through concrete measures. Such infrastructure gaps are widely recognised as a key barrier to achieving EU environmental standards and sustainable water management.

Another critical issue lies in **institutional coordination and governance**. Although roles and responsibilities among key institutions have been defined more clearly in recent years, coordination remains weak. Overlapping mandates, limited data sharing, and weak vertical integration between national and local levels hinder effective implementation. These governance challenges are consistent with broader findings on environmental management in Kosovo, where institutional fragmentation and limited enforcement capacity continue to constrain progress toward EU alignment. As a result, even when policies and programmes are well designed, their implementation and impact remain limited.

In addition, **financial and technical capacity constraints** represent a cross-cutting limitation. Monitoring and water management activities are still heavily dependent on donor-funded projects, and sustainable financing mechanisms have not yet been fully established. Technical capacity gaps persist in areas such as advanced monitoring techniques, laboratory analysis, and data processing. Monitoring implementation is primarily carried out by the Hydrometeorological Institute of Kosovo (KHMI), with continued reliance on external expertise—particularly for biological assessments and analysis of priority substances—under the IWRM-K project framework. This reliance on external support affects the continuity and scalability of monitoring activities, making it difficult to establish a stable, long-term system as required under the WFD and highlights the need for further strengthening of in-country technical and laboratory capacities.

Finally, a significant systemic gap relates to the **transboundary dimension of water management**. Even though all river basins in Kosovo are international, cooperation with neighbouring countries remains limited and largely ad hoc. Data exchange mechanisms are not fully institutionalised, and joint monitoring approaches are still underdeveloped. This represents a critical shortcoming, as the WFD explicitly requires coordinated management at the river basin level, including across national borders.

Overall, these systemic gaps highlight that the main challenge for Kosovo is no longer the establishment of a formal WFD-aligned framework, but rather the **effective operationalisation of this framework**. Bridging these gaps will require an integrated approach that simultaneously strengthens monitoring systems, data management, infrastructure, institutional coordination, and financing mechanisms.

6.4. Gap-to-Action Matrix (Priority Measures)

The gap-to-action matrix links the identified systemic gaps to targeted measures and positions them within the WFD implementation cycle. This approach ensures that recommended actions are consistent with the phased development of monitoring systems and river basin management planning.

Table 10: Gap-to-Action Matrix identifying key measures.

Gap Area	Identified Gap (Kosovo)	Key Measures	Phase Link
Monitoring Programme Implementation	Monitoring programme not yet fully operational nationwide; uneven spatial coverage; inconsistent monitoring frequency; partial reliance on pilot/project-based activities	• Fully operationalise the 2025–2028 monitoring programme across all basins • Ensure consistent monitoring frequency aligned with WFD requirements • Expand monitoring to cover all water bodies and monitoring types (surveillance, operational, investigative) • Strengthen monitoring of pressures (discharges, abstractions)	**Phase 2 & 3**
Biological Monitoring	Biological Quality Elements (BQEs) partly missing or underdeveloped; limited national methodologies; insufficient taxonomic expertise	• Develop and standardise national methods for all BQEs (phytobenthos, macroinvertebrates, macrophytes, fish) • Build taxonomic and ecological expertise through targeted training • Integrate biological monitoring into routine programmes across all basins • Establish reference conditions and intercalibration approaches	**Phase 2 & 3**
Chemical Monitoring	Limited monitoring of priority substances and river basin-specific pollutants; lack of biota and sediment monitoring; detection	• Expand monitoring to include all priority substances and RBSPs • Introduce sediment and biota monitoring • Upgrade laboratory equipment to achieve EQS-compliant detection limits	**Phase 2 & 3**

	limits not always WFD-compliant	• Harmonise sampling and analytical protocols	
Laboratory Capacity & QA/QC	Laboratory capacity uneven; QA/QC procedures not fully standardised; limited accreditation and intercalibration	• Ensure ISO 17025 lab accreditation • Establish a national QA/QC framework • Standardise sampling, handling, and analytical procedures	**Phase 3 & 4**
Data Management & WIS	Fragmented data across institutions; no fully operational integrated water information system; limited interoperability and accessibility	• Develop and operationalise a national water information system (WIS) • Integrate datasets from HMI, KEPA, RBDA and other stakeholders • Ensure compatibility with WISE reporting requirements • Establish data sharing protocols and pollutant registries	**Phase 4 & 5**
Status Assessment	Status classification partly provisional; incomplete datasets; limited reliability of EQR/EQS-based assessments; reliance on expert judgement	• Develop national classification tools and standards (EQR, EQS) • Improve completeness and quality of monitoring datasets • Standardise assessment methodologies across basins • Strengthen linkage between monitoring results and classification outputs	**Phase 2, 3 & 5**
Monitoring Network Design	Monitoring network not fully representative; gaps in spatial coverage; insufficient pressure-based and reference sites	• Optimise and expand monitoring network design • Increase station density in key pressure areas • Establish reference sites for ecological status assessment • Ensure basin-wide representativeness across all river basins	**Phase 1 & 2**
Institutional Capacity & Coordination	Fragmented institutional landscape; overlapping responsibilities; weak coordination and data sharing; limited technical capacity	• Clarify institutional roles and strengthen RBDA coordination role • Establish formal coordination and data-sharing mechanisms • Increase staffing and provide targeted capacity building • Develop clear operational workflows between institutions	**All Phases**
Sustainability of Monitoring	Monitoring dependent on external projects; limited long-term financing; weak integration into national budgets	• Secure sustainable financing through state budget and tariff mechanisms • Integrate monitoring activities into regular institutional mandates • Develop long-term financial planning for monitoring and maintenance • Reduce reliance on donor-funded projects	**All Phases**

