

# River Basin Management Plan for the Ishem River Basin 2024-2029



## Main Report



## LIST OF ACRONYMS

ADA/ADC	AUSTRIAN DEVELOPMENT AGENCY/AUSTRIAN DEVELOPMENT COOPERATION
AGS	ALBANIAN GEOLOGICAL SURVEY
AWB	ARTIFICIAL WATERBODY
CA	COMPETENT AUTHORITY
CWB	COASTAL WATERBODY
AWRM AMBU	AGENCY FOR WATER RESOURCES MANAGEMENT <i>AGJENCIA E MENAXHIMIT TË BURIMEVE UJORE</i>
AKUM	AGENCY FOR WATER SUPPLY, SEWERAGE AND WASTE MANAGEMENT
DCM	DECISION OF THE COUNCIL OF MINISTERS
DWD	EU DRINKING WATER DIRECTIVE
DWPA	DRINKING WATER PROTECTED AREA
EC	EUROPEAN COMMISSION
EF	ENVIRONMENTAL FLOW
EO	ENVIRONMENTAL OBJECTIVE
EQR	ENVIRONMENTAL QUALITY RATIO
EQS	ENVIRONMENTAL QUALITY STANDARD
EQSD	EU ENVIRONMENTAL QUALITY STANDARDS DIRECTIVE
EU	EUROPEAN UNION
EUSIWM	EU SUPPORT TO INTEGRATED WATER MANAGEMENT
FD	EU FLOODS DIRECTIVE
FDC	FLOW DURATION CURVE
GD	EU GROUNDWATER DIRECTIVE
GES	GOOD ECOLOGICAL STATUS
GEP	GOOD ECOLOGICAL POTENTIAL
GWB	GROUNDWATER BODY
GWDTEs	GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEM
HMWB	HEAVILY MODIFIED WATERBODY
IWRM	INTEGRATED WATER RESOURCES MANAGEMENT
LIWRM	LAW ON INTEGRATED WATER RESOURCES MANAGEMENT – LAW N° 111/2012
IGE	INSTITUTE FOR GEOSCIENCE
IPH	INSTITUTE OF PUBLIC HEALTH
MARD	MINISTRY OF AGRICULTURE and RURAL DEVELOPMENT
MTE	MINISTRY OF TOURISM AND ENVIRONMENT

MFE	MINISTRY OF FINANCE AND ECONOMY
MIE	MINISTRY OF INFRASTRUCTURE AND ENERGY
ND	EU NITRATES DIRECTIVE
NEA	NATIONAL ENVIRONMENT AGENCY
AKM	AGJENCIA KOMBËTARE E MJEDISIT
NSPA	NUTRIENT SENSITIVE PROTECTION AREA
NVZ	NITRATE VULNERABLE ZONE
NWC	NATIONAL WATER COUNCIL
NWRC	NATIONAL WATER RESOURCES CADASTRE
PoM	PROGRAMME OF MEASURES (WFD terminology)
PMO	PRIME MINISTER'S OFFICE
RB	RIVER BASIN
RBC	RIVER BASIN COUNCIL
RBD(A)	RIVER BASIN DISTRICT (AUTHORITY)
RBM	RIVER BASIN MANAGEMENT
RBMP	RIVER BASIN MANAGEMENT PLAN
RBPA	RECREATIONAL OR BATHING WATER PROTECTED AREA
STPs	STANDARD TECHNICAL PROCEDURES (OF AWRM)
SUDS	SUSTAINABLE URBAN DRAINAGE SYSTEM
SWB	SURFACE WATERBODY
UWWTD	EU URBAN WASTEWATER TREATMENT DIRECTIVE
WAFU	WATER AVAILABLE FOR USE (BY OPERATORS)
WBMO	WATER BASIN MANAGEMENT OFFICE
WFD	EU WATER FRAMEWORK DIRECTIVE
WRA	ALBANIA WATER REGULATORY AUTHORITY
<i>ERRU</i>	ENTIT RREGULLATOR TË UJIT
WTW	WATER TREATMENT PLANT (PUBLIC WATER SUPPLY)
WWTP	WASTEWATER TREATMENT PLANT

## **CONTRIBUTORS**

### **EUSIWM project implemented by the Austrian Development Agency (ADA)**

The technical expertise was provided by National and International Experts, contracted by ADA. Project Management, Coordination and Supervision was provided by the EUSIWM / ADA Project Team and WRMA representatives.

### **Water Basin Management Expert Group (WB MEG)**

Based on the Prime Minister's Order no. 24, dated 09.02.2021 "On the establishment of the inter-institutional working group for the drafting of the legal package regarding the harmonization of all EU directives in the field of water resources management", two inter-institutional working groups on water resources have been established (for legal issues and water basin management issues). These groups operate under the direction of WRMA and represent the main stakeholders in the field of water resources: Ministry of Tourism and Environment (MTE), Ministry of Agriculture and Rural Development (MARD), Ministry of Finance and Economy (MFE), Ministry of Infrastructure and Energy (MIE), Ministry of Defense (MoD), Ministry of Health and Social Protection (MoHSP) together with the Institute of Public Health (IPH) and Local Health Care Units (LHCUs) monitor the quality of drinking and washing water, the National Environmental Agency (NEA), the Albanian Geological Survey (AGS), and the National Agency for Civil Protection (NCPA). The highly coordinated and efficient work of these groups under the auspices of WRMA has been essential for the implementation of this document as well as for addressing the main challenges of the sector, including the development of monitoring of water resources according to the required standards. WRMA is leading the IMWR and implementing the water basin management, is chairing the working group for legal issues and that for expert issues of the WRM, as well as leading the decision-making process.

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## **Compliance Statement**

*This Document complies with the requirements of the Albania Law on Public Consultation, Article 15 and Article 17.*

*This Document is intended to comply with the EU Directive 2000/60/EC – Article 14 – Public Consultation on the development of River Basin Management Plans and Annex VI*

## Foreword

Dear Colleagues, Water and Environmental Professionals, Stakeholders,

As you are aware, Albania is implementing the EU Water Framework Directive 2000/60/EC (EU WFD), as a very important link for membership in the European Union.

For this purpose, Water Resources Management Agency (AMBU), as the authority responsible for drafting and implementing River Basin Management Plan, under support of the EUSIWM project (European Union Support for Integrated Water Management), which is implemented by the ADA (Austrian Agency for Development), has drafted this **River Basin Management Plan for the Ishem River Basin**, consisting of:

- Protection and improvement of water bodies;
- Comprehensive participation of the public in the development of the process, until achieving the good status of water bodies.

**Water** is our precious natural resource. As such, it is essential to the flourishing of wildlife, agriculture, and business. It is also one of the tools for promoting regeneration (structural and economic), recreation and tourism. Therefore, this effort is considered fair, as it will make it possible to identify pressures and impacts on water resources, contributing to improving the quality of our aquatic environment in the Ishem basin, through its sustainable management.

Following the rules established through the Decision of the Council of Ministers No.1015, dated 16.12.2020, for each designated river basin, the River Basin Councils (RBC) must ensure that all stakeholders have the opportunity to share their opinions from their professional point of view regarding with RBMP-s, through cooperation with various institutions, organizations, local communities. In this way, each of us can gain new knowledge regarding the management of water resources and, together, make it possible to formalize this plan.

Considering the above, based on your field of expertise, we would appreciate your engagement in identifying the issues that you consider important, as well as proposing possible measures to resolve them.

In the end, the last document, before its publication, should have taken into account the proposals of all water actors.

We call for your attention that a RBMP has a 6 years implementation cycle. In Europe currently, Member States have completed the second cycle of RBMPs (2022-2027) and have started the third implementation cycle (2024-2029). For this reason, your thoughts and suggestions are considered highly valuable, as they will show the commitment of each of us to the EU accession process, believing that the **River Basin Management Plan for the Ishem River Basin** will be implemented in the period, in compliance with the third cycle of the EU RBMP.

*Signed*

General Director - AMBU

Gerta Lubonja

## Executive Summary

The EUSIWM Project is co-financed by the EU under the IPA 2016 Action Programme for Albania for the Support to Integrated Water Management and the Austrian Development Cooperation (ADC). The Austrian Development Agency (ADA), under the Agreement No. 2017/393-187 signed between the European Commission and ADA on 21<sup>st</sup> December 2017, is the responsible body for the implementation of the project.

WRMA is the direct beneficiary of the EUSIWM Project based on the Agreement between the Government of Albania and ADA signed on 14<sup>th</sup> November 2018 (updated following the no-cost extension of 1 year granted to the current existing project). The overall objective of the Project is to enhance the implementation of the National Water Sector Reform and advance progress of the Albanian water sector towards EU water legislation requirements.

Highly interlinked with the technical work, the aim of the project itself was to enhance the role of AWRM and other Albanian water-related institutions not only in the drafting of a RBMP but in general in the implementation of integrated water resources management, under the EU approach/methodology. Such work flow has helped AWRM's leadership role to be gradually performed throughout the whole RBM process.

### **Objective of Ishem River Basin Management Plan (RBMP)**

The drafting of Ishem RBMP was carried out with support of the EUSIWM project, during 2019 – 2021. At the beginning of the program, but especially in 2019, 2020, the performing of key aspects and RBM activities was done with the support of ADA/EUSIWM project team and international and national experts.

In 2021, based on the recommendations of EUSIWM project team an inter-institutional expert group for RBM was established, under WRMA's leadership. Different institutions responsible for the water management in the country were represented and directly involved in all preparatory stages of RBMP preparation and in particular on data collection and validation.

The structure of the current RBMP for Ishem RB is in full compliance with the requirements defined in Annex VII of the EU WFD 2000/60/EC<sup>1</sup>. Few adaptations were made in the internal chapters and content-wise of the plan as to better respond to the national conditions and operational systems available for the water resources management.

Working under a clear framework methodology for the RBM, having the WRMA staff fully trained under the EUSIWM project and moreover having established the inter-institutional dialogue at technical level through the RBM EG(s), it has shown guarantee that in the future the RBM planning process of new plans 2024-2029 followed by their implementation through defined, EU compliant Programme of Measures (PoM), shall be professionally performed under the leadership of WRMA and in strong cooperation with the water-related institutions.

### **Challenges encountered**

The drafting of the RBMP is a challenging and complex process, and having regards to the conditions of Albania such difficulties are much more present and demanding. Although the preparation of the RBMP may be the responsibility of one or several institutions, its design itself is a complex undertaking involving all related stakeholders such as experts in various fields. Integrated management of water resources is a "must" process which relevant institutions should perform to better manage the

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<sup>1</sup> [https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF)

available resources. A major requirement for the adequate implementation of the RBM process is data availability, and when (*if*) available their reliability. a huge question mark during the Ishem RBMP preparation period was weather to wait until the full set of data was collected, a well-organized monitoring system was fully operational or to proceed with “what is available” approach and define the future Roadmap on how to solve the phased problems and challenges.

*In overall, should AMBU wait for all such conditions to be met and afterwards start with the preparation of the RBMP or Should the meeting of these conditions become integral part of the RBMP itself?*

### **How the RBMP was born**

In 2000, the EU WFD came into force, establishing a legal framework to protect and enhance the status of aquatic ecosystems, prevent their deterioration, and ensure the long-term, sustainable use of water resources throughout the EU. The objective was to achieve for all inland surface waters, transitional and coastal waters ‘good chemical and ecological status (or potential)’ – and for all groundwater to achieve ‘good chemical’ and ‘quantitative status’.

‘Clean water’, not been put under pressure by the use of organic substances, nutrients and dangerous substances is essential. However, not enough in case the natural ecosystem including its flora and fauna is significantly damaged. That is why a holistic approach requires surface waters to be as well in ‘good ecological status’; River bed and banks have to be well structured and enough water has to be ensured so that migration routes and natural habitats are provided for aquatic animals and plants.

### **Identification of Significant Water Management Issues (SWMI)**

The preliminary stage was the identification of main SWMI as to offer an overview of main issues and pressure in the given RB. This Statement report presents the current issues in the river basin and proposes the main topics/aspects to be further addressed in the RBMP – indeed seeking for solutions.

Few of the most significant issues are listed below:

1. Climate change and water resources
2. Hydrometeorological monitoring systems and data system
3. Protected areas and aquatic ecosystems;
4. Floods and droughts;
5. Morphology and continuity of canals and muds;
6. Ecological input
7. Use of water, water extraction and permits for water extraction;
8. Water discharges, water pollution and discharge permit;
9. Dams and hydropower plants;
10. Use, protection and monitoring of groundwater;
11. Coastal water quality and habitats
12. Coastal water level, danger and floods, erosion and floods.

For each issue, the statement included information on the:

- Importance of treatment;
- Current situation;
- Future complications and needs;
- Possible measures for implementation within the River Basin Management Plan.

### **Towards a RBMP framework for the country**

Based on the analysis of the situation and the problems that were proposed to be addressed in SWMI, it was agreed that the next important step would be definition of an adequate and useful structure of

the RBMP, which would fully comply with the requirements of the Annex VII of EU WFD, and at the same time would take into account the specifics of water resources and their problems in Albania. This structure was prepared mainly by EUSIWM international expert Brian Faulkner in June 2020.

The draft RBMP includes 13 chapters all in accordance with what is provided in Annex VII of the WFD, but the sequence of the chapters was slightly adapted to the national context. Few chapters are quite advanced and almost completed, and other ones are only considered. With regards to chapter 11 it took a longer period of preparation and consultation; economic analysis of water use represents a first time – pilot case for Albania, being conducted at river basin level.

The first draft RBMP took full shape in April 2021. From this moment onwards, the completion of the RBMP was conducted done under the leadership of AMBU with the support of the ADA-EUSWIM team and relevant international and local experts. The draft report and its contents were fully consulted with relevant stakeholders and related institutions through the RBM EG(s) meetings as well.

A continues update of the draft RBMP report took continuously, having the advanced draft RBMP in December 2021 as it was announced and introduced to all actors in a National Water Conference.

### **Programme of Measures**

Based on the WFD requirements, for each RBMP prepared a PoM shall be defined in order to achieve the environmental objectives (WFD Article 11(1)2).

The measures identified in the Ishem RBMP are designed based on the assessment of the current status of the water bodies designated, fed with information from the analysis of pressures and impacts affecting the water body. Each step of the planning process is, therefore, necessary to ensure that the correct measures are implemented in the appropriate location.

The measures were targeted in terms of their type “Key Types of Measures” (KTMs<sup>3</sup>) and to which extent they would ensure that such pressures are addressed. KTMs are groups of measures identified by the Member States in the PoMs which target the same pressure or purpose. *A KTM may be one national measure but it would typically comprise more than one national measure. The measures had been designed based on the assessment of the actual status of water bodies, supplemented with the information from the analysis of pressures and impacts affecting the water bodies.*

This RBMP sets out the PoMs that will be implemented during 2024-2029 to achieve ‘environmental objectives’ described fully under Chapter 3, in compliance with the WFD, Article 44. Guidance on general pressure and measure indicators are provided under WISE 2016 Annex 3, with examples given. Specific measures (whilst falling within the framework of KTMs), should address the specific pressures (Key Type Pressure KTPs<sup>5</sup>) encountered at the water body level. The most effective way to reflect the relevant pressure(s) and consequent measure(s) is to summarise the individual elements that contribute to the waterbody overall status or potential.

#### **Main Measures defined:**

- Reducing pollution by organic substances

Despite the huge investments already made in the wastewater infrastructure, additional measures should be taken in the future. 52% of the total PE of the basin need basic infrastructural development

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<sup>2</sup> Article 11 (1). Each Member State shall ensure the establishment for each river basin district, or for the part of an international river basin district within its territory, of a programme of measures, taking account of the results of the analyses required under Article 5, in order to achieve the objectives established under Article 4. Such programmes of measures may make reference to measures following from legislation adopted at national level and covering the whole of the territory of a Member State. Where appropriate, a Member State may adopt measures applicable to all river basin districts and/or the portions of international river basin districts falling within its territory.

<sup>3</sup> Summarised on Table 13-1 (*the EU WISE compliant Key Types of Measures (KTMs) that have been broadly adopted in this RBMP Report*)

<sup>4</sup> Article 4 : Environmental objectives

<sup>5</sup> Summarised on Table 10-1 (*the EU WISE compliant Key Types of Pressure (KTPs) that have been broadly adopted in this RBMP Report*)

aiming to achieve connection to public sewer systems and at least biological treatment. Albania, as non-EU MS also intend to make efforts to achieve significant improvements by constructing a specific number of sewer systems and waste water treatment plants till 2029.

- Reducing pollution by nutrients

The measures under implementation have been substantially contributing to the reduction of nutrient inputs into surface waters and groundwater but further efforts are still needed. Continuation of measures implementation in urban waste water, industrial, and agricultural sectors is necessary.

In addition, introduction of phosphate-free detergents is considered to be a fast and efficient measure to reduce phosphorus emissions into surface waters. The EU Detergents Regulation has to be implemented in all countries and similar efforts are either already in progress or recommended to be made in Non-EU countries.

Diffuse pathways have a dominant share in the total nutrient emissions, therefore implementation of measures addressing land management has high importance. A key set of best agricultural practices to reduce nutrient inputs and losses related to farming and land management has been identified as appropriate management tools to be applied in agricultural areas.

Moreover, application of good agricultural practices is either ensured by regulatory actions (cross-compliance) or encouraged by economic incentives (rural development programmes) of the financial mechanism of the Common Agricultural Policy. Non-EU countries are also highly encouraged to implement similar best agricultural practices.

- Reducing pollution by hazardous substances

Appropriate treatment of urban waste water and application of Best Available Techniques (BAT) in the industrial plants and large agricultural farms are elementary measures and can significantly contribute to the mitigation of hazardous contaminations.

In Non-EU countries the efforts to be made in order to develop and improve the waste water sector and industrial technologies and to apply best agricultural practices will also have positive effects on water status related to hazardous substances pollution.

Further efforts are needed to identify which priority substances and other emerging chemicals are of basin wide relevance. Since only limited information is recently available on the emission sources contributing to hazardous substances contamination of the surface waters, this information gap should be narrowed. Compilation of the basin-wide inventory on discharges, emissions and losses has to be continued. In particular, diffuse emissions should be addressed by regionalized pathway modelling. To support these activities further information on in-stream concentrations and river loads via improved regular monitoring (enhanced devices and higher sampling frequency) and specific sampling campaigns (e.g. to sample point source effluents) is needed.

- Improving the hydromorphological conditions

From the evaluation of hydro morphological modifications, it is clear that only 2 water bodies are in poor condition. The measures proposed are those to facilitate the fish paths and the removal of obstacles to achieve a fuller continuity along the rivers.

- Improving groundwater status

#### Groundwater quality

Considering that contamination by nitrates is a key factor against achieving good chemical status of a significant portion of the GWBs of basin-wide importance, it is essential to eliminate or reduce the quantity of nitrates entering groundwater bodies. Prevention of deterioration of groundwater quality

and any significant and sustained upward trend in concentrations of nitrates in groundwater has to be achieved primarily through the implementation of the EU Nitrates Directive and also the EU UWWTD.

#### Groundwater quantity

The over-abstraction of GWBs should be avoided by effective groundwater and surface water management. Therefore, appropriate controls regarding abstraction of fresh surface water and groundwater and impoundment of fresh surface waters (including a register or registers of water abstractions) must be put in place as well as the requirements for prior authorisation of such abstraction and impoundment. In line with the WFD, it must be ensured that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction.

#### **Public Participation and Consultation**

WRMA is committed to active public participation in its decision making to achieve broader support for policies and increase efficiency in implementation efforts. The relevant stakeholders and all levels were fully consulted since the beginning of the drafting period for the Ishem RBMP. In November 2019 the first kick-off/consultation meeting took place with relevant institutions to discuss and jointly identify/agree on the significant water management issues.

Due to Covid-19 pandemic, during 2020 only one consultation meeting was held in October 2020 with representatives of Ishem and Erzen RBs. This advanced RBMP shall be published at AMBUofficial website as to comply with the requirements of Article 14 of EU WFD on public participation and involvement.

*The Directive itself is gender-blind however AMBU with full extensive support of EUSIWM team have taken into full consideration the role of women, at all levels during the preparation phase.*

# 1 Objectives, Administration and Coordination

## 1.1 Objectives

This document delivers the statutory requirements of the RBMP for the Ishem river basin, as set out in the Law on Integrated Water Resources Management (LIWRM) especially Articles 17 and 24<sup>6</sup>. In parallel, the RBMP is also broadly compliant with the objectives and procedures of the European Union EU WFD, the over-arching legislation of the EU with respect to protection of national waters, and its associated Directives<sup>7</sup>.

The overall purpose of the EU WFD is primarily concerned with the quality of waters, broadly defined as the 'status'. Control of water quantity (flows or volumes) is an ancillary element in securing good water quality and therefore measures on quantity serving the objective of ensuring good quality should also be established.

The RBMP is the main tool for the management of surface and groundwater bodies within a specified River Basin District (RBD), in this case the Ishem River Basin area. With respect to water governance, the RBMP contains:

- a general description of the river basin, incorporating principally: hydro-meteorology, land and water use;
- categorisation of waterbodies into rivers, lakes, transitional and coastal surface water, groundwater bodies, their associated typology and reference conditions for all waterbodies;
- a technical evaluation of the baseline (current) condition of all waterbodies within the river basin in terms of their quality and quantity status;
- identification of protected areas within the river basin where water has a special use or importance that requires protection;
- a summary of the significant anthropogenic pressures and impacts on surface and groundwater bodies;
- a summary of the measures intended to mitigate the impacts identified for specific waterbodies if these are below the minimum required status of 'Good';
- an economic and/or technical justification for those waterbodies typically described as 'heavily modified waterbodies' (HMWBs) where achievement of 'Good Status' is not feasible;
- an economic analysis sufficient to identify the necessary recovery of resource and environmental costs of water services, taking account of long-term forecasts of supply and demand for water in the river basin;
- a register and summary of any more detailed plans proposed for sub-basins, sectors, management issues or water categories that may influence or be influenced by the environmental objectives and programme of measures of this Plan;
- a summary of public consultation measures taken and how these consultations have been taken into account in the formulation of the RBMP objectives and programme of measures;
- a list of the Competent Authorities that have obligations or are influenced by this Plan, including their relationship with other authorities co-ordinated within Albania, and where necessary, a

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<sup>6</sup> Government of Albania, Law 111/2012, amended by Law no 6/2018 on Integrated Water Resources Management

<sup>7</sup> European Union, Directive 2000/60/EC – on establishing a framework for Community action in the field of water policy – “the Water Framework Directive”, Annex VII, Annex IX

summary of institutional relationships established to ensure co-ordination in international River Basin Districts;

- A register of abstractions and their permits where those abstractions are likely to impact on waterbody status<sup>8</sup>.

The defined period of the Plan is six years (2024-2029) in accordance with national legislation and the WFD, and represents the 3<sup>rd</sup> cycle of such Plans within the Member States of the EU with which Albania proposes to align. Once adopted at National Water Council and Council of Ministers level, the PoM defined in the RBMP that delivers the stated environmental objectives devolving from LIWRM Article 25(1) are expected to be legally binding on the designated competent authorities, operators or other stakeholders as appropriate.

## 1.2 Legal Status of the Competent Authority

The Ishem river basin is independently defined<sup>9</sup> but located within the “Tirana River Basin District” of Albania (Map1-1). For the purposes of this Plan, the WRMA acts as the River Basin District Authority (RBDA) as defined in the LIWRM (Article 11). The specific competences of the AMBU are regulated by Article 11 of the LIWRM and the Decision of the Council of Ministers No. 221, dated 26.04.2018 on the organisation and functioning of the WRMA.

The WRMA has overall responsibility to ensure that the requirements of the LIWRM and the EU WFD, especially the environmental objectives and programme of measures as set out in the RBMP, are coordinated across all sectors and programmes within the river basin<sup>10</sup>.

## 1.3 Administrative Arrangements

The LIWRM defines the institutional framework, at national and local level, to ensure the management of water resources, and also aligns with the principal EU environmental and water related Directives including the UWWTD, the Drinking Water Directive (DWD) and partially the Groundwater (GD) and Floods Directives (FD).

The governance structure of water management generally is set out in Figure 1-1. AMBU is the designated competent authority to develop and implement policies, strategies, plans, programs and projects aimed at the integrated management of water resources, including RBMPs.

The RBCs are the responsible bodies at local level for integrated water resources management in the relevant basin, including the conservation and protection of water resources, as well as an equitable distribution of the water resources within the concerned river basin (LIWRM, Article 12).

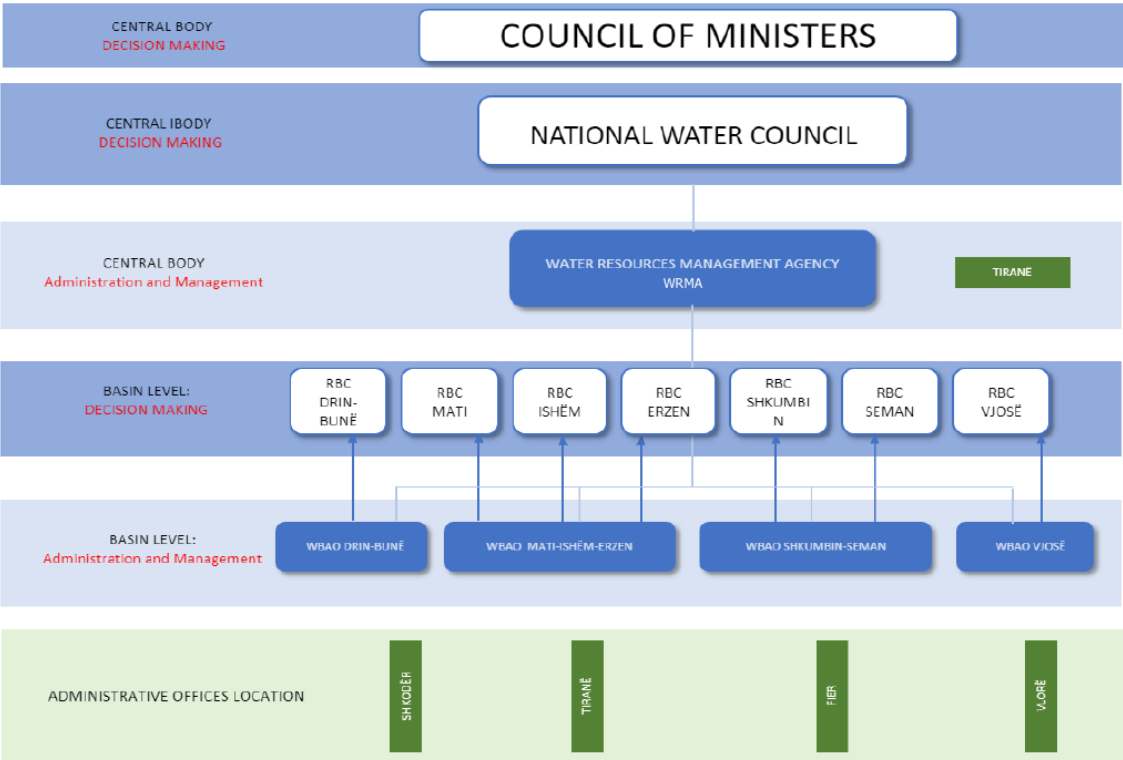
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<sup>8</sup> European Commission, Directive 2000/60/EC – Article 11(3)

<sup>9</sup> GoA, Decision of the Council of Ministers – Decision no.696 date 30.10.2019 – on the approval of territorial and hydrographic boundaries of water basins

<sup>10</sup> European Commission, Directive 2000/60/EC – Article 3(2)

**Figure 1-1 – Administrative Arrangements for Water Governance**



The Water Basin Administration Offices (WBAOs) are operational units of WRMA. Their main tasks include the development of the respective river basin water resources management plans and the maintenance of water resource inventories (Article 13, LIWRM).

**1.4 Competent Authority Coordination and Institutional Relationships**

AMBU acts as the principal responsible body for the development and coordination of the RBMP. However, RBMPs are necessarily highly complex initiatives, requiring extensive cooperation and consultation between Government Ministries, Agencies and regulators, so-called “competent authorities”.

Table 1-1 summarises the competent authorities relevant to this Plan, and their duties and obligations, and coordination mechanisms with the River Basin District Authority. This coordination routinely takes place through the Governance mechanisms.

The institutions in charge of drafting and implementing plans for its administration and organization of national bodies in Water Resources Management are: Council of Ministers, National Water Council, Agency for Water Resources Management, Council of River Basins and Water Resources Management Offices. (Article 7, LIWRM).

RBCs are assisted by the WBAOs, which function as a secretariat to the RBC. The WBAOs are responsible for technical assessment of water use applications (surface and groundwater) and provide recommendations for approval by RBC, support municipalities in resolving related issues water resources and are responsible for supervising (controlling) all activities related to the use of water resources. However, the WBAOs have limited authority to enforce legal and regulatory procedures.

Prime Minister's Order no.129 dated 21.09.2015 'On taking institutional and operational measures for the implementation of the sectoral approach and the establishment of integrated policy management groups' institutionalizes for the first time the sectoral approach within the Integrated Planning System

(IPS) which is the main decision-making system that determines the strategic direction and distribution of the country's resources. The Integrated Sector Management mechanism was set up with the aim of developing, implementing and monitoring sectoral reforms in Albania. This would be achieved through the design of national sectoral programs and the creation of a single list of priority projects for strategic investments. The mechanism was based on the establishment of four Integrated Policy Management Groups (GMIPs) in four priority areas:

- Integrated Water Management;
- Employment and Social Sector;
- Competitiveness and Innovation;
- Good Governance and Public Administration.

Through the Order of the Prime Minister no. 157, dated 22.10.2018 'On taking measures for the implementation of the wide sectoral / cross-sectoral approach, as well as the establishment and functioning of the integrated sectoral / cross-sectoral mechanism', the GMIP mechanism is reorganized and consolidated in support of taking organizational measures, inter-institutional and operational for the implementation of the sector-wide / cross-sectoral approach. In the new organization, GMIPs aim to operate in the function of integrated sectoral and cross-sectoral approach in priority areas. In this regard, a cross-sectoral perspective has been added in contrast to the first organization that emphasized only the sectoral one. In addition to GMIPs, a new form of organization is added: Sectoral Steering Committees (SCCs) divided into five. It is important to specify the role that this mechanism has in the process of using and implementing the Financial Instrument of Sectoral Budget Support. The Prime Minister's Order 2015 specifies that: 'this mechanism aims to develop, implement and monitor sectoral reforms in Albania through the drafting of national sectoral programs and the creation of a single list of priority projects for strategic investments, in accordance with the...membership process in the EU and Albania's international obligations'.

All stakeholders within the river basin from end-users to local and national authorities (government institutions), are represented by different subjects that operate in the water sectors; such as: agriculture, industry, urban, energy providers, to NGOs, scientific community, donors and civil society at large.

**Table 1-1 – Register of Competent Authorities Relevant to the Plan**

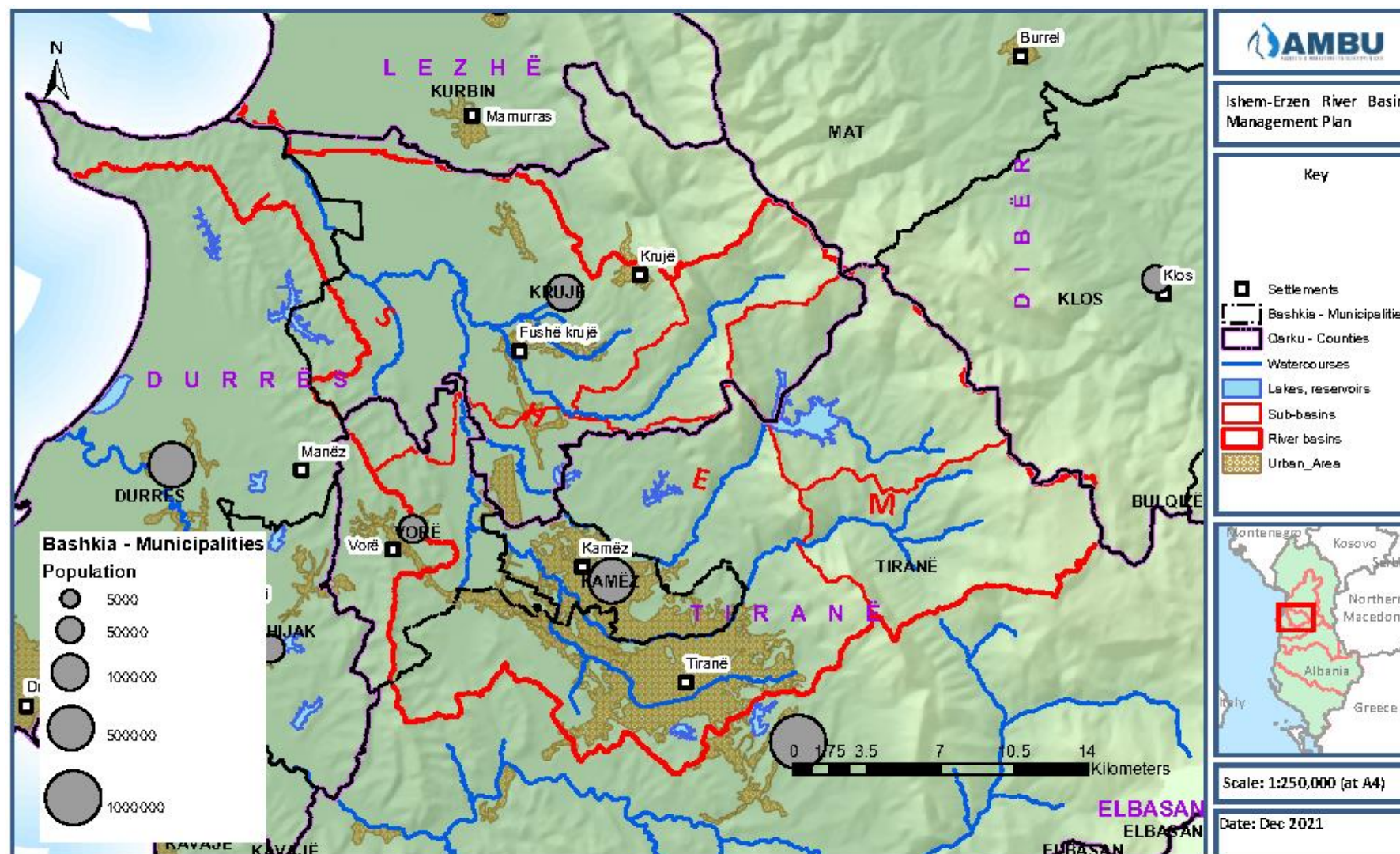
COMPETENT AUTHORITY & LEGAL AUTHORITY	MAIN ACTIVITIES CONTRIBUTING TO WFD	COORDINATION MECHANISMS WITH OTHER CAs
<p>Agency for Water Resources Management (AWRM) (Office of the Prime Minister)</p> <p>Law No. 111/2012 as amended by Law no. 6/2018 on “Integrated water resources management”</p> <p>DCM No. 221 dated 26.4.2018 on “Establishment of AMBU”</p>	<p>Implementation and coordination of the Law on Integrated Water Resources Management</p> <p>Implementation and coordination of the EU Water Framework Directive</p> <p>Preparation of River Basin Management Plans</p> <p>Preparation of Water Resource Management Plans</p> <p>Preparation of Flood Risk Management Plans</p> <p>Preparation of Drought Risk Management Plans</p> <p>Holder of the Register of Water Abstractions (in NWRC)</p>	<p>Publication of River Basin Management Plans and Subsidiary Plans</p> <p>Implementation of National IWRM Strategy</p> <p>Maintenance of the register of water resources operators</p> <p>Maintenance of the National Water Resources Cadastre</p>
<p>National Environmental Agency (NEA)</p> <p>Law No. 10431 date 9.6.2011 on “Environmental Protection”</p> <p>DCM No. 568 date 17.7.2019 on “Establishment of NEA”</p>	<p>National Environmental Monitoring of River Waterbodies</p> <p>National Environmental Monitoring of Lake Waterbodies</p> <p>National Environmental Monitoring of Coastal Waterbodies</p> <p>Environmental Permits issued for all industrial activities in the country</p> <p>EIAs and SEA assessed regularly</p>	<p>Publication of the National Environmental Monitoring Programme (yearly exercise)</p> <p>Maintenance of Register of Environmental Permits</p> <p>Maintenance of the Register of Pollutant release and discharges</p>
<p>Department of Climate and Environment, Institute of Geosciences, Energy, Water and Environment (IGEWE)</p> <p>Law No. 8485 dated 12.5.1999 on “Code of administrative procedures”</p> <p>DCM No. 490 dated 6.7.2011 on “Establishment of IGJEUM / IGEWE (merging previous existing different institutions).</p>	<p>Data collection, verification and distribution of meteorological data (precipitation monitoring)</p> <p>Data collection, verification and distribution of hydrological data (flow monitoring)</p>	<p>Publication of Climate Monthly Bulletin via website</p>