6.5. Conclusions

The assessment of Kosovo's surface water monitoring system against the six phases of the Monitoring Development Plan (MDP) highlights a clear progression from **formal alignment with EU requirements toward gradual operationalisation**, but also confirms that the system remains **in a transitional stage**. While the fundamental elements required by the Water Framework Directive (WFD) are largely in place, their level of implementation varies significantly across phases.

At the level of **Phase 1 (Characterisation)**, Kosovo has reached a relatively advanced stage. River basin characterisation has been completed through the RBMPs using a WFD-compliant DPSIR framework, and the main pressures affecting water bodies have been identified. However, this phase is still constrained by limited monitoring data, which restricts the robustness of pressure-impact analyses. As a result, although the conceptual framework is aligned with EU requirements, the analytical depth and quantitative reliability remain moderate.

In **Phase 2 (Monitoring Programme Design)**, the adoption of the 2025–2028 monitoring programme represents a significant step forward. The programme reflects the structure and requirements of the WFD, including the integration of biological, physico-chemical, and chemical quality elements, as well as the differentiation between surveillance and operational monitoring. Nevertheless, the monitoring design is still evolving, and gaps persist in spatial representativeness, parameter coverage, and the systematic inclusion of pressure-related monitoring. This indicates that Kosovo has moved beyond the initial design stage, but still requires refinement to achieve full WFD compliance.

The most critical challenges emerge in **Phase 3 (Implementation)**, where the transition from planning to execution remains incomplete. Monitoring activities are expanding, but coverage across river basins is still uneven, station density is limited, and monitoring frequencies are not yet consistently applied. Moreover, implementation continues to rely partly on project-based approaches, rather than a fully institutionalised and continuous national system. This phase therefore represents a key bottleneck in the overall monitoring framework.

Similarly, **Phase 4 (QA/QC and Data Management)** reveals substantial gaps. While laboratory capacities and monitoring institutions are in place, quality assurance and quality control procedures are not yet fully harmonised, and data management remains fragmented across institutions. The absence of a fully operational Water Information System (WIS) limits data integration, accessibility, and interoperability. These shortcomings reduce the reliability and usability of monitoring data and hinder alignment with EU reporting standards.

These limitations directly affect **Phase 5 (Assessment and Reporting)**, where Kosovo faces the most significant discrepancies with WFD requirements. Although status assessments have been carried out in the RBMPs, they are often provisional due to incomplete and inconsistent datasets. The lack of fully developed classification tools and limited biological and chemical data prevents consistent application of EQR- and EQS-based assessments. As a consequence, the current system does not yet support robust and comparable status classification in line with EU expectations.

Finally, **Phase 6 (Adaptive Improvement)** needs to be an ongoing process. The introduction of the new monitoring programme demonstrates a clear intention to improve and expand the system, but adaptive management practices—such as systematic feedback loops between monitoring results, policy decisions, and Programme of Measures (PoM) implementation—need to be strengthened further. Therefore, improvements are ongoing, but they are not yet embedded in a continuous, self-sustaining cycle of optimisation.

Across all phases, a consistent pattern emerges. **Strategic and methodological alignment with the WFD has largely been achieved, while operational implementation remains uneven and incomplete**. The most advanced elements are found in **planning and framework development (Phases 1–2)**, while the most significant gaps occur in **implementation, data integration, and assessment (Phases 3–5)**.

Overall, Kosovo's monitoring system can be characterised as **"partially operational with strong foundations but limited effectiveness"**. Moving forward, the key challenge will be to **consolidate and operationalise the existing framework**, ensuring that monitoring becomes systematic, data becomes fully integrated and reliable, and results are effectively translated into management decisions. Achieving this will be essential not only for compliance with the WFD, but also for delivering measurable improvements in water status and supporting the broader EU integration process.