<p>National Agency for Protected Areas</p> <p>Law No. 81/2017 on “Protected areas” DCM No. 102 dated 4.2.2015 on “Establishment of national agency for protected areas”, as amended on 2016.</p>	<p>Management of Protected Areas</p> <p>Implementation of the EU Birds and Habitats Directives</p>	<p>Publication of management plans for protected areas, all types</p> <p>Maintenance of register for protected areas – GIS based</p> <p>Maintenance of the national Inventory of flora and fauna</p>
<p>National Coastline Agency (NCA)</p> <p>Law No. 93/2015 on “Tourism” DCM No. 569 dated 17.7.2019 on “Establishment of national coastline agency”</p>	<p>Protection and development of sustainable environment in coast</p> <p>Monitoring and control of illegal touristic-based activities in coast (beaches)</p>	<p>Maintenance of national inventory of coastline</p> <p>Monitoring implementation of territorial planning instruments</p>
<p>National Territorial Planning Agency</p> <p>Law No. 107/2014 on “Territorial development and planning”. DCM No. 427 dated 8.6.2016 on “Establishment of national agency for territorial planning”</p>	<p>Preparation of territorial management plans in a coordinated manner – through local governments</p> <p>Preparation of integrated plans thematic-wise (including infrastructure, floods, water, agriculture, urban development, etc).</p>	<p>Publication of National Development Plan</p> <p>Coordinate preparation of local governments territorial management plans</p> <p>Publication of Integrated Cross-Sectorial Coastline Plan – GIS based</p> <p>Publication of Integrated Cross-Sectorial Coastline Plan for Tirana-Durres Region – GIS based (including Tirana, Durresi, Kamza, Vora, Shijaku and Kruja municipalities).</p> <p>Maintenance of an Integrated Planning Database.</p>
<p>Albanian Geological Survey (AGS)</p> <p>Law No. 111/2015 dated 15.10.2015 on “Albanian geological survey”</p>	<p>Study and monitoring of groundwater, aquifers, geological layers, hydrogeology</p>	<p>Publication of reports on groundwater quality</p> <p>Maintenance of database – GIS based – on geology, hydrogeology and groundwater aquifers.</p> <p>Member of EuroGeoSurveys, since 2007</p>
<p>National Agency for Nature Resources (NANR/AKBN)</p> <p>Law No. 7/2017 on “Use of renewable resources”</p>	<p>Maintenance of database – national – on Energy sector use / capacity</p> <p>Monitoring and inspection of energy sector + fuels, oils, and all other natural resources</p>	<p>Publication of Bulletin on hydropower potential / investments in the country</p> <p>Maintenance of GIS based system on energy</p>

<p>DCM No. 547 dated 9.8.2006 on "Establishment of AKBN) as amended in 2017</p>	<p>Preparation of national action plan on use of renewable resources for energy production – every 2 years</p> <p>Hydropower plants monitoring</p> <p>Analysis of minerals</p>	
<p>National Agency for Water Supply, Sewerage and Waste Infrastructure (AKUM)</p> <p>Law No. 8102, dated 28.3.1996 on "water supply and sewerage", as amended by law no. 9915 dated 2008. (The new draft law is prepared – not yet adopted).</p> <p>DCM No. 431 dated 11.7.2018 "on establishment of AKUM"</p>	<p>Implementation of policy and strategy on water supply and sewerage (Master plan for WSS and Waste)</p> <p>Wastewater treatment</p> <p>Planning infrastructure for waste</p> <p>Planning investment needs for water supply / wastewater and waste management</p>	<p>Maintenance of national GIS platform on water supply and sewerage assets</p> <p>Publication of reports / statistics on performance of water utilities</p>
<p>Regional Directorates for Irrigation and Drainage</p> <p>Law No. 24/2017 on "Irrigation and drainage"</p> <p>DCM No. 437 dated 17.5.2017 on "Establishment of 4 regional directorates for irrigation and drainage"</p>	<p>4 Directorates established: in <b>Lezhe, Durres, Fier and Korçe</b>.</p> <p>Inventory of irrigation, drainage and flood protection infrastructure</p> <p>Planning needs / water demand for irrigation sector</p> <p>Planning rehabilitation interventions in irrigation, drainage and flood protection infrastructure</p>	<p>Maintenance of irrigation, drainage and flood protection infrastructure</p>
<p>National Forestry Agency (NFA)</p> <p>Law no. 5/2016 dated 04.02.2016 "On the announcement of the Moratorium on forests"</p> <p>DCM No. 570, dated 17.7.2019 "On the establishment of the KPA".</p> <p>Order no. 24, dated 03.02.2020 "On the approval of the structure and organizational chart of the National Forest Agency"</p>	<p>Prepare inventory of forestry</p> <p>Preparatory of GIS based maps</p> <p>Implementation of yearly monitoring programme for forestry, biodiversity, habitats, etc.</p> <p>Monitoring / control / inspection</p>	<p>Maintenance of integrated forest system (registry, database, GIS system).</p> <p>Establishes and maintains the National Register of the Forest Fund.</p> <p>Develops the methodology for forest inventory, organization and management of work at the national level.</p> <p>Publication of forest status reports and other relevant data / information.</p>

Law no. 57/2020 "On Forests" dt.30 / 04/2020		
National Agency for Civil Protection ( <b>former General Directorate for Civil Emergencies</b> )	Preparation of national strategy for remediation of risk from disasters	Maintenance of database of information on losses and damages Establishment of the Fund for Solidarity
Law No. 45/2019 dated 18.7.2019 on "Civil Protection"	Preparation of national plan for civil emergencies Interventions in infrastructure in the damaged areas	
State Authority for Geo-Spatial Information (ASIG)	Implementation of INSPIRE Directive requirements Preparation of National Standards for geo-Spatial information	Publication of all typology / sector maps at local/region/country level Maintenance of National GIS system for all types of information
Law No. 72/2012 dated 28.6.2012 on "organisation and functioning of the state infrastructure for geo-space information"	Preparation of all thematic-wise maps, at GIS system	Maintenance of the National Geo-Portal (website) with information thematic-wise and available for public
Institute of Public Health	Quality assessment of drinking water (analysis of surface water, groundwater and water treatment facilities)	Publication of reports on health issues / status Publication of health medical Journal
Law No. No.10 138, dated 11.5.2009 on "public health"	Monitoring drinking water quality	Publication of Bulletin of Health via website
DCM no. 379, dated 25.5.2016 for the approval of the regulation "Drinking water quality"	The analysis of drinking water quality monitoring data was carried out by local healthcare units.	Publication on the Annual Drinking Water Quality Report website

Map 1-1 – Extent of the Ishem Basin



## 1.5 Overall Structure of the RBMP Framework and Documentation

### 1.5.1 Core Components

Within the context of WFD, the RBMP should give a detailed account of how the environmental objectives to be set for the river basin (ecological status, quantitative status, chemical status and protected area objectives) are to be reached within the timescale required<sup>11</sup>. Broadly:

- Measures to protect the quality and quantity of all waters, including aquatic ecology and valuable habitats
- Measures to protect sources of water used for potable water, both surface and groundwater
- Measures to ensure the long-term sustainability of waters in terms of both environmental and economic needs
- Measures to protect bathing waters and other waters of economic importance

These objectives must be integrated for each river basin. Broadly, programmes of measures are divided to:

- i) 'Basic measures' incorporating the key compliance requirements of various EU Directives, set out under Part A, WFD Annex VI
- ii) 'Supplementary measures' at the discretion of the RBDA as required, to achieve environmental objectives, set out under Part A, WFD Annex VI.

In parallel, a detailed economic analysis of water use within the river basin must be carried out. Adequate water pricing and cost recovery acts as an incentive for the sustainable use of water resources and thus helps to achieve the environmental objectives under the Directive. Additionally, the economic analysis facilitates rational discussion on the cost-effectiveness of the various possible measures listed above.

### 1.5.2 Secondary Components

At the scale of the river basin, comprehensive and best practice integrated water resources management requires broader considerations than the limited range of 1.5.1 above.<sup>12</sup> In its core formulation, the WFD makes only very limited explicit reference to management of water resources, flood management, drought management and coastal management.

These activities have significant potential to impact on the measures of 1.5.1, and within the foreseen additional component subsidiary strategies or plans (water resources, flood risk and drought risk management), these sectoral strategies should be reporting specifically on the impacts of those strategies on river basin environmental objectives and waterbody status where relevant.

But they also require significant and technically complex strategies and/or Plans in their own right, far beyond the narrower scope of 'quality of waters' originally envisaged under the WFD.

In accordance with best international practice, the RBMP framework for Albania envisages additional subsidiary strategies and/or Plans coordinated with but distinct from the core RBMP document (the measures of 1.5.1.). Specifically, where necessary:

- A Water Resources Management Strategy or Plan
- A Flood Risk Management Strategy or Plan
- A Drought Risk Management Strategy or Plan

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<sup>11</sup> European Commission - [https://ec.europa.eu/environment/water/water-framework/info/intro\\_en.htm](https://ec.europa.eu/environment/water/water-framework/info/intro_en.htm)

<sup>12</sup> The World Bank – Integrated River Basin Management – From Concepts to Good Practice, Briefing Notes 1-15, 2006.

- A Coastal Zone Management Strategy or Plan
- A Strategic Environmental Assessment (SEA) of the RBMP Proposals.

The content and objectives of these supportive strategies is explained further under Chapter 9. If these Strategies or Plans are not yet developed for the river basin in question (or are not applicable) this is clarified in the relevant sub-section.

In summary, it should be understood by all regulators, competent authorities and operators contributing to any of the above strategies and/or plans that ultimately the over-arching environmental objectives of the LIWRM Article 25 and WFD Article 4 set the pre-eminent guiding principles for the environmental compliance of these subsidiary strategies. These strategies should fully take account of and coordinate with the stated environmental objectives of the over-arching RBMP, OR fully comply with the derogation requirements as set out under WFD Article 4(7).

### **1.5.3 Supportive Elements**

Primary national legislation and the EU Directives cannot in themselves provide sufficient guidance as to how River Basin Management Plans should be prepared. In particular, specific technical issues or procedures will usually require the provisions of secondary legislation, Decisions of the Council of Ministers (DCMs)(DCM 1015/2020), Standard Technical Procedures (STPs) prepared by the AWRM, and not least the large body of supportive policies, evidence and procedures provided by the EU Common Implementation Strategy.<sup>13</sup> International best practice is also highly relevant, as not all such practices have yet been enshrined in EU policy or implementation strategy.

These supporting elements are numerous; therefore, so Table 1-2 presents a summary of the most relevant documents.

### **1.5.4 The RBMP Reporting Framework Illustrated**

The illustrative overview of the RBMP framework in Albania, which acts as the current default template for all future RBMPs is set out under Figure 1-2.

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<sup>13</sup> [https://ec.europa.eu/environment/water/water-framework/objectives/implementation\\_en.htm](https://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm)

**Table 1-2 – Supportive Elements to the RBMP Framework**

<b>PRINCIPAL DIRECTIVES RELATED TO THE WATER FRAMEWORK DIRECTIVE</b>	
Directive 2000/60/EC	Establishing a framework for Community action in the field of water policy
Directive 2006/118/EC	On the protection of groundwater against pollution and deterioration
Directive 2013/39/EU	Amending Directives 2000/60/EC and 2008/105/EC as regards priority
Directive (EU) 2020/2184	On the quality of water intended for human consumption
Directive 91/676/EEC	Concerning the protection of waters against pollution caused by nitrates from
Directive 2006/7/EC	Concerning the management of bathing water quality
Directive 2010/75/EU	On industrial emissions (integrated pollution prevention and control)
Directive 2001/42/EC	On the assessment of the effects of certain plans and programmes on the
Directive 91/271/EEC	Concerning urban waste water treatment
Directive 97/62/EC	On the conservation of natural habitats and of wild fauna and flora
<b>PRINCIPAL GUIDANCE DOCUMENTS OF THE WFD COMMON IMPLEMENTATION STRATEGY</b>	
Guidance Document 2	Identification of Waterbodies
Guidance Document 3	Analysis of Pressures and Impacts
Guidance Document 4	Identification and Designation of Heavily Modified Waterbodies
Guidance Document 7	Monitoring under the Water Framework Directive
Guidance Document 13	Overall approach to the classification of ecological status and ecological potential
Guidance Document 19	Guidance on Surface Water Chemical Monitoring under the Water Framework
Guidance Document 27	Technical guidance for deriving environmental quality standards
Guidance Document 31	Ecological flows in the Implementation of the Water Framework Directive
Guidance Document 34	On the application of water balances for supporting the implementation of the WFD
Guidance Document 35	Water Framework Directive Reporting Guidance 2016 – 6.0.6

<b>GOVERNMENT OF ALBANIA – LEGAL ACTS</b>	
Law no.111/2012	On the Integrated Water Resources Management
Law no.10431/2011	On Environmental Protection
Law no.44/2015	On administrative Procedures
Law no.81/2017	On Protected Areas
Law no.93/2015	On tourism
Law no.107/2014	Territorial Development and Planning
Law no.111/2015	On Albanian Geological survey
Law no. 7/2017	On use of renewable resources
Law no.8102/1996	On water supply and sewerage
Law no.24/2017	On Irrigation and drainage
Law no.90/2012	On public Administration
Law no.45/2019	On civil protection
Law no 72/2012	Organisation and functioning of the state infrastructure for geo-space information
Law no.10138/2009	Public health

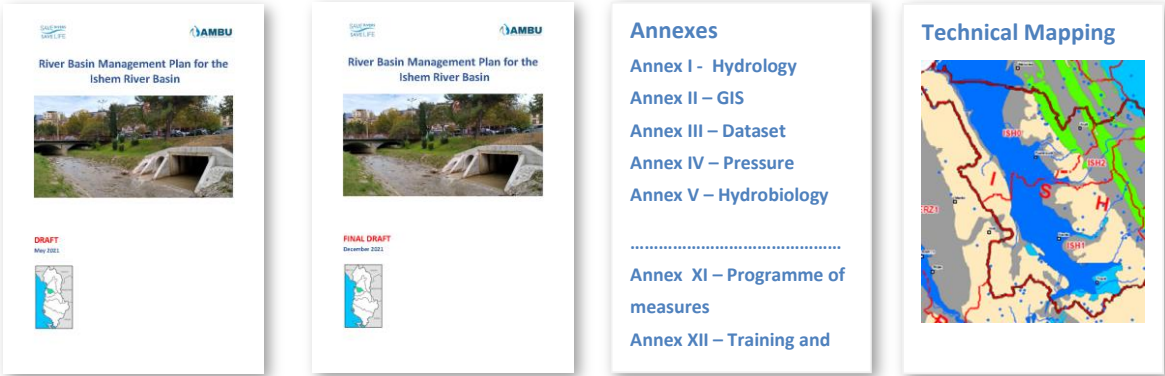
GOVERNMENT OF ALBANIA – DECISION OF COUNCIL OF MINISTERS	
DCM no.221/2018	On Establishment of AMBU
DCM no. 1015/2020	On The Content, Development and Implementation of National Water Strategies, of River Basin District Management Plans and of Flood Risk Management Plans
DCM no.568/2019	On Establishment of MEA
DCM no.490/2011	On establishment of IGEWE
DCM no.102/2015	On establishment of National Agency for protected areas
DCM no 427/2016	On establishment of National Agency for territorial planning
DCM no 547/2006	On establishment of National Agency of Natural Resources
DCM no.431/2018	On establishment of AKUM
DCM no.437/2017	On establishment of 4 regional directorates for irrigation and drainage
DCM no.570/2019	On establishment of National Forest Agency

Figure 1-2 – Illustrative Layout of the RBMP Reporting Framework for Albania

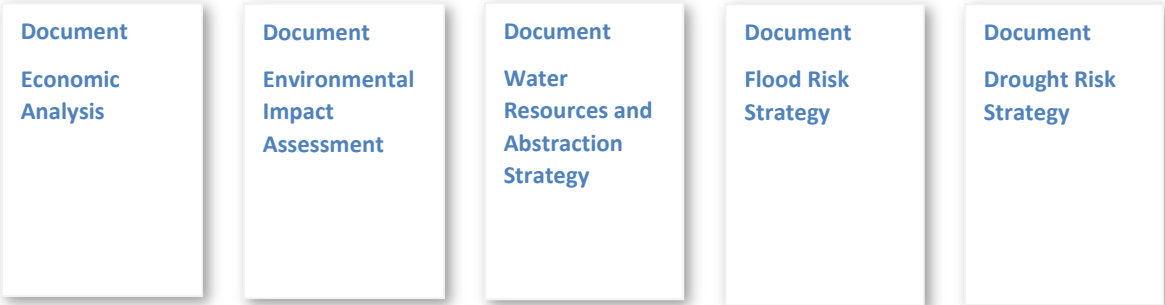
*Initiation Phase and Consultation*



*River Basin Management Plan – Core Document (Draft to Final)*



*Supporting Plans and Strategies*



## 2 Expert and Public Consultation Measures

### 2.1 Legal Context

It is a broad requirement of the WFD to promote the active encouragement of the public and other stakeholders (“interested parties”) in the production, review and updating of the RBMPs.<sup>14</sup>

#### 2.1.1 Albania

General provisions and procedures with respect to public consultation on water management issues are transposed in the LIWRM<sup>15</sup> and the Law on Public Consultation (LPC).<sup>16</sup> The DCM nr.1015, date 16.12.2020 on “The Content, Development and Implementation of National Water Strategies, of River Basin District Management Plans and of Flood Risk Management Plans” includes provisions to ensure a record of public consultation measures and changes made to the plan as a consequence (in alignment with WFD Annex VII).

#### 2.1.2 European Union

Under European Commission best practice, relations with stakeholders should be governed by four general principles<sup>17</sup>:

- Participation: adopt an inclusive approach by consulting as widely as possible
- Openness and accountability: make the consultation process and how it has affected decision making transparent to those involved and to the general public
- Effectiveness: consult at a time where stakeholder views can still make a difference, respecting proportionality and specific restraints
- Coherence: ensure consistency of consultation processes across all groups, sectors, and services as well as adequate evaluation, review and quality control.

In the development of RBMPs specifically, WFD Article 14 sets out a clear progression of consultation steps:

1. A Statement of Consultation Measures, incorporating a timetable, work programme and list of interested parties to be consulted and by what methods, to be issued by the RBDA three years before the onset of the proposed Plan.
2. An interim Overview of Significant Water Management Issues identified by the RBDA two years before the onset of the proposed Plan.
3. A draft River Basin Management Plan issued one year before the onset of the proposed Plan.

In each case a full six months consultation period should be allowed in order to allow active involvement of interested parties. These minimum requirements do not preclude other ad hoc consultations with expert groups or significant operators, providing these consultations are transparently recorded.

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<sup>14</sup> Water Framework Directive – Article 14, Annex VII (9)

<sup>15</sup> Government of Albania – Law on Integrated Water Resources Management, Chapter XVII, Article 91.

<sup>16</sup> Government of Albania – Law on Public Consultation, Article 15 and Article 17.

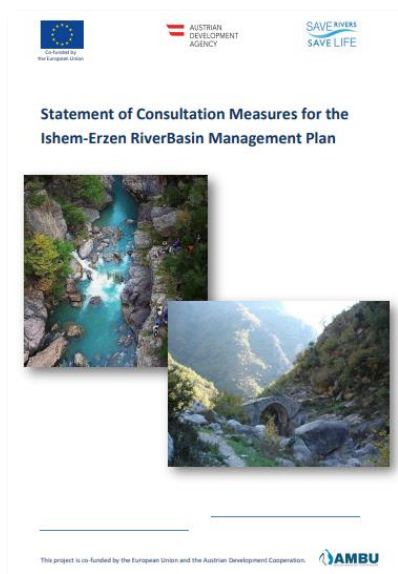
<sup>17</sup> European Commission – Better Regulation Guidelines, SWD (2017) 350, 2017

## 2.2 Main Consultation Measures for the Ishem River Basins

### 2.2.1 Statement of Consultation

The Statement of Consultation for the Ishem RBMP was issued by the AMBU on October 2019, and posted for public dissemination via the Agency website.<sup>18</sup> Due to resource and capacity limitations, it was not possible to issue this Statement fully in accordance with the three years rule (target January 2019).

Figure 2-1 –Statement of Consultation Measures



### 2.2.2 Overview of Significant Water Management Issues (OSWMI)

The OSWMI was published to the AMBU website on May 2020 (target January 2020). Due to resource and capacity limitations and the 2020 COVID-19 pandemic, it was not possible to issue this Overview fully in accordance with the two years rule (target January 2020).

This Document was formulated in two stages:

- i) The draft was distributed for comments to several institutions ("Expert Group") to ensure that the content of the PCRMU properly represented the main issues affecting the water basin. The list of contributors is summarized in Table 2-2, referred to as Technical Annex XII.
- ii) The finalised OSWMI was published for general consultation via the WRMA website on May 2020.

The OSWMI is not intended to be a technical document. Rather it should provide the general public and other interested parties with a general insight as to the main water related deficiencies and problems that need to be addressed in order to protect valuable ecosystems and sources of water and ensure sustainable water quality and quantity in the long-term.

Predominantly the OSWMI should be sufficiently informative so as to stimulate responses and opinions from a wide range of interested parties. The OSWMI was structured according to a range of easily recognisable 'themes', summarised in Table 2-1. Within the document, AMBU suggested possible management and operational measures to mitigate perceived unsustainable or damaging water use practices.

The consultation responses and a summary of how these views have been considered in the RBMP Programme of Measures are provided under RBMP – Technical Annex XII.

### 2.2.3 Draft River Basin Management Plan

The RBMP final draft is published at AMBU website on April 2022. A six months consultation period ensued. The comments during the consultation process and the summary of these views will also be considered in the Program of Measures, which is presented in Technical Annex XII of the RBMP.

### 2.2.4 Public Meetings, Road-shows and Workshops

The preparation of RBMP has a number of steps that have been identified, and the workshop/training activities will be structured around these steps. The steps used here are:

<sup>18</sup><http://www.ambu.gov.al/wp-content/uploads/2019/10/190521-VS-Draft-Statement-of-Proposed-Consultation-Measures-for-the-Ishem.pdf>

- Initiating RBMP process
- Characterisation
- Pressure-Impact assessment
- Protected areas
- Monitoring assessment
- Environmental objectives
- Economic evaluation
- Programme of Measures
- River Basin Management Plan
- Consultation

These steps are based on the EU WFD and the EU Common Implementation Strategy for the WFD with a number of guidance documents.

In addition to the modules linked directly to the RBMP process some modules has been developed for general background, legal transposition and implementation after the RBMP.

Each module has a series of events (Training Workshops, Practical examples, Field Work, On the Job Training) depending on the module. Implementation of all events involved can take several months as it follows the progress in working with the RBMP process.

The product of the RBM process is the RBMP, which includes 10 key Sections.

Each Workshop/Training Module is directly linked and supports at least one section of the RBMP and sometimes it supports more than one.

Participation in various workshop/training activities should include all institutions involved in preparation of RBMP, such as AMBU, and other related institutions either directly or indirectly involved such as National Environmental Agency (NEA).

In this context, Prime Minister's Order No. 32 dated 01.03.2021 for "Establishment and operation of inter-institutional working groups for the preparation of management plans for the Mat, Ishëm, and Erzen water basins". To develop an open discussion on the steps followed and in function of the preparation of the management plans of the aforementioned water basins, the continuation of the work until the drafting of the project plans, AMBU together with the national and international experts contracted by the project "EU support for integrated water management in Albania" have held 4 (four) meetings with GNP representatives by 2021.

The meetings held with elected representatives from the institutions mentioned in point 4 of the Prime Minister's Order have been organized and directed. The institutions represented in this working group were the Water Resources Management Agency, Ministry of Tourism and Environment, Ministry of Infrastructure and Energy, Ministry of Agriculture and Rural Development, Albanian Geological Survey, National Agency of Civil Protection, National Agency of Environment, Agency National Agency of Water-Sewage and Waste Infrastructure, National Agency of Protected Areas, Institute of Public Health, Institute of Statistics, Mat Water Basin Administration Office, Ishem, Erzen, and Regional Administration Offices of Protected Areas of Tirana, Durrës, and Lezha.

The meetings held in 2021 focused on the distribution of draft plan materials for the Mat, Ishem, and Erzen basins to the representatives of the group to receive their comments and contributions for the discussed chapters. These materials were sent via e-mail, and the comments given by each representative were also collected.

4 (four) meetings were held where the meeting of:

- The first meeting was held on 28.5.2021;
- The Second Meeting was held on 23.6.2021;
- The Third Meeting was held on 23.7.2021;
- The Fourth Meeting was held on 27.9.2021.

The meetings were held in a hybrid format, with limited participation in the number of people in the hall, and through online platforms, to respect the rules established by the Technical Committee of Health Experts. To facilitate the inclusion of group representatives at every meeting.

### **2.2.5 Final River Basin Management Plan**

The Program of Measures, presented in the RBMP (Chapter 13), is the main product aimed at achieving environmental objectives in the water basin, as defined in Chapter 3 of this document. The PoM should be included within the 2024-2029 period plan, and within the national legislation, the measures should be considered mandatory by law for the authorities determined after the approval of the RBMP.

The second period of public consultations ended in September 2022 and was accompanied by the drafting of the Strategic Environmental Assessment Report.

During this period, there were meetings with representatives of the inter-institutional working group, representatives from various non-governmental organizations, and the Water Basin Council. The draft plan was distributed for consultation and gathering of opinions in line with the institutional procedures.

There were also contributions from experts in various fields that mainly focused on the program of measures. These changes are reflected in the final Watershed Management Plan for the Išem River.

**Table 2-1 – Summary of Significant Water Management Themes**

MAJOR THEME	COMMENTARY ON MAIN PRESSURES, STATE OR IMPACTS
<b>ENVIRONMENT</b>  Climate Change and Water Resources  Hydro meteorological Data & Monitoring Systems  Protected Areas & Aquatic Ecosystems  Floods and Droughts  Channel and Floodplain Morphology & Continuity  Environmental Flow	<b>POSSIBLE ISSUES</b>
	<ul style="list-style-type: none"> <li>• Expected -8% reduction in precipitation by 2025</li> <li>• Expected -20% reduction in precipitation by 2050</li> <li>• Substantial impacts expected on water availability for all uses</li> </ul>
	<ul style="list-style-type: none"> <li>• Collapse of the surface water monitoring system since 2000</li> <li>• No recent data for climate change or water resource analysis available for surface or groundwater</li> </ul>
	<ul style="list-style-type: none"> <li>• Drinking water sources not demarcated or protected</li> <li>• Natural protection areas are not respected and many potential Natura 2000 habitats not defined</li> <li>• Very limited data available; monitoring system not fit for the purpose</li> </ul>
	<ul style="list-style-type: none"> <li>• No Flood Risk Management Plans developed</li> <li>• No Drought Risk Management Plans developed</li> </ul>
	<ul style="list-style-type: none"> <li>• Illegal excavation of gravels and destroyed habitats</li> <li>• Barrages, weirs and hydropower installations acting as barriers to river continuity</li> </ul>
	<ul style="list-style-type: none"> <li>• Environmental flows not properly defined for any rivers</li> <li>• Numerous aquatic ecosystems severely degraded in terms of species diversity</li> </ul>
<b>WATER USE</b>  Water Use, Water Abstraction and Abstraction Permitting  Water Discharges, Water Pollution and Discharge Permitting  Dams & Hydropower  Groundwater Use, Protection and Monitoring	<b>POSSIBLE ISSUES</b>
	<ul style="list-style-type: none"> <li>• Inefficient use of water by municipalities, with a real loss of +60% in water supply systems</li> <li>• Lack of methodologies and guidelines for the full recovery of usage costs and environmental impacts regarding the water used by operators</li> </ul>
	<ul style="list-style-type: none"> <li>• Treatment of urban wastewater in Tirana, Kamez, and areas with high population intensity and industrial activity</li> <li>• Degradation and high pollution of the main rivers from untreated discharges without obtaining permits for these activities</li> <li>• Discharge Permitting unlikely to achieve necessary environmental quality standards</li> </ul>
	<ul style="list-style-type: none"> <li>• Interruption of ecosystem continuity and water flow by dams</li> </ul>
	<ul style="list-style-type: none"> <li>• Excessive uncontrolled abstraction of groundwater</li> <li>• Monitoring system of quantity and quality not fit for purpose</li> <li>• Risk of seawater intrusion into fresh underground water as a result of overexploitation</li> </ul>
<b>COASTLINE MANAGEMENT</b>  Coastal water quality, bathing waters, habitats  Coastal management, flood risk and erosion	<b>POSSIBLE ISSUES</b>
	<ul style="list-style-type: none"> <li>• Risk to human health due to pollution of surface waters discharged into coastal areas</li> <li>• Degraded coastal habitats due to solid waste deposition</li> </ul>
	<ul style="list-style-type: none"> <li>• Forecasts for the rise of the sea level to the extent of 0.2 - 0.3 m by the year 2050 indicate a significant risk of sea floods and the reduction of the discharge capacity of the rivers in their deltas</li> <li>• Sea level rise may increase intrusion pressure to groundwater</li> </ul>

## 3 Environmental Objectives for the River Basin

### 3.1 Overview

All RBMPs in the EU countries have as their overriding purpose the maintenance and protection of the aquatic environment. This is achieved through measures to ensure that all waters (surface and groundwater) are of sufficient and sustainable quality and quantity for both environmental and economic needs. Quality and quantity both have complex characteristics that are explained below.

This Chapter serves to explain the main definitions and principles by which surface water and groundwater quality and quantity are assessed, and is the only Chapter of this plan that may be regarded as ‘non-specific’ to the Ishem river basin. However, the concepts and procedures set out below closely control the aquatic environment protection strategy for the Ishem basin through *a)* general environmental policies (Chapter 12) *b)* remedial or protective measures for specific waterbodies (Chapter 13).

#### 3.1.1 Albania

Albania is distinguished for its rich biological and landscape diversity. The high diversity of ecosystems and habitats offers rich habitats for a variety of plants and animals. Of the estimated 3,200 species of vascular plants, 27 are endemic and 160 sub-endemic species. Riverine ecosystems and wetlands of Albania are rich in habitat typologies, animal and plant communities and species. They represent an important part of nature heritage not only for the country itself but also for the Mediterranean region as a whole.

“Environmental objectives with regard to surface, groundwater bodies and protected areas shall be defined for the purpose of preventing the damage to water bodies, as well as protecting, increasing and rehabilitating the status of all bodies of water, both surface and groundwater ones” LIWRM, Article 25(1).

The requirements of the LIWRM broadly follow the EU legislation.

#### 3.1.2 European Union

WFD Article 4 defines the core concept of the WFD and the specific purpose of RBMPs, namely to implement measures as appropriate to:

- Prevent deterioration of the status of all surface water and to achieve good ecological status or good ecological potential;
- Progressively reduce pollution from priority substances and river basin specific pollutants so as to achieve good chemical status for surface waters;
- Prevent or limit the discharge of pollutants generally to groundwater and reverse negative trends;
- Prevent deterioration of the status of all groundwater, determined by quantitative status and chemical status, and to achieve good chemical status for all groundwater bodies;
- Ensure a sustainable balance of groundwater abstraction against annual recharge.

## 3.2 The Concept of Waterbody Status

### 3.2.1 Ecological Status

Ecological status is an assessment of the quality of the structure and functioning of surface water ecosystems. It shows the influence of pressures (e.g. abstraction, pollution or habitat degradation) on the identified quality elements.

Ecological status is determined for rivers, lakes, and transitional and coastal waters based on biological quality elements (BQEs) (phytoplankton, macrophytes, phytobenthic, benthic invertebrate fauna and fish). Supporting physical-chemical are oxygen condition, temperature, nutrients, transparency, salinity and river basin specific pollutants (RBSPs) and river basin priority substances. Hydro-morphological quality elements include flow regime, connectivity to groundwater, river continuity and morphological conditions (

Figure 3-1). There are no EU-standards for the Ecological status; each Member state must develop their own, type specific standards (see Section 3.3).

### 3.2.2 Chemical Status

EU legislation provides for measures against chemical pollution of surface waters. There are two components a) the selection and regulation of substances of EU-wide concern (the 'priority substances' and 'priority hazardous substances') b) the selection by Member States of substances of national or local concern ('river basin specific pollutants') for control at the relevant level. For surface waters, good chemical status means that no concentrations of 'priority substances'<sup>19</sup> exceed the relevant EQS established in the Environmental Quality Standards Directive (EQSD) 2008/105/EC, which is amended by the Priority Substances Directive 2013/39/EU. EQSs aim to protect the most sensitive aquatic species from direct toxicity, and to protect human health. The standards for river basin specific pollutants (RBSPs) are defined by the national competent authority. For groundwater to meet the aim of good chemical status, hazardous substances should be prevented from entering groundwater, and the entry of all other pollutants (e.g. nitrates) should be limited below defined levels.

### 3.2.3 Quantitative Status

Whereas water quantity was regarded as an ancillary element to overall ecological status in the WFD at publication, water quantity in terms of flow regime is now seen as one of the primary elements of good ecological status.<sup>20 21</sup> For rivers especially, specific assessment should be made to identify the 'environmental flow regime' and to quantify the degree of impact on the waterbody resulting from changes to the flow regime. Environmental flow is poorly regulated in Albania at this time, and for example, current legislation defining the flow exceedance probability of  $Q_{97}$  as the single 'minimum ecological flow' is not fit for purpose. A best practice method is proposed (see section 3.3.5). For groundwater, quantitative status is determined by a comparison of the rate of annual recharge of the groundwater stock against consumption of the groundwater. Abstractions exceeding recharge even in the short-term will negatively impact on local groundwater level with consequences for a) surface water flows and ecosystems b) availability of groundwater for economic uses generally.

### 3.2.4 Levels of Status

The concept of waterbody status is central to the environmental deliverables of the LIWRM and WFD generally and RBMPs specifically. The Status is seen as a relative concept, relative to the 'reference condition' which is always type specific (section 5.2.2). Reference conditions (RC) do not necessarily equate to totally undisturbed, pristine conditions. They may include very minor disturbance which

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



<sup>19</sup> European Commission – Water Framework Directive, Article 16, and Annex X replaced by EQSD, Annex II.

<sup>20</sup> European Commission – CIS Guidance No 31 – Ecological Flows in the Implementation of the WFD



<sup>21</sup> European Commission - Environmental Flows as a Tool to Achieve WFD Objectives - Discussion Paper, 2012

means that some anthropogenic pressure is allowed providing there are no or only very minor ecological effects. RCs are always aligned with high ecological status.

Typically:

- High Status -  - No or very minor anthropogenic alterations to the biological quality, physical-chemical and hydromorphological elements of the waterbody
- Good Status -  - Slight levels of distortion of the composition and abundance of biological quality elements, with physical-chemical and hydromorphological conditions consistent with the achievement of good biological quality
- Moderate Status -  - Modest deviation of biological quality elements relative to High Status, with physical-chemical and hydromorphological conditions consistent with the achievement of moderate biological quality
- Poor Status -  - Waters showing evidence of major alterations to the values of the biological quality elements
- Bad Status -  - Waters showing evidence of severe alterations to the values of the biological quality elements

For groundwater, status is defined only by the lesser of quantitative status and chemical status, thereby being either:

- 'Good' - 
- or 'Fail' – 

### Figure 3-1 – Quality Elements in Waterbody Ecological Status

Figure 3-1 illustrates various components associated with an ecological status assessment generally. The comprehensive list of all quality elements is shown in Technical Annex V. Biological assessment results need to be expressed using a numerical scale between 0.00 and 1.00, the 'Ecological Quality Ratio' (EQR).<sup>22</sup> An EQR value = 1.00 represents type-specific reference conditions (i.e. fully natural conditions). Values close to 0.00 = Bad Ecological Status (BES). The objective of the EQR is to ensure comparability between different assessment methods i.e. to provide a common scale of ecological quality between different river basins. The EQR intervals shown in

Figure 3-1 are indicative only, and may vary depending on the BQE under assessment. Flow abstraction has a direct impact on ecological status, even in modest quantity.

Figure 3-1 shows that typically, permanent or very extended abstraction quantities > 30% of the mean flow are likely to result in the hydro-morphological quality element achieving only Moderate status.<sup>23</sup> Due to the importance of flow regime generally, it is probable that the ecological status of the waterbody would also be classed as Moderate.

### 3.3 Environmental Objectives for Surface Waterbodies

In order to progress the determination, the status of individual waterbodies, their current status must be compared to a 'type specific reference condition'. Waterbody typologies are explained more fully under section 5.2 and 6.2 to this plan.

For each surface waterbody type, type-specific biological, hydro-morphological and physical-chemical conditions should be established representing the values of the elements specified for that surface

<sup>22</sup> European Commission – Water Framework Directive, Annex V, 1.4.1

<sup>23</sup> European Commission – CIS Guidance No 31 – Ecological Flows in the Implementation of the WFD

water body type at high ecological status.<sup>24</sup> ‘Status’ is therefore a condition relative to the reference condition, generally defined as the waterbody type in ‘high status’. Determination of the biological reference condition for each waterbody type is a matter for national procedures, although some EU standard criteria are fixed, especially with respect to ‘priority substances’ as set out in Directive 2013/39/EU.<sup>25</sup>

### 3.3.1 Reference Conditions for Biological Quality Elements

Numerous approaches have been used in EU to assess surface water biological quality conditions by evaluating taxonomic data. The general approach is to use the composition (defined as diversity + abundance) of the community at each site to infer water quality conditions. Some macro-invertebrates tend to be tolerant of poor water quality conditions e.g. some species (but not all) of the order Diptera and the class Oligochaeta. Other organisms—for example, some species (but not all) of the orders *Ephemeroptera*, *Plecoptera*, and *Trichoptera* —are more sensitive to pollution.

Specific to the type of waterbody (see section 5.2) the relative presence and abundance of sensitive taxa are expected to be higher at sites with ‘good water quality’, varying according to specific national conditions. In the same way the relative presence and abundance of tolerant species for poor water quality conditions are expected to be higher in disturbed sites. The ecological quality is expressed as the EQR, which indicates the similarity between the actual status and the RC. It can be generally inferred that if any of the specific ‘biology supporting quality elements’ of waterbody status i.e. physical-chemistry, specific pollutants, and/or hydro-morphology are significantly adverse, then the BQEs can be expected to show a lower EQR.