7. ROADMAP 2026–2030 (IMPLEMENTATION PLAN)

The following roadmap translates the identified gaps into a **time-bound implementation plan (2026–2030)** aligned with the **identified gaps, MDP phases, RBMP findings, and EU Chapter 27 context.**

Table 11: Roadmap for Monitoring Development (2026–2030).

Task	Time-frame	Strategic Focus	Key Actions	Expected Outputs
Task A – System Completion	**2026-2027**	Finalisation of monitoring design and legal/technical framework	• Finalise and formally adopt the WFD-compliant monitoring programme (including all biological, physico-chemical and chemical quality elements, and groundwater integration) • Align secondary legislation and technical guidelines with WFD requirements • Define and formalise a national QA/QC framework for monitoring	• Adopted and harmonised legal and technical framework • Fully defined and approved national monitoring programme • National QA/QC framework established • Clear institutional mandates and coordination procedures in place

			and laboratories • Clarify institutional roles and responsibilities (MESPI, RBDA, HMI, KEPA) and establish coordination mechanisms	
Task B – Capacity & Infrastructure Build-up	**2026–2027**	Strengthening operational and technical capacity	• Upgrade laboratory infrastructure (equipment, analytical methods, parameter coverage) • Establish QA/QC-compliant laboratory procedures and improve analytical reliability • Expand and optimise the monitoring network (increase station density, include reference and pressure sites) • Recruit and train staff for biological, chemical and hydromorphological monitoring • Establish operational monitoring teams across all river basins	• Improved laboratory capacity and analytical capabilities • Expanded, better distributed monitoring network • Operational monitoring teams active in all river basins • Strengthened institutional and technical capacity
Task C – Full Monitoring Implementation	**2027–2028**	Regular and systematic WFD-compliant monitoring	• Implement surveillance and operational monitoring programmes nationwide • Ensure consistent sampling frequency and full parameter coverage Introduce monitoring of priority substances, river basin-specific pollutants, as well as biota and sediments • Strengthen monitoring of pressures (wastewater discharges, abstractions)	• Regular and harmonised monitoring campaigns implemented • Complete datasets for ecological and chemical status assessment • Improved spatial and temporal data coverage • Increased reliability and comparability of monitoring results
Task D – Data Integration & Assessment	**2028–2029**	Data validation, integration, classification and reporting	• Establish and operationalise a national Water Information System (WIS) • Integrate monitoring data from all institutions into a central database • Develop and apply WFD-compliant classification systems (EQR, EQS) • Conduct comprehensive status assessments for all water bodies Prepare reporting datasets aligned with WISE requirements	• Fully operational and integrated WIS • Harmonised national monitoring database • First robust and EU-comparable status classification • Improved evidence base for RBMPs • EU-compatible reporting system

Task E – RBMP Update & Optimisation	**2029–2030**	Integration into planning cycle and adaptive system optimisation	• Use monitoring results to update RBMPs in the next planning cycle • Strengthen the link between monitoring results, pressures, and Programme of Measures • Optimise monitoring network based on results and identified pressures • Introduce advanced monitoring approaches where feasible (e.g. modelling tools, automation) • Establish adaptive management feedback loops • Secure long-term and sustainable financing mechanisms	• Updated RBMPs based on robust monitoring evidence • Optimised and more cost-effective monitoring system • Improved effectiveness of water management measures • Fully operational monitoring–planning feedback cycle • Financially sustainable monitoring system

7.1. Link to WFD Planning Cycles

The phased roadmap is designed to align Kosovo's monitoring system with the six-year planning cycle of the Water Framework Directive (WFD), ensuring readiness for the next River Basin Management Plan (RBMP) iteration. It provides a structured pathway for transitioning from a partially operational and project-based monitoring system to a fully WFD-compliant, institutionalised, and adaptive water management framework by 2030.

The roadmap supports the progressive fulfilment of key WFD requirements, including monitoring implementation, status assessment, and reporting obligations, and ensures that monitoring results can be systematically integrated into planning and decision-making processes.

The following phases describe the alignment of roadmap implementation with the WFD cycle:

- **2026-2027:**
  - System consolidation phase, including finalisation of monitoring design, legal framework, and institutional arrangements
  - Transition from planning to operational implementation, with strengthening of monitoring capacity and infrastructure
- **2027–2029:**
  - Generation of consistent and comprehensive monitoring datasets to support reliable status assessment and classification
- **2029–2030:**
  - Integration of monitoring results into the next RBMP cycle and fulfilment of WFD reporting obligations (including WISE-compatible reporting)

7.2. Strategic Priorities

To ensure successful implementation of the roadmap, the following priorities must be addressed:

- **Strengthen and expand the monitoring network**
  → Improve spatial coverage and ensure representative monitoring of all water bodies, including pressure and reference sites
- **Achieve full WFD-compliant parameter coverage**
  → Complete integration of biological, physico-chemical, and chemical quality elements, including priority substances and RBSPs
- **Ensure consistent and regular monitoring implementation**
  → Establish systematic monitoring campaigns aligned with WFD requirements and reduce reliance on project-based activities
- **Establish an integrated Water Information System (WIS)**
  → Harmonise datasets across HMI, KEPA, RBDA and other institutions and ensure compatibility with WISE reporting
- **Strengthen data quality, QA/QC and laboratory capacity**
  → Improve standardisation of methods, QA/QC procedures, and analytical reliability
- **Enhance institutional coordination and technical capacity**
  → Strengthen cooperation between institutions and increase human and technical resources
- **Improve status assessment and classification methodologies**
  → Transition from partly provisional assessments to robust, data-driven ecological and chemical classification
- **Strengthen the linkage between monitoring and management measures**
  → Use monitoring results to prioritise and optimise the Programme of Measures
- **Secure sustainable financing for monitoring systems**
  → The ongoing monitoring programme, as developed under the IWRM-K project and funded by SKAT, is largely project-financed, underlining the need to transition towards sustainable, state-funded monitoring mechanisms to ensure long-term continuity and compliance with WFD requirements.
- **Promote adaptive management and system optimisation**
  → Continuously refine monitoring design and integrate results into future RBMP cycles

8. REFERENCES

8.1. EU Legislation and CIS Guidance Documents

- European Union. (2026). *Directive (EU) 2026/805 amending the Water Framework Directive, Groundwater Directive and EQS Directive*.
- European Environment Agency (EEA). (2025). *Kosovo country profile – Europe's environment 2025*. Copenhagen.
- European Union. (2018). *Commission Implementing Decision (EU) 2018/840 establishing a watch list of substances for Union-wide monitoring*.
- European Commission. (2010). *Common implementation strategy for the Water Framework Directive (2000/60/EC): Guidance document No. 25 – Chemical monitoring of sediment and biota under the Water Framework Directive*.
- European Commission. (2009). *Common implementation strategy for the Water Framework Directive (2000/60/EC): Guidance document No. 19 – Surface water chemical monitoring under the Water Framework Directive*.
- European Union. (2009). *Directive 2009/90/EC laying down technical specifications for chemical analysis and monitoring of water status*.
- European Union. (2008). *Directive 2008/105/EC on environmental quality standards in the field of water policy, as amended by Directive 2013/39/EU*.
- European Commission. (2005). *Common implementation strategy for the Water Framework Directive (2000/60/EC): Guidance document No. 13 – Overall approach to the classification of ecological status and ecological potential*.
- European Commission. (2003). *Common implementation strategy for the Water Framework Directive (2000/60/EC): Guidance document No. 7 – Monitoring under the Water Framework Directive*.
- European Union. (2000). *Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy (Water Framework Directive)*.

8.2. National Documents of Kosovo

- Ministry of Environment, Spatial Planning and Infrastructure (MESPI). (n.d.). *River Basin Management Plan for Drini i Bardhë Basin*. Government of Kosovo.
- Ministry of Environment, Spatial Planning and Infrastructure (MESPI). (n.d.). *River Basin Management Plan for Ibër Basin*. Government of Kosovo.
- Ministry of Environment, Spatial Planning and Infrastructure (MESPI). (n.d.). *River Basin Management Plan for Lepenc Basin*. Government of Kosovo.
- Ministry of Environment, Spatial Planning and Infrastructure (MESPI). (n.d.). *River Basin Management Plan for Morava e Binçës Basin*. Government of Kosovo.
- Ministry of Environment, Spatial Planning and Infrastructure (MESPI). (2024). *Surface and Groundwater Monitoring Programme 2025–2028*. Government of Kosovo.
- Government of Kosovo. (2017). *Kosovo Water Strategy 2017–2036*. Pristina.
- Government of Kosovo. (2023). *Water Strategy 2023–2027 and Action Plan 2023–2025*. Pristina.
- Assembly of Kosovo. (n.d.). *Statement of compliance of legislation of the Republic of Kosovo with the EU acquis (Draft Law on Water Resources Management)*.

8.3. Other

- Umweltbundesamt GmbH. (2026). *Monitoring Development Plan – Groundwater, Kosovo* (EU4Green project).
- Skat Consulting Ltd. & Umweltbundesamt. (2025). *Surface and Groundwater Quality Monitoring in Kosovo 2025–2028 (IWRM-K Project Phase II)*.
- BMLFUW - Bundesministerium für Land- und Forstwirtschaft, Umwelt Wasserwirtschaft – Sektion VII (2008). *GZÜV – Oberflächengewässer (Gewässerzustandsüberwachungsverordnung) Umsetzung 2007 – 2009.*