The RCs and standards for lower quality classes for BQEs can be expressed in an index, e.g. the Biotic Index, BMWP, ASPT, EPT, etc. The standards of these indices for the ecological quality classes however, must be type specific and also ecoregion specific. This means that standards used in other EU countries cannot be used as such. As almost no biological data of Albanian surface water bodies are available (data should be available of all water types and within each water type all quality classes), no description of Biological RCs of Albanian water types can be given at this moment. An option would be to use Greece standards (because Greece is situated in the same Ecoregion as Albania; the Hellenic Wester Balkan), but Greece also has no standards, due to lack of data.

The preferred method to set up a biological assessment method for Albania is first to sample a lot of water bodies (covering all types and within each type all expected quality classes) and then to analyse the data, using multivariate analysis techniques, like (Detrended) Canonical Correspondence Analysis. (Reference for more information in Annex V on Hydrobiology)

### 3.3.2 Reference Conditions for General Physical-chemical Quality Elements

As explained in previous sections: the General physical-chemical quality elements are supporting the hydro biological quality elements. The concept of – type-specific – reference conditions apply also to the general physical-chemical quality elements. For example, a calcareous geology affects water quality parameters such as alkalinity and pH.

It is not yet possible to apply WFD-compliant classification schemes for General physical-chemical quality elements, because of:

- the lack of – type-specific – RCs and EQRs of hydrobiological quality elements;
- the lack of monitoring/field data for substantiating – type-specific – reference conditions of General physical-chemical quality elements.

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<sup>24</sup> European Commission – Water Framework Directive, Annex II, 1.3

<sup>25</sup> European Commission – Directive 2013/39/EU – The Environmental Priority Substances Directive

However, NEA applies a classification scheme for rivers, which is adequate for the interim period, while anticipating fine-tuning of the requirements of the hydrobiological quality elements. This scheme is included in Table 3-1.

**Table 3-1 NEA classification scheme for assessment of physical-chemical parameters in rivers** <sup>26</sup>

Parameter	Unit	High	Good	Moderate	Poor	Bad
Dissolved oxygen	mg/l	>7	>6	>5	>4	<3
BOD <sub>5</sub>	mg/l	<2	<3.5	<7	<18	>18
pH (acid)	-	-	>6.5	>6	-	-
pH (alkaline)	-	-	<8.5	<9	-	-
NH <sub>4</sub>	mg N/l	<0.05	<0.3	<0.6	<1.5	>1.5
NO <sub>2</sub>	mg N/l	<0.01	<0.06	<0.12	<0.3	>0.3
NO <sub>3</sub>	mg N/l	<0.8	<2	<4	<10	>10
PO <sub>4</sub>	mg P/l	<0.05	<0.10	<0.2	0.5	>0.5
P-total	mg P/l	<0.1	<0.20	<0.4	<1	>1

### 3.3.3 Reference Conditions for ‘Priority Substances and certain other pollutants’

The ‘Priority Substances and certain other pollutants’ of the Directive 2013/39/EU include both synthetic (man-made), and non-synthetic substances. By definition, there are no – natural – RCs for synthetic substances. Non-synthetic substances include heavy metals, and certain polycyclic aromatic hydrocarbons (PAH). Directive 2013/39/EU mentions the following as regards cadmium (Cd), lead (Pb), mercury (Hg), nickel (Ni):

*Member States may, when assessing the monitoring results against the relevant EQS, take into account: (a) natural background concentrations for metals and their compounds where such concentrations prevent compliance with the relevant EQS; (b) hardness, pH, dissolved organic carbon or other water quality parameters that affect the bioavailability of metals, the bioavailable concentrations being determined using appropriate bioavailability modelling.’*

Considering the (heavy) metal mining in Albania, one might expect certain specific elevated natural (geogenic) background concentrations in various regions. However, there is lack of monitoring/field data for substantiating – type-specific – RCs for the priority substances.

### 3.3.4 Reference Conditions for River Basin ‘Other Specific Pollutants’

WFD Annex V.1.1 mentions Specific synthetic and non-synthetic pollutants, comprising:

- Pollution by all priority substances identified as being discharged into the body of water.
- Pollution by other substances identified as being discharged in significant quantities into the body of water.

The priority substances meanwhile became part of the ‘Priority substances and certain other pollutants’ included in the Directive 2013/39/EU, used for determining the chemical status.

There is no prescribed list with ‘Specific pollutants’, although Annex VIII of the WFD gives some indications about which pollutants might be concerned (referred to in Annex V with information tables). This, while noticing that several WFD Annex VIII pollutants are already included under the ‘Priority substances and certain other pollutants’ and the ‘General physical-chemical quality elements’.

<sup>26</sup> BOD<sub>5</sub>: biochemical oxygen demand (five days); NH<sub>4</sub>: ammonium; NO<sub>2</sub>: nitrite; NO<sub>3</sub>: nitrate; PO<sub>4</sub>: orthophosphate; P-total: total phosphorus. Raport Për Gjëndjen e Mjedisit 2015, Aneksi Rregulluar.docx (Environmental Status Report 2015, Corrected Annex); <http://www.akm.gov.al/assets/rjgm-2015per-botim.rar>

A list with 'Other specific pollutants' has not yet been compiled for the Albanian basins. Only BOD<sub>5</sub> and COD<sub>Cr</sub> are routinely monitored by NEA. These data are not suitable though for establishing – type-specific – RCs for BOD<sub>5</sub> and COD<sub>Cr</sub>.

### 3.3.5 Reference Conditions for Environmental Flow

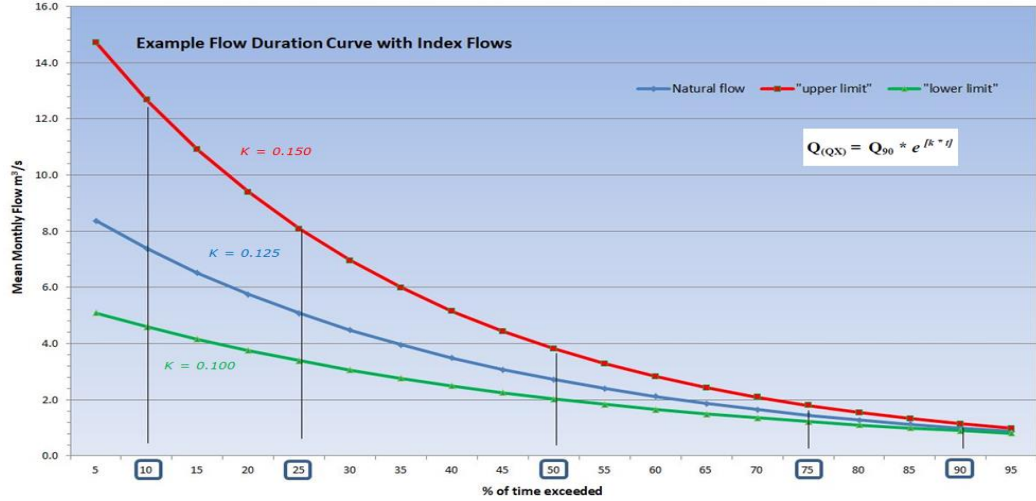
The correct identification and maintenance of environmental flow (the flow needed to support aquatic ecosystem function(s) throughout a typical year) is vital to waterbody status. Many national legislations, technical procedures and/or studies wrongly infer that there is a single 'minimum' flow throughout the year, which if allowed to remain in the waterbody, will satisfy ecological needs. For example, the single flow derived from the Q<sub>97</sub> value of the annual flow duration curve is defined in legislation and used in Albania. This is completely incorrect as a concept.

As Figure 3-2 illustrates, in fact environmental flow is a continuum throughout the flow regime range (shown by the annual Flow Duration Curve, FDC). At any particular flow exceedance (e.g. Q<sub>50</sub>), the environmental flow is synonymous with the undisturbed (natural) flow of the river (blue line). There are many values of environmental flow, depending on the position on the FDC, and typically the FDC positions of Q<sub>10</sub>, Q<sub>25</sub>, Q<sub>50</sub>, Q<sub>75</sub> and Q<sub>90</sub> are used as 'index flows' to check the level of deviation of measured flow (artificially influenced) from the fully natural flow.

Some deviation from the fully natural flow growth curve is permissible, but typically this will not be more than about +/- 30% before Good Status will be impacted. Hence, for all environmental flow growth curves, there is associated a lower and an upper limit by which the natural flow can be altered before the waterbody degenerates from GES.

Figure 3-2 illustrates that at high, infrequent flows e.g. Q<sub>10</sub>, environmental flow is correspondingly higher but so is the absolute level of abstraction or discharge that can be permitted without compromising GES. At the opposing end e.g. Q<sub>90</sub>, environmental flow is correspondingly small but so are the permitted abstraction levels, typically less than 10% for sensitive waterbodies.

Figure 3-2 – Best Practice Concept of Environmental Flow Curves



Source: www.waterconsultant.com

The precise +/- % limits of the environmental index flows will be ecosystem specific and will require detailed ecological surveys to confirm the level of sensitivity to abstraction, and hence the base value and curvature of the growth curve(s). The value of this approach is that consistent environmental flow curves (and values at any point on the FDC) can be generated according to mathematical rules.

$$Q_{(QX)} = Q_{90} \times e^{[k \times t]}$$

where Q<sub>(QX)</sub> = the environmental flow value at FDC X; Q<sub>90</sub> is the naturalised baseflow value from the FDC  
 e = base of natural logarithms; k = growth constant; t = number of 5% FDC steps from Q90

Currently in Albania, these environmental flow growth curves have yet to be developed, and cannot be formulated until the hydrometric network is re-established with reliable and current flow data. The concept is presented to underline the true meaning of 'environmental flow' and how it can be calculated on an objective basis.

### **3.3.6 Reference Conditions for Hydro-morphological Impact**

The leading-edge methodology now used in the current RBMP framework in Albania attempts to make an objective quantification of hydrological and/or morphological impact (where data exists) according to a well-established but little used European Technical Standard.<sup>27</sup> Various objective scoring systems are provided in the Standard for physical alterations.

The objective method proposed above can be utilised for any form of flow regime change, for example abstraction by agriculture or hydro-peaking (increase in flow) due to uncontrolled hydropower operations.

Standard EN 15843 (for more information refer to Complaint VI on hydro morphology) also indicates another extremely important feature of quantitative status, namely that increases in flow over and above the natural regime can be equally damaging to aquatic ecosystems. This aspect is ignored in many RBMP status assessments. This condition arises especially from the impacts of hydropower due to inappropriate releases from hydropower plants, especially during natural low flows periods. The released flows can be several orders of magnitude greater than the natural flow, creating significant and often irreparable damage to downstream ecosystems. For example, an increase of 100% of the mean flow (i.e. double) for only 40% of the time will result in a waterbody of moderate status, irrespective of the status of any other biological or physical-chemical quality element. Many hydropower plants in Albania, especially HPPs with off-line storage, frequently operate at these destructive levels without any adequate assessment or regulation.

### **3.3.7 Reference Conditions for HMWBs and AWBs**

According to WFD Article 2(9), there are two components to the definition of a HMWB. To be a HMWB a water body must be (i) physically altered by human activity, (ii) substantially changed in character. A waterbody may only be designated as heavily modified if it has passed through the designation procedure involving both tests as specified under WFD Article 4(3)(a) & (b). The tests are designed to ensure that HMWBs are only designated where there are no reasonable opportunities for achieving good status within a water body, and must therefore be waterbody specific. The designation and the reasons for it must be specifically mentioned in the RBMP.

As for natural waterbodies, the environmental objectives for HMWBs and AWBs are defined relative to a reference condition, which is the maximum ecological potential (MEP) of the waterbody. The MEP is the state where the biological status reflects, as far as possible, that of the closest comparable surface waterbody taking into account the modified characteristics of the waterbody. With regards to its biological status, Good Ecological Potential (GEP) accommodates "slight changes" from the MEP.

Once designated as HMWB or AWB, the environmental objectives are "good ecological potential" (GEP) and good chemical status. GEP is a less stringent objective than GES because it makes allowances for the ecological impacts resulting from those physical alterations that are necessary to support a specified use e.g. flood protection, hydropower.

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<sup>27</sup> European Standard EN 15843 - Water quality - Guidance standard on determining the degree of modification of river hydromorphology

### 3.3.8 Hydro-morphological Impacts of Hydropower and HMWB Designation

The proliferation of small to large hydropower installations in Albania, the perceived lack of adequate environmental impact assessment, inadequately designed permit criteria, damages to ecosystems and disruption of flow regimes has been the subject of increasing international concern.<sup>28 29</sup>

The objective determination of the extent of potential hydro-morphological impact from HPPs is highly relevant with respect to waterbody status. The hydro-morphological condition of the waterbody is integral to its overall status. As confirmed by EU CIS Guidance 31<sup>30</sup>, flow regime has a preeminent controlling effect on ecosystem health, and therefore waterbody status.

The relevance of hydropower operation is that very frequently, the downstream flow regime is entirely disrupted, either in terms of the magnitude of the flow abstracted relative to the mean flow at the point of abstraction, and/or the duration of time that the flow abstraction takes place. This flow regime disruption is additional to the mainly morphological (physical) impacts implied by EU CIS Guidance 4. An objective test to determine the level of impact of hydropower is essential within the context of HMWB designations.

Clearly, construction of major weirs, barrages or dams have a substantial physical impact on the waterbody, totally disrupting the longitudinal continuity and ecosystem integrity. The ambivalence of EU CIS Guidance 4<sup>31</sup> (2003) with respect to whether or not alteration of flow constitutes a substantial change in character (3.1.1 -In cases of temporary or intermittent substantial hydrological changes the waterbody is not to be considered substantially changed in character) is utterly incorrect and has in any case been superseded by the implications of EU CIS Guidance 31 (2016).

As all hydropower engineers know (and as evidenced by EN 15843), persistent changes to flow regime alone potentially have a catastrophic impact on ecosystem sustainability.<sup>32</sup> Diversion of 75%+ of river flow during critical dry periods is typical for many HPPs in Albania, as is the tendency to construct offline systems that create many kilometres of 'depleted reach'. The depleted reaches are frequently entirely devoid of any river flow during low flow months.

The hydropeaking of turbine releases typically increases river flows by several orders of magnitude over and above what would normally be expected, equally damaging to biological quality elements, especially fish and macroinvertebrates. The deficient status of the waterbody (due either to too little flow or too much flow depending on the HPP operation) is therefore extended along the entire length of the waterbody.

For the majority of historical HPPs in Albania, the lack of adequate provision of longitudinal continuity, intermittent zero environmental flow, and the magnitude and time disruption of the flow regime means that even Good Ecological Potential (GEP) (the target status for HMWBs) is unlikely to be ever achieved for many installations, as the operators typically have legally binding energy production compliance targets with the Ministry of Infrastructure & Energy, and the (fixed) permit concession period typically runs for 20-30 years. Environmental flow regimes downstream of the HPP installations have rarely been correctly determined or monitored by the competent authorities.

Arguably, many HPP historical installations in Albania could have been implemented in a more ecologically sustainable way (and therefore not liable to an Article 4(3)(a) & (b) test) had proper assessment and mitigation of hydro-morphological impacts been included at the design stage.

Section 10.6 presents an objective summary of potential hydro-morphological impacts and consequent status on waterbodies affected by HPPs within the river basin. The same methodology, based on

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<sup>28</sup> CSO-Help - Identification of water related conflicts linked to hydro power projects in Albania, 2017

<sup>29</sup> Western Balkans Hydropower - Who pays, Who profits?, CEE Bankwatch & WWF, 2019

<sup>30</sup> EU Common Implementation Strategy – Guidance Document 31 - Ecological Flows in the Implementation of the Water Framework Directive, Technical Report 2016-086

<sup>31</sup> EU Common Implementation Strategy – Guidance Document 4 - Identification and Designation of Heavily Modified and Artificial Water Bodies

<sup>32</sup> EU Common Implementation Strategy - WFD and Hydro-morphological Pressures Technical Report, 2006.

determination of modified status through EN 15843 could be used in future in order to determine more environmentally sustainable operational regimes for current and future HPPs.

**Figure 3-1 – Maximum Flow Diversion and Depleted Reach by HPPs (HPP of Cekreza)**



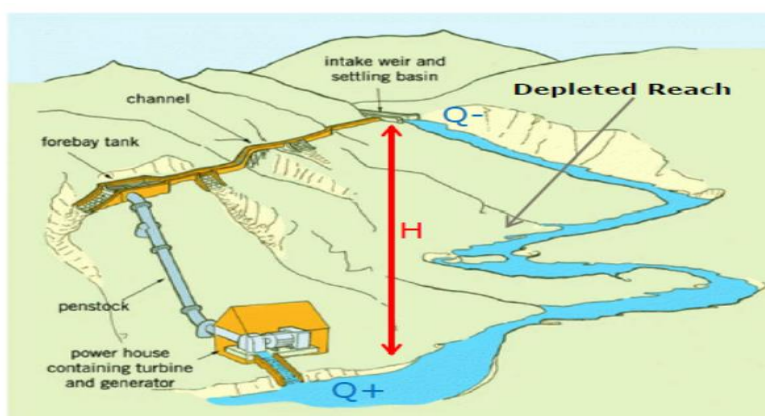
The length of the depleted reach for offline HPP systems is a critical factor in ecosystem impacts. A depleted reach is defined as the length of the river waterbody between the point of abstraction and the point of flow discharge (Figure 3-3). Long depleted reaches arise when the hydropower Operator is seeking to maximise the hydraulic head ( $H$ ) operating at the turbine, thus maximising the power output. If the HPP system is offline, then this maximisation of Head invariably means excessively long depleted reaches, a common feature of Albania HPPs.

The deficient hydro-morphological status will apply for the full length of the depleted reach, albeit on a 'reducing balance' basis. At the point of hydropower discharge, the river flow is restored and for 'run of river' systems, equilibrium is restored.

However, for the worst-case design of a major Dam + an offline HPP system (i.e. HPP not at the Dam), then at the point of discharge (where turbine operation is a function of storage, not of river flow), the disrupted regime may then continue for a further significant distance downstream, as the turbines discharge significantly in excess of the expected natural flow, the degree of impact depending on the downstream hydrology. Such examples are common in Albania.

A single large storage based offline HPP system may therefore significantly impact on e.g. 20 km+ of waterbody, depleting flow in the upper reaches, and over-compensating in the lower reaches, and thoroughly disrupting if not completely destroying the aquatic ecosystem.

**Figure 3-3 – Concept of Depleted Reach Due to Hydropower**



### 3.3.9 Other Forms of HMWBs and AWBs

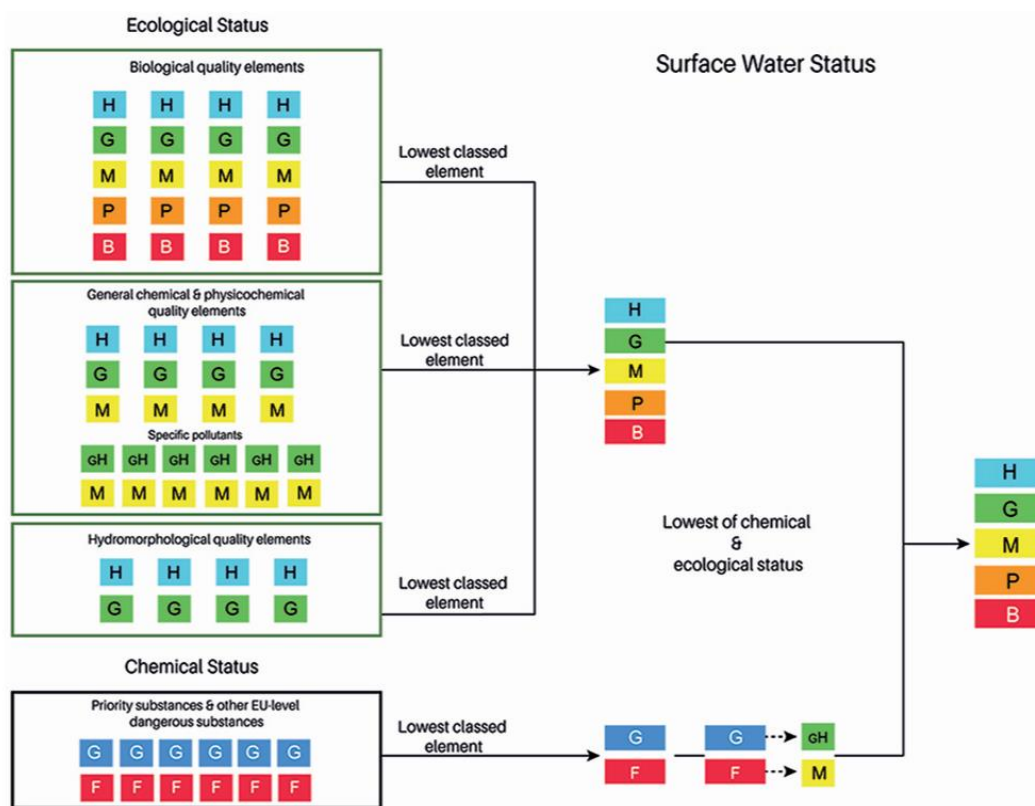
Other more conventional forms of HMWBs are applicable in the Ithem river basin, subject to the same designation test of WFD Article 4(3) (a) & (b), and the same GEP objective. Specifically, these typically include hard canalisation of urban centre rivers for erosion control and flood protection, or the provision of flood defences. Provisionally identified HMWBs and AWBs are listed in the Pressure Status assessment of Chapter 10.

### 3.3.10 Final Status Determination of Surface Waterbodies

The final or overall status of each delineated waterbody is derived through a complex evaluation of elements shown in

Figure 3-4. According to WFD CIS guidance<sup>33</sup>, the final status of the waterbody should derive from the lowest classed element in each group.

Figure 3-4 – Procedure for Determination of Waterbody Overall Status



<sup>33</sup> European Commission – CIS Guidance 13 - Overall approach to the classification of ecological status and ecological potential

### 3.4 Environmental Objectives for Groundwater Bodies

The WFD requires to designate separate groundwater bodies and ensure that each one achieves 'good chemical and quantitative status' (WFD Article 2(24) (25)). Determination of groundwater status is not as complex as those for surface water bodies. However, groundwater protection is the subject of numerous interacting Directives, including principally Directives 2006/118/EEC and 291/676/EEC.<sup>34</sup> Primarily through Directive 2006/118/EC<sup>35</sup>, a management regime should be established which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. Member States should establish standards at the most appropriate level and take into account local or regional conditions.<sup>36</sup>

#### 3.4.1 Reference Conditions for Groundwater Quantity

Groundwater level is typically the main measure of quantitative status. To achieve good groundwater quantitative status, the available groundwater resource (i.e. the long-term average rate of groundwater recharge less the annual rate of groundwater discharge required to achieve the ecological quality objectives for associated surface waters) is not exceeded by the long-term annual average rate of abstraction (WFD Article 2(27)). For this reason, the annual recharge quantity as described in section 4.2.3 (annual water balance) is very important number for sustainable utilisation of groundwater resources. Abstraction of groundwater resource over and above the annual recharge rate compromises a) long-term available resources b) surface water flow regimes and associated ecological status.

Determination of annual groundwater recharge rate is technically challenging, requiring widespread and accurate monitoring networks of groundwater level. However, as an approximate indicator, international best practice widely accepts the naturalised Base flow Index (BFI) of the river basin is a good indicator of annual groundwater discharge to the surface water system.<sup>37</sup> <sup>38</sup> The BFI is determined from the appropriate FDC, groundwater discharge must equal groundwater recharge. It is probable that the current groundwater monitoring network in the Ishem basin is of insufficient quality and extent to determine groundwater recharge by water balance or modelling techniques.

The second element of reference groundwater quantity is the extent to which groundwater abstraction redirects groundwater flow paths such that normal discharge to surface streams is disrupted. Groundwater discharge is a significant component of most streamflow, and in sub-basins with extensive wetlands or where the streamflow BFI exceeds 0.5 for example, it is likely that terrestrial ecosystems depend on this flow being maintained. Abstraction of groundwater alters hydraulic gradients such that discharge rates to rivers are reduced, so directly impacting the environmental flow. In extreme cases, excessive abstraction may create reverse flow gradients such that river flow negatively discharges to the groundwater, also known as 'induced recharge' (Figure 3-5).<sup>39</sup> A locally important variation concerns springs, which are extensively captures for water supply in the Ishem Basin. Because water is collected at the point of natural discharge, the abstraction has no impact on the status of the groundwater body but does impact in terms of reduced baseflow in the receiving surface water body.

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<sup>34</sup> European Commission – Directive 91/676/EEC - concerning the protection of waters against pollution caused by nitrates from agricultural sources

<sup>35</sup> European Commission – Directive 2006/118/EC - on the protection of groundwater against pollution and deterioration

<sup>36</sup> European Commission – Groundwater legislative framework <https://ec.europa.eu/environment/water/water-framework/groundwater/framework.htm>

<sup>37</sup> UK Institute of Hydrology - Low Flow Studies Report no.1 Research Report, NERC, 1980.

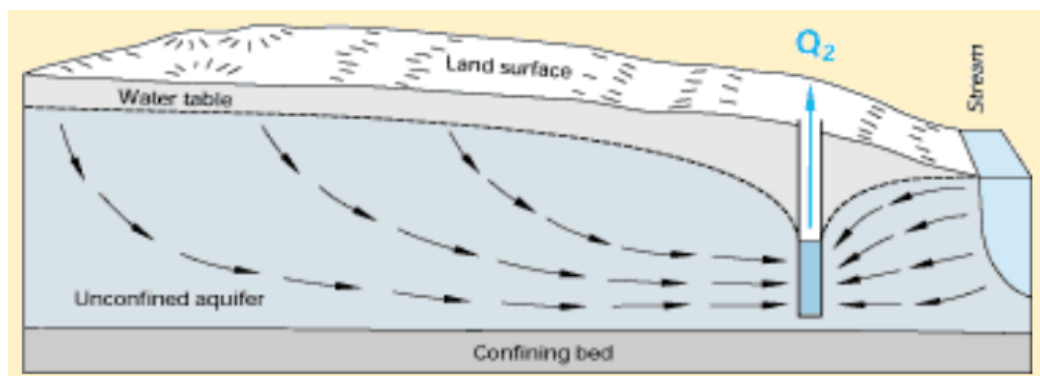
<sup>38</sup> "Naturalised Flow" = Recent Actual Flow + (Abstractions + Exports) – (Returns + Imports)

<sup>39</sup> United States Geological Survey – Ground Water and Surface Water – A Single Resource – USGS Circular 1139, 1997.

Precise impacts of groundwater – surface water interactions are typically localised and highly technical, requiring modelling assessments. However, as a very general approximation, it can be stated that e.g. a 10% reduction in the groundwater resource (e.g. due to consumption) will generally result in a comparable 10% reduction in groundwater discharge somewhere in the surface water system on a mean annual basis. A further aspect potentially affecting the quantitative status of groundwater bodies in the Ishem Basin is the role of water transfers between basins and between water bodies. Spring water from Selita in GW35140409 and surface water from the Bovilla reservoir and spring water from Shenmeria in the Erzen Basin are transferred to the Tirana groundwater body (GW35140103).

For many rivers, including those in Albania, since the groundwater component is often of the order of 30%+ of mean annual flow, it follows that a 10% reduction in groundwater net recharge will likely create a 3% reduction in streamflow on a mean annual basis. However, during seasonal low flow periods e.g. summer when the BFI may be typically be at 0.9+, the same 10% recharge reduction will result in a 9% reduction in seasonal streamflow. Such reductions are likely to impact adversely on aquatic ecosystems.<sup>40</sup>

**Figure 3-5 – Example of Surface Flow Depletion due to Groundwater Abstraction**



### 3.4.2 Reference Conditions for Groundwater Quality

The GWD provides certain flexibility to Member States in the establishment of threshold values by requiring the consideration of the different receptors of the groundwater body as well as the risks and functions, the characteristics and behaviour of pollutants and the hydrogeological characteristics represented by the background levels. The consideration of these different requirements, potentially adapted to each individual groundwater body, leads to different approaches followed by Member States.

Broadly, the quality of groundwater is determined through its chemical status, principally sub-defined through:

- Degree of saline and ‘other’ intrusions, typically indicated mainly through the parameter of electrical conductivity (EC). Although intrusion of seawater is the default condition driving this status test, WFD/GWD guidance identifies ‘other’ intrusions to include infiltration from polluted streams and lateral subsurface inflow from other aquifers, both of which are relevant to the Ishem Basin.
- EQS for general physical-chemical parameters primarily dissolved oxygen, pH, conductivity, nitrate, chloride and ammonium, pesticides and other main pollutants, as stipulated by the GWD Annex I.

<sup>40</sup> European Commission – Groundwater as a resource - <https://ec.europa.eu/environment/water/water-framework/groundwater/resource.htm>

- Degree to which groundwater chemical status adversely affects the ecological status of receiving surface waters.

EQSs for groundwater are explicitly stated in EU Directive 2006/118/EEC for the parameters of a) nitrate – 50 mg/l b) Total Pesticides – 0.5 µg/l). The derivation of threshold values is described in Chapter 10. Drinking water standards are most frequently used as the basis of chemical status threshold values, either as laid down in the DWD, WHO international standards or priority substances objectives set out in the Directive 2013/39/EU.<sup>41</sup>

It should be noted that under the GWD, chemical status provisions do not apply to high naturally-occurring levels of substances, ions or indicators due to specific hydro-geological conditions which are not covered by the WFD definition of pollution. Because background levels can be very high for some parameters and some types of groundwater body it is important to identify these background levels as a first step in the status and trend assessments. EQSs adopted for groundwater bodies in Albania are presented in Technical Annex VII.

### 3.4.3 Reference Conditions for Groundwater Dependent Terrestrial Ecosystems

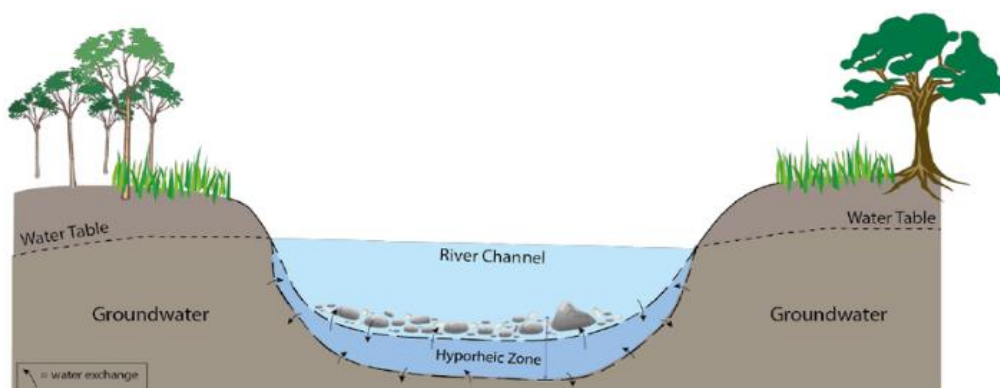
Groundwater dependent terrestrial ecosystems (GWDTEs) represent a special case of groundwater characterisation and associated reference conditions.<sup>42</sup>

GWDTEs are part of the status assessment for groundwater. Therefore, they are relevant in characterisation and risk assessment of GWBs (see Figure 3-7). The relevance of GWDTEs with respect to groundwater waterbody status is that in addition to the basic tests of groundwater quantity (3.4.1) and quality (3.4.2), a GWB may fail the test of ‘good status’ if it can be determined that the dependent surface water ecosystem is in some way compromised through deficient quality or quantity of the contributing groundwater.

Many surface water aquatic ecosystems are highly adapted to and dependent on groundwater discharge, usually in the form of ‘baseflow’ as part of the total flow in the river. This is because, by definition, baseflow (perennial) is usually present throughout an entire hydrological year, whereas surface runoff is intermittent with only short-term and transient influences on water quality and quantity.

Groundwater most usually discharges to the surface water system through the hyporheic zone (Figure 3-6), and the hyporheic zone has considerable importance with respect to chemical and biotic interactions between surface water and groundwater, providing habitats for benthic invertebrates, reduction of pollutant concentrations, and stabilisation of pH, oxygen and water temperature.

**Figure 3-6 – Illustration of the Hyporheic Zone**



<sup>41</sup> European Commission – Directive 2008/176/EEC – Annex I (Priority Substances), Annex II (replacing WFD Annex X) identifying Priority Hazardous Substances

<sup>42</sup> European Commission – CIS - Technical Report on Groundwater Dependent Terrestrial Ecosystems, Technical Report 6, 2011

It is not easy to determine which terrestrial ecosystems are directly dependent on a GWB, and there will be a continuum of ecosystems between those that are dependent on groundwater from a GWB and those that are dependent on other water sources.

Typically, specialist ecological surveys will be required to confirm the presence of typically adapted species due to the distinctive natural chemistry of groundwater compared to surface waters. These surveys will be necessary to determine the threshold values (TVs) of pollutants or indicators of pollution (i.e. chemical status) that may adversely impact on GDTEs.<sup>43</sup> It is a specific requirement of the GWD (Annex II, Part A) that threshold values take account of the extent of interactions between groundwater and associated aquatic and dependent terrestrial ecosystems.

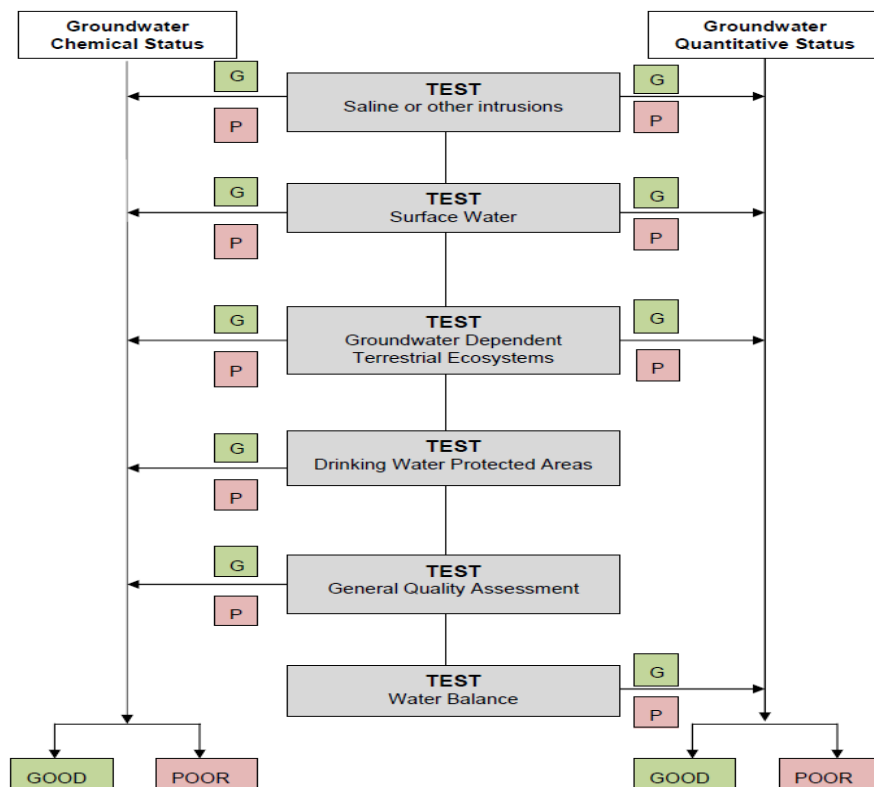
A second useful practical test derived from surface water hydrology is to ascertain the Baseflow Index (BFI) of the flow regime. The BFI is defined as the long-term mean annual  $Q_{90} / Q_{50}$  ratio of surface flow. The greater the proportion of baseflow as part of total flow, the more likely is the surface water ecosystem to be dependent on groundwater contribution. BFI values > 0.5 indicate that 50%+ of the total flow is derived from groundwater discharge, and therefore it is highly likely that ecosystems will be highly adapted to and dependant on discharged groundwater properties.

The problematic of reliable recent actual flow data since 1992 in the majority of rivers in Albania, together with a gap of monitored and reported abstraction and discharge data from operators means that naturalised<sup>44</sup> flows and hence naturalised  $Q_{50S}$  and  $Q_{90S}$  make difficult this evaluation for GDTEs.

### 3.4.4 Step-wise Tests for Groundwater Quantity and Quality Status

The formal procedure for groundwater status determination adopted in Albania follows the standard CIS guidance, as per Figure 3-7.<sup>45</sup>

Figure 3-7 – Standard Procedure for Determination of Groundwater Overall Status



<sup>43</sup> European Commission – CIS Guidance 18 - Guidance on Groundwater Status and Trends Assessment.

<sup>44</sup> Naturalised flow is defined as Recent Actual Flow (aka measured) + Abstractions – Returns. This formula provides the natural flow (at daily, monthly, seasonal, annual timestep as required) with all artificial influences removed. Measured  $Q_{90}$  and  $Q_{50}$  cannot be used to infer natural conditions unless influences are near zero.

<sup>45</sup> European Commission – CIS Guidance Document 18 - Guidance on Groundwater Status and Trend Assessment

### 3.5 Environmental Objectives for Protected Areas

According to Article 6 and Annex IV of the WFD, Member States shall ensure the establishment of a register or registers of all areas lying within each RBD which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater, or for the conservation of habitats and species directly depending on water, including the protection of Natura 2000 sites and economically significant aquatic species (e.g. shellfish).

A summary of the register of Protected Areas should be part of the RBMPs, including maps indicating the location of each protected area and a description of the Community, national or local legislation under which the protected areas have been designated. For those water bodies designated as protected areas, the environmental objectives set are typically beyond good status, as more stringent objectives have been set for those areas in the relevant Community legislation.

Annex VII (7)(1) of the WFD requires that the RBMPs contain ‘a summary of the measures required implementing Community legislation for the protection of water’. The additional measures for protected areas should be an integral part of the RBMPs in order to ensure that the requirements of those Protected Areas are included in the overall management of the river basin and to ensure the coherence of the entire water planning with the objectives already established by other Community and national legislation.

Monitoring programs should include specific sub-programs for the areas included in the Register of protected areas. Beside requirements for surface and groundwater status Article 8 of the WFD sets out the requirements for the monitoring of protected areas. This specific monitoring should ensure the assessments with the standards and objectives defined for particular protected area type.

Article 4, Par. 1, c WFD determines the objectives for protection areas: Member States shall “achieve compliance with any standards and objectives at the latest 15 years after the date of entry into force of this directive unless otherwise specified in the Community legislation under which the individual protected areas have been established”. For these objectives, mainly the adaptation possibilities offered by the WFD apply. Thus, two kinds of objectives must be achieved for protected areas: the specific objectives of the directive concerned and which were decisive for the designation of an area (see WFD Annex 4) and the individual national standards of implementation and objectives of the WFD. Some protected areas correspond to water bodies. The register of protected areas should cover areas identified by the WFD or other related EU Directives.

These include five general types of PAs:

- Water bodies used for the abstraction of drinking water;
- Areas where measures have been implemented to protect economically significant aquatic species (PA under Directive 2006/44/EC (freshwater fish directive); Shellfish Directive 79/923/EEC);
- Bathing waters (PA under Bathing Water Directives 76/160/EEC and 2006/7/EC); and
- Nutrient sensitive areas (PA under Nitrates Directive 91/676/EEC; Urban Wastewater Treatment Directive 91/271/EEC).
- Areas important for the protection of habitats and/or species where the maintenance or improvement of the status of the water is an important factor in their protection (Natura 2000, sites subject to the Birds Directive 79/409/EEC and the Habitats Directive 92/43/EEC).

As applicable national legislative in non-EU countries is not fully harmonized with EU standards, a complete inventory of PA as required by the WFD cannot currently be drawn up for the basin as a whole. Therefore, a modified approach could be applied, which takes into consideration:

- National standards for the delineation of PA;
- A different status within Bern Convention implementation and NATURA 2000 network design within the country;
- The different level of adaptation of national legislation to EU legislation and standards in non-EU countries;
- The general lack of registers and/or effective databases of PA in country;
- Shared responsibility regarding maintenance and the protection of drinking water zones between national and sub-national level competent authorities;
- Shared responsibility for the monitoring of drinking water protection areas.

### **3.5.1 Areas Designated for Drinking Water Abstraction**

The relevant EU legislation for the protection of drinking water with more stringent objectives includes the DWD as amended by Directive (EU) 2020/2184 and potentially the ND. The objectives for Drinking Water Protected Areas (DrWPAs) are to:

- Ensure that, under the water treatment regime applied, the drinking water produced meets the requirements of the DWD;
- Ensure necessary protection in the DrWPA with the aim of avoiding deterioration in water quality in order to reduce the level of purification treatment required in producing drinking water.
  - The first objective will be achieved by meeting the requirements of the DWD.
  - The second objective will be achieved by putting in place actions that aim to ensure that there is no deterioration in water quality at abstractions used for drinking water supply. In many cases it may take some time for actions to become effective and either halt or reverse deterioration. Providing sufficient actions are in place, the objective is met.

### **3.5.2 Areas designated for the protection of economically significant aquatic species**

In December 2013 the Shellfish Directive was repealed by the EU WFD. Article 4.9 of the WFD sets out that it offers a level of protection at least equal to any directive which it repeals. The 2003 Regulations transpose many of the WFD obligations and impose most of the water quality standards and obligations which were required by the Shellfish Directive. These amending Regulations make additional amendments to the 2003 Regulations to ensure shellfish waters can continue to be identified, protected and monitored.

The objective for shellfish waters designated under the Shellfish Directive was to protect and, where needed, improve the quality of shellfish waters in order to support shellfish (bivalve and gastropod molluscs) life and growth, and thus contribute to the high quality of shellfish products directly edible by man.

Areas designated for the protection of economically significant aquatic species are areas with the protection of inland surface waters, transitional waters, coastal waters and groundwater, which: prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems. These areas are connected with coastal and wetlands areas, as well the transitional water bodies where live the economically significant aquatic species.

Wetland ecosystems are ecologically and functionally parts of the water environment, with potentially an important role to play in helping to achieve sustainable river basin management. The WFD does not set environmental objectives for wetlands. However, wetlands that are dependent on groundwater bodies, form part of a surface water body, or are protected areas, will benefit from WFD obligations to protect and restore the status of water. Pressures on wetlands (for example physical modification or pollution) can result in impacts on the ecological status of water bodies. Measures to manage such pressures may therefore need to be considered as part of river basin management plans, where they are necessary to meet the environmental objectives of the Directive.

Wetland creation and enhancement can in appropriate circumstances offer sustainable, cost-effective and socially acceptable mechanisms for helping to achieve the environmental objectives of the Directive. In particular, wetlands can help to abate pollution impacts, contribute to mitigating the effects of droughts and floods, and help to achieve sustainable coastal management and to promote groundwater recharge. Some of these PAs will include wetland habitats and species directly depending on surface water or groundwater. A crucial part of the development of the PAs Register will therefore be the identification of those habitats and species within the Natura 2000 network which qualify under WFD criteria.

### **3.5.3 Bodies of water designated as recreational waters**

This section refers to areas designated under Directive 2006/7/EC under the management of Bathing Water Quality (repealing Directive 76/160/EEC). This Directive lays down provisions for:

- a) the monitoring and classification of bathing water quality;
- b) the management of bathing water quality; and
- c) the provision of information to the public on bathing water quality.

The purpose of this Directive is to preserve, protect and improve the quality of the environment and to protect human health by complementing WFD. This Directive shall apply to any element of surface water where the competent authority expects a large number of people to bathe and has not imposed a permanent bathing prohibition, or issued permanent advice against bathing (hereinafter bathing water). It shall not apply to:

- a) swimming pools and spa pools;
- b) confined waters subject to treatment or used for therapeutic purposes;
- c) artificially created confined waters separated from surface water and groundwater.

The 'management measures' means the following measures undertaken with respect to bathing water:

- a) establishing and maintaining a bathing water profile;
- b) establishing a monitoring calendar;
- c) monitoring bathing water;
- d) assessing bathing water quality;
- e) classifying bathing water;
- f) identifying and assessing causes of pollution that might affect bathing waters and impair bathers' health;
- g) giving information to the public;
- h) taking action to prevent bathers' exposure to pollution;
- i) taking action to reduce the risk of pollution.

The identification and characterization of bathing waters in Albania is not done according to the requirements of the bathing waters Directive. There are some efforts on the monitoring of bathing waters use as beach areas or recreational waters but their classification is not done through a process related to the EU requirements.

The Bathing Directive aims to prevent and reduce pollution in bathing waters to levels that are no longer harmful to human health and the environment, and is the EU's main tool to protect the health of humans when bathing. The definition for recreational water refers to rivers, lakes and coastal waters that are used for recreational purposes.

In Ishem river basin most of the artificial lakes are created and used for irrigation in agriculture.

In the municipality of Tirana, there are many reservoirs built over the years with the function of irrigation of lands, for energy production, for drinking water supply and natural parks. During the design phase, measures have been taken to ensure that their dams are safe, the volume of water to enable the functionality of their creation. From the studies so far, it has resulted that the informal

urban development of the years has alienated the work of the reservoirs and the loss of their function, due to the lack of maintenance.<sup>46</sup>

- a) Tirana Artificial Lake is an erosive valley between the hilly ranges where a series of streams that end in the lake intersect. The lake's main supply derives entirely from the lake's waters and from storm waters. The capacity of the lake is 2,500.00 m<sup>3</sup>, the dam was built with an initial height in the years 1957-1958 about 12.5m, but in 1962 it was increased by 2m. The construction of the lake was carried out having initially the main purpose of the industrial water supply of the former textile factory. Later, water was supplied from Lake Farkë, which was used for irrigation. The Park on the Artificial lake is a 289ha public park situated on the southern part of Tirana.
- b) Paskuqan Reservoir was built in 1983, with an area of 150 ha from 2500 ha that was at the time of design, with a water volume of 9 Mm<sup>3</sup>.
- c) The Purez Reservoir was built in 1971 to irrigate farmland with a volume of 1.5 Mm<sup>3</sup>. Today, this area has been reduced relative to the initial area at the time of construction of 500 ha.
- d) The Kashar Reservoir was built in 1963 with a water volume of 1.8 Mm<sup>3</sup> and the area of irrigated land is about 500ha.
- e) The Çekreza Reservoir was built in 1968 with a volume of 4.8 Mm<sup>3</sup> and an irrigated area of approximately 300ha.
- f) Farka Reservoir was built in 1984 with a water volume of 9.0 Mm<sup>3</sup> and an irrigated area of 1900 ha. Today, this acreage has been reduced. The Farka Lake is an artificial lake and municipal park in the southeast of Tirana. It is about 9.6 km away from the city centre. The lake is about 75ha larger than the Artificial Lake of Tirana. It has a maximum length of two kilometres as well as a maximum width of 700m. The dam at the south is about 300m long.

### 3.5.4 Nutrient-sensitive Areas

The general objective of the Nitrates Directive is to:

- reduce water pollution caused or induced by nitrates from agricultural sources and
- prevent further such pollution.

This objective will be achieved through designating Nitrate Vulnerable Zones (NVZs) and action programmes being implemented within them. NVZs comprise all land draining to “polluted waters” as defined by the Directive. A Code of Good Agricultural Practice has also been published, which provides advice to all farmers on how to reduce nitrate losses to the environment. The enrichment of waters by nutrients (especially from phosphates and nitrates) leading to eutrophication of waters is one of the major issues for waterbody status. There are three European Directives that deal with nutrient discharges into waterbodies:

- Water Framework Directive (WFD) (2000/60/EC)
- Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC)
- Nitrates Directive (ND) (91/676/EEC)

Areas designated as vulnerable areas fall under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC.

UWWTD deals primarily with the management actions required to protect waterbodies from domestic sewage, industrial waste and surface water run-off. WFD nutrient and ecological standards should be used first to identify potentially eutrophic water bodies which can then be controlled under UWWTD or ND standards.

If discharges from qualifying WWTPs – (those serving a population equivalent (p.e.) of greater than 10,000) -either directly or indirectly are found to cause (or may cause) eutrophication, or result in

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<sup>46</sup> The general plan of the City of Tirana. Amended with Decision of the National Council of the territory nr.1, date 14.04.2017

excess total phosphorous level (i.e. > 2.0 mg/l P), excess total nitrogen levels (i.e. > 15 mg/l N)<sup>47</sup>, or > 50 Mg/l NO<sub>3</sub> in drinking water supplies, the receiving water bodies are identified as sensitive, and a further level of treatment beyond secondary is required to protect these areas. ND covers the protection of waters caused by nitrates from agricultural sources. Given the diffuse nature of this type of pollution, it is usual to adopt a "total basin" approach to the implementation of the ND where an Action Programme under the ND applies to all farmers.

### 3.5.5 Areas designated for the protection of habitats or species

This section refers to the areas where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC and Directive 79/409/EEC.

A "Protected area" is a land, water, sea and coastal space, clearly defined geographically, known, with clear physical boundaries and managed through legal or other effective means, to achieve long-term conservation / protection of nature, related to ecosystem services and cultural values. Under EU legislation, a protected area is a clearly defined geographical area that is dedicated to achieving the long-term conservation of nature. IUCN protected area management categories classify protected areas according to their management objectives.<sup>48</sup> At EU level, through the Birds and the Habitats Directives, the Natura 2000 network is established. Its purpose is primarily to ensure the conservation of targeted species and habitats of European interest.<sup>49</sup> The EU Emerald Network is an ecological network made up of Areas of Special Conservation Interest. The objective is the long-term survival of the species and habitats of the Bern Convention requiring specific protection measures.<sup>50</sup>

The objective for Natura 2000 Protected Areas identified in relation to relevant areas designated under the Habitats Directive is to:

*“Protect and, where necessary, improve the status of the water environment to the extent necessary to achieve the conservation objectives that have been established for the protection or improvement of the site’s natural habitat types and species of Community importance in order to ensure the site contributes to the maintenance of, or restoration to, favourable conservation status”.*

Where a Natura 2000 Protected Area forms part of a water body or where a water body lies within a Natura 2000 Protected Area, the WFD objectives apply in addition to the requirement to maintain at favourable conservation status or restore it to that status. Some water bodies that coincide with Natura 2000 Protected Areas have been designated as artificial or heavily modified; in these cases, the aim to achieve good ecological potential applies in addition to the objective of favourable conservation status. **Annex B** sets out the status objectives for each water body and indicates where the water body coincides with a Natura 2000 Protected Area. The protected area objectives are independent of the water body status objectives in Annex B but all objectives have to be met in accordance with each of the EC Directives that underpin them. It is important to note that water body status objectives in **Annex B** will not always fully reflect the Natura 2000 Protected Area objectives in this Annex even where the element is the same, for example phosphate.

It is possible for a water body to meet the objectives for 'good status' but fail the Natura 2000 Protected Area objective of maintenance of, or restoration to, favourable conservation status. It is also possible to meet favourable conservation status (for example for salmon) but fail to achieve 'good status' in a coincident water body (for example for fish since the WFD requires action to protect and restore a wider range of fish species). Although the objective to restore or maintain favourable conservation status in Natura 2000 sites is mandated by the EC Habitats and Birds Directives, there is no specific date for achieving it. The WFD introduces the 2015 deadline, which applies to the Natura 2000 Protected Areas (water dependent SACs and SPAs) (refer to Annex V). If the protected area is also a 'water body', or forms part of a 'water body', the deadline for restoration to favourable

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<sup>47</sup> Total Nitrogen (TN) = Σ (inorganic nitrogen + organic nitrogen). Inorganic nitrogen = ammonium (NH<sub>4</sub>) + nitrate (NO<sub>3</sub>) + nitrite (NO<sub>2</sub>)

<sup>48</sup><https://www.iucn.org/theme/protected-areas/about/protected-area-categories>

<sup>49</sup>European Commission - [https://ec.europa.eu/environment/nature/natura2000/index\\_en.htm](https://ec.europa.eu/environment/nature/natura2000/index_en.htm)

<sup>50</sup> Council of Europe - <https://www.coe.int/en/web/bern-convention/emerald-network>

conservation status may be extended where the conditions in Article 4.4 of the WFD are met. If the protected area is not a water body, for example fens and bogs, the deadline for achievement of favourable conservation status cannot be extended.

Only recently the work has commenced on managing Natura 2000 sites.<sup>51</sup> In framework of the project NaturAL the potential distribution of the Natura 2000 Sites of Community Interest (SCIs) was identified, resulting in the preliminary list of 43 proposed sites in all country. According to this list there are three protected areas identified as Natura 2000 site of community interest in Ishem river basin (table 3-2).

**Table 3-2 – Protected areas according to Natura 2000 in Ishem Basin**

<b>SITE_CODE</b>	<b>SITE_NAME</b>	<b>Existing PA</b>	<b>Habitat Map</b>
<b>AL0000007</b>	Dajt	Yes	No
<b>AL0000015</b>	Bize-Brosh-Berdhet	Yes	No
<b>AL0000024</b>	Rrushkull-Bisht Palle	Yes	No

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<sup>51</sup> EU - Strengthening National Capacity in Nature Protection – Preparation for Natura 2000 Network, March 2019

## 4 River Basin Overview

The purpose of this chapter is to give an overview of the hydro-meteorological, topographical, geological, population, land-use and principal water-use features of the basin in so far as they are likely to influence the typology and status of waterbodies. These elements may be typically considered as the 'driving forces' in the river basin.

### 4.1 Division to Sub-basins

River basin districts and even river basins are rarely homogenous in character, and are not effectively analysed or managed as single entities. Division to smaller more homogenous sub-units (basins and sub-basins) within the river basin district is permitted within the WFD<sup>52</sup> and accords with international best practice. For example, management issues of diffuse pollution are best analysed and managed at the scale of the sub-basin, not the individual waterbody.

The approach in Albania has been to sub-divide each river basin into a maximum of five further sub-basins, based predominantly on a single over-riding feature (e.g. major Dam, dominant geological type, predominant land-use type), or a combination of other influential characteristics, including but not limited to:

- Distinct boundaries of major geological formations e.g. carboniferous to siliceous;
- Changes in ecologically significant altitude or land-cover e.g. < 200 m or > 800 m, forest to urban etc.;
- Natural breakpoints created by major tributaries, infrastructure or river modifications e.g. major Dams, river canalisation etc.;
- Concentrations of anthropogenic influence e.g. urban or agriculture dominated areas.

It will be noted that these broad differentiations coincide generally with the same typology delimitations as used for waterbodies. Therefore, the sub-basin characteristics should generally be reflective of the waterbody characteristics. The division to sub-basins is useful to further refine more targeted policies or strategies particularly regarding land-use pressures such as urban growth or diffuse pollution issues from agriculture (Chapter 12).

### 4.2 Climate and Hydrometeorology

Climate generally, and annual and seasonal precipitation specifically (comprising snow and/or rainfall) is the over-riding driver of all water-based interactions in the river basin. An evaluation of basin hydrometeorology is relevant to a subsequent understanding of the pressures, state/status and impacts imposing on the otherwise natural state of waterbodies in the river basin.

A full technical evaluation of hydro-meteorology and its detailed influences on the basin is generally presented in the Water Resources Management Plan or similar subsidiary strategy. The hydro-meteorology is only relevant to the environmental objectives of the river basin in order to correctly establish:

- The annual renewable resource of surface water and groundwater i.e. the resource that can be annually exploited or consumed without compromising future sustainability

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<sup>52</sup> European Environment Agency - Water Framework Directive reporting resources, EIONET Central Data Repository, (Schema SWB: EUSubUnitCode). [http://cdr.eionet.europa.eu/help/WFD/WFD\\_521\\_2016](http://cdr.eionet.europa.eu/help/WFD/WFD_521_2016)

- The seasonal natural flow regime (with zero anthropogenic influence) comprising: timing, magnitude and durations of specified flows
- The naturalised environmental flow regime (the proportion of full natural flows that is the minimum required to sustain aquatic ecosystems). Environmental flow is not a single minimum value; rather it is the continuum of all-natural flow throughout the year.

Significant and uncontrolled anthropogenic influences on any of the above that do not have mitigation measures are very likely to result in a reduced ecological status of the impacted waterbody, and therefore fail the primary tests of the WFD, namely ‘waterbodies to be in Good Status’ and ‘no deterioration of status below the present level’. Therefore the ‘baseline’ hydrometeorology forms an important reference condition for ecological status.

#### 4.2.1 Climate and Meteorology – Ishem River Basin

The area-weighted annual precipitation for the entire Ishem river basin of 704 km<sup>2</sup> is 1440 mm. This is spatially distributed as shown in Map 4-1 from representative Stations. These data derive from 20+ precipitation monitoring stations sited in or peripheral to the basin. Monthly climate statistics are shown in Table 4-1 for specific locations. As for most of western Albania, the precipitation gradient declines from east to west in accordance with decreasing altitude. The river basin is drained by the principal river of the Ishem, with significant tributaries formed by the Tirana, Lana, Tërkuza and Zezë rivers. They consist of a considerable number of large and small streams, who shed their waters in the main river Ishem.

The annual meteorological regime across the basin is summarised in **Error! Reference source not found.** for three representative Stations at varying altitude.<sup>53</sup> The wettest year in the WMO standard climate period 1991-2020<sup>54</sup> is reported as 1991 with an annual total of 1993 mm at Station Dajt<sup>55</sup>. The driest year of 2011 is reported with an annual total of 1085 mm at Station Dajt (see Technical Annex I).

Across all stations, the same meteorological regime is encountered, typically with 30%+ of the annual rainfall total falling in the seasonal period October-November-December. The driest 2 months are July and August typically comprising < 10% of the annual total.

**Table 4-1 – Main Climatic Variables – Ishem Basin**

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Σ
MEAN TEMPERATURE	6.3	7.7	9.8	13.1	17.4	21.6	23.8	23.4	20	15.4	11.3	7.7	
PRECIPITATION <sup>56</sup>	145	135	111	93	87	60	35	41	72	107	166	155	1207
EVAPOTRANSPIRATION <sup>57</sup>	37	45	65	86	120	154	172	150	107	66	47	39	1088
EVAPOTRANSPIRATION <sup>58</sup>	22	32	62	92	122	150	23	31	60	64	35	23	716

<sup>53</sup> Institute of GeoSciences, Energy, Water and Environment (IGEWE) for the period 1991-2018.

<sup>54</sup> World Meteorological Organisation – Technical Regulations – “Climatological Standard Normals”

<sup>55</sup> Reported as calendar years, (not hydrological years commencing in October).

<sup>56</sup> Based instead on internet sources.

<sup>57</sup> Defined as Reference Evapotranspiration ET<sub>0</sub>. Source is Laska, A. et al. “Evapotranspiration and Its Evaluation in Albania”, BALWOIS 2010. Utilising FAO 56, Penman-Monteith at Durres.

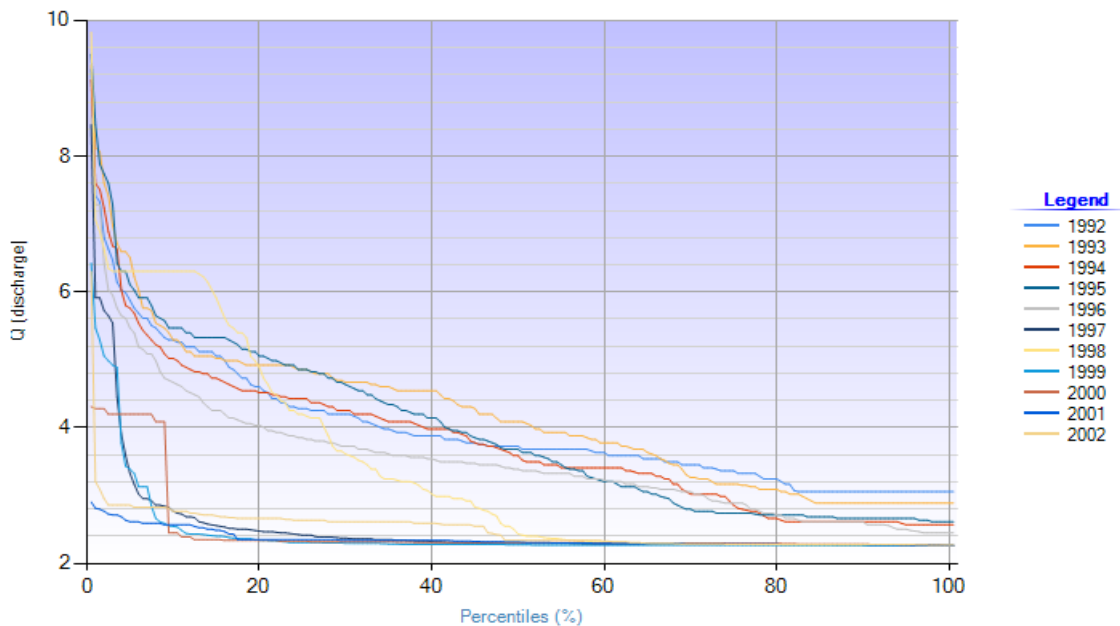
<sup>58</sup> Defined as Actual Evapotranspiration ET<sub>A</sub>. Source is Laska, A. et al. “Evapotranspiration and Its Evaluation in Albania”, BALWOIS 2010. Utilising Thornthwaite at Durres.

#### 4.2.2 Hydrology – Ishem River Basin

At the most downstream flow gauging station of the river basin (River Ishem at Sukth Vendas) mean annual flow (MAF) in the period 1968-1992<sup>59</sup> was 18.6 m<sup>3</sup>/s (reported as 20.2 m<sup>3</sup>/s in Hydrology of Albania 1984).<sup>60</sup> Factored to the entire river basin area (704/624 km<sup>2</sup>), this gives an approximate river basin mean annual discharge rate of 22.8 m<sup>3</sup>/s. Flow hydrographs for three representative river regimes (Tirana, Zezë and Ishem) are presented in Figure 4-7 for the period 1960-1992.<sup>61</sup> Since 1990, significant changes have taken place within the Ishem river basin, most notably an increase in population from 244,000 (1990) to 814,000 (2018, UKT estimate).

The major reservoir of Bovilla became operational in 1999/2000, and is hydrologically significant because it diverts approximately 207 Ml/day (2.40 m<sup>3</sup>/s) of stored water from the Terkuza catchment draining to Bovilla (ISH3) to the receiving catchments of the Tirana and Lana rivers (ISH1). The impact on the overall water balance is minimal, since the Terkuza, Tirana and Lana rivers all merge at the downstream boundary of ISH1; however, the Terkuza stream is now totally deprived of flow downstream of Bovilla Dam since no provision was made in its design for environmental or compensation flow. Accordingly, the flow regime and ecological disruption to the Terkuza is probably significant and it has been classified as a Heavily Modified Waterbody (HMWB). The drastic change in the flow duration curve in the Terkuza river is shown in the Figure 4-1.

**Figure 4-1 - Flow duration curves for the river Terkuza before and after the construction of Bovilla Dam**



In addition to annual flow regimes, the river basin hydrology is most usefully characterised by Flow Duration Curves, which represent the proportion of time that any given flow is equalled or exceeded. Of particular importance are the ‘indicator flows’ of Q<sub>10</sub>, Q<sub>25</sub>, Q<sub>50</sub>, Q<sub>75</sub> and Q<sub>90</sub>. Q<sub>50</sub> is the more reliable measure of most probable flow (by suppressing extreme values from the record), and this value should

<sup>59</sup> Data are from two series 1968-1992 and 1992-2008. Data are useful to show the relative magnitude of Individual River flows (which may also have changed since 1992).

<sup>60</sup> There are some discrepancies between the supplied data to this project, and the historical data in Albania Hydrology 1984. Mean annual flows are typically 15-18% higher in the Albania 1984 Report and therefore indicate data errors or significant alterations to hydrology in the period 1984 – 2008, which is unlikely.

<sup>61</sup> World Bank - On the Establishment of Institutional and Regulatory Platform for Governance and Functioning of the National Water Resources Cadastre in Albania, Assessment Report WRIP/WMA/3/CS/006, 2019.

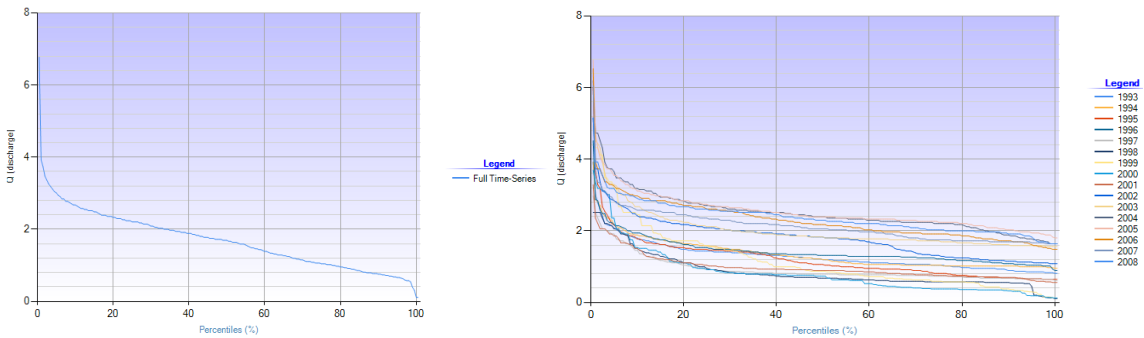
be used for long-term planning of water resource allocations, not the mean value. The ratio  $Q_{90}/Q_{50}$  is generally a good indicator of the proportion groundwater discharge as part of measured total stream-flow, the so-called 'Baseflow Index' (BFI). On a mean annual basis, the absolute minimum 'environmental flow' should never be less than  $Q_{95}$ , and in groundwater influential systems ( $BFI \geq 0.35+$ ) should at least equal or exceed  $Q_{90}$ . Comparison of meteorological and hydrological profiles shows that the precipitation peak occurs in November for the majority of stations. However, peak flows occur in January and February. This delayed response is the result of groundwater storage being recharged before groundwater levels are sufficient to discharge to the river systems in the form of baseflow. Flow Duration Curves for the same three flow gauging stations are tabulated in Table 4-2. The problematic of reliable flow data since 1992 compromises many aspects of the environmental objectives for the river basin since flow is a critical component of waterbody ecological status and is the basis of many volumetric indicators of pressure. Recent actual flows, levels of recharge, water resource availability, and groundwater contribution to surface water, environmental flow values and the chemical load component of surface waters are updated up to the year 2008.

**Table 4-2 – Flow Duration Curves for Ishem River Basin Flow Gauging Stations <sup>62</sup>**

FLOW GAUGING STATION	RIVER	LATITUDE WGS84 <sup>63</sup>	LONGITUDE WGS84	Q <sub>10</sub>	Q <sub>25</sub>	MAF	Q <sub>50</sub>	Q <sub>75</sub>	Q <sub>90</sub>	Q <sub>95</sub>
Zall Dajt	Tirana	41.400424°	19.925794°	2.64	2.20	1.70	1.67	1.04	0.76	0.66
Brar Shupal	Tirana	41.379939°	19.859456°	4.05	3.84	3.10	3.04	2.60	2.23	2.05
Hotel Dajti	Lana	41.323944°	19.820972°	0.67	0.54	0.49	0.44	0.34	0.27	0.22
Ura Gjoles	Ishem	41.467361°	19.691667°	26.52	18.9	14.8	12.43	8.2	5.9	5.2
Lorushk <sup>64</sup>	Tërkuza	41.445442°	19.699505°	9.13-	7.62	6.57	6.37	5.19	4.27	3.81
Zall-Herr (Pinar)	Tërkuza	41.409516°	19.833934°	5.25	4.28	3.32	3.37	2.62	2.29	2.27
Arameras Fushe Kruje	Zeze	41.474083°	19.720750°	5.42	3.42	1.95	1.82	1.12	0.69	0.48
Sukth Vendas	Ishem	41.525694°	19.618389°	32.67	22.32	17.15	14.95	9.31	7.32	5.75

**Figure 4-2. Example of the Flow Duration Curves in Zall Dajt station, Tirana River**

*(Left long term flow duration curve and right annual curves)*



<sup>62</sup> Hydrometric (flow) data for the river basin are updated up to 2008. These data are used to calculate the current hydrological conditions.

<sup>63</sup> WGS84 coordinate system. Gauging Station coordinates supplied by IGEWE have not been field-verified and may not be accurate.

<sup>64</sup> Data is derived from Hydrology of Albania 1984.

### 4.2.3 Summary Water Balance of the Ishem River Basin

Determination of a reliable river basin water balance is a technically challenging exercise, requiring accurate recent data on measured inflows, outflows and levels of consumption. However, an understanding of the primary sources of inflow to the basin, and how the water is consumed or transferred between sources (surface water and groundwater) and ultimately discharged to the outlet (sea or trans-boundary downstream basin) is critical to correct understanding of the basin hydrodynamics and sustainable water management. A full and detailed appraisal of water resources supply and demand is the subject of the more technical report which is currently not covered in this RBMP framework.

The innovative standard river basin water balance<sup>65</sup> newly applied in Albania promotes a useful understanding of several key issues (see Table 4-6):

- The inter-linkage between surface water and groundwater. Although frequently managed and reported separately, they are in fact closely aligned and connected<sup>66</sup>. The groundwater recharge volume in particular is a critical value with respect to aquatic ecosystems and abstraction licensing, and is frequently misreported in IWRM evaluations.
- Natural losses (evaporation, transpiration and trans-boundary groundwater outflows) must be subtracted from the total natural inflows (precipitation, trans-boundary surface water inflows and groundwater inflows) in order to arrive at the Annual Renewable Resource (ARR).
- If the ARR of the surface water or groundwater (or both) is exceeded continually through excessive abstraction and consumption,<sup>67</sup> this is a totally unsustainable position for the river basin, and will result in declining river flows and/or groundwater levels. In both cases the environmental objectives of the river basin will be impacted.
- Specific economic sectors should be broadly evaluated to identify which sectors are responsible for the highest levels of consumption.<sup>68</sup> Almost invariably this is the agricultural sector, due to high levels of transpiration of intensively irrigated crops and inefficient irrigation practices, but municipal water is also often responsible for significant 'losses' of surface water to groundwater, and vice-versa. Hydropower schemes may divert large quantities of water between sub-basins. These water transfers can be significantly damaging to environmental objectives without appropriate mitigation.
- It is a fundamental objective of sound water resource management to determine and to control the key 'water exploitation indices' for surface water and groundwater in order to protect environmental flow requirements and to ensure long-term quantities for economic uses.<sup>69</sup>

### 4.2.4 Global Climate Change Evaluation and Impacts

Specific to Albania, three national communications<sup>70</sup> have been prepared under the United Nations Framework Convention on Climate Change, the Ministry of Environment and the United Nations Development Program.

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<sup>65</sup> The best practice River Basin Comprehensive Water Balance complies with the general concepts set out in the UN System of Environmental-Economic Accounting for Water (UN SEEAW), UN DESA, 2012

<sup>66</sup> Ground Water and Surface Water - A Single Resource, U.S. Geological Survey Circular 1139, 1998

<sup>67</sup> CONSUMPTION – defined hydrologically as: (Abstractions + Exports) – (Returns + Imports).

<sup>68</sup> CONSUMPTION in this context complies with the UN SEEAW definition whereby: Total Abstraction = Total Returns + Water Consumption

<sup>69</sup> EUROSTAT – Water Exploitation Index - [https://ec.europa.eu/eurostat/web/products-datasets/-/t2020\\_rd220](https://ec.europa.eu/eurostat/web/products-datasets/-/t2020_rd220)

<sup>70</sup> 1st (2002), 2nd (2009), 3rd (2016) National Communication of the Republic of Albania on Climate Change

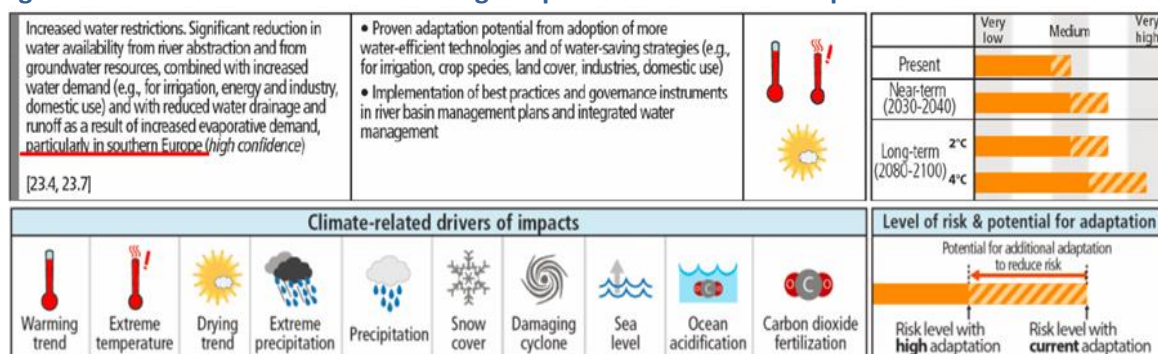
As indicated by Figure 4-3 – Figure 4-5 and Table 4-3–Table 4-4, based on the Inter-governmental Panel on Climate Change (IPCC) precipitation changes for a ‘worst-case’ scenario (Representative Concentration Pathway (RCP) 8.5), south-east Europe is likely to be particularly impacted by significant increases in temperature and reductions in precipitation.<sup>71</sup> Typically, for SE Europe, annual precipitation may reduce by as much as 20% by 2100 compared to a 1990 base level.

Such meteorological changes will have massive and potentially catastrophic impacts for aquatic ecosystems adaptation,<sup>72</sup> droughts,<sup>73</sup> water resources<sup>74</sup> and agriculture across all river basins in Albania. Detailed analyses of these impacts are left to the specific sector strategies related to the water resources, flood and drought supporting elements of the RBMP.

With respect to the objectives of this RBMP, climate change is relevant in so far as it will impact on the future status of waterbodies. Climate change therefore represents one of the most critical pressures on the aquatic environment, manifested through:

- Increased evapotranspiration of land surfaces, so reducing surface water and groundwater recharge and increasing water losses (shifts in the water balance).
- Reduced precipitation, so reducing water resources generally and increasing need for summer irrigation and depleting environmental flows
- Reduced runoff, so depleting groundwater recharge and restocking of reservoirs and volumes available for hydropower
- Reduced river flow, so reducing flows below ecological minimums and increasing concentrations of pollutants.

**Figure 4-3 - Indications of Climate Change Impacts for Southern Europe**



Source: IPCC 5<sup>th</sup> Assessment Report, Working Group II, 2014

Sea level rise is also projected to be extremely hazardous for many low-lying coastal areas, threatening many ecologically valuable habitats as well as groundwater resources, coastal infrastructure and agriculture. Figure 4-4 indicates possible inundation areas on a 10% probability basis for the Ishem coastline based on an RCP 8.5 scenario within 30 years.<sup>75</sup>

<sup>71</sup> IPCC – Assessment Report 5 (AR5) - Climate Change 2014: Impacts, Adaptation, and Vulnerability, WGII, IPCC 2014.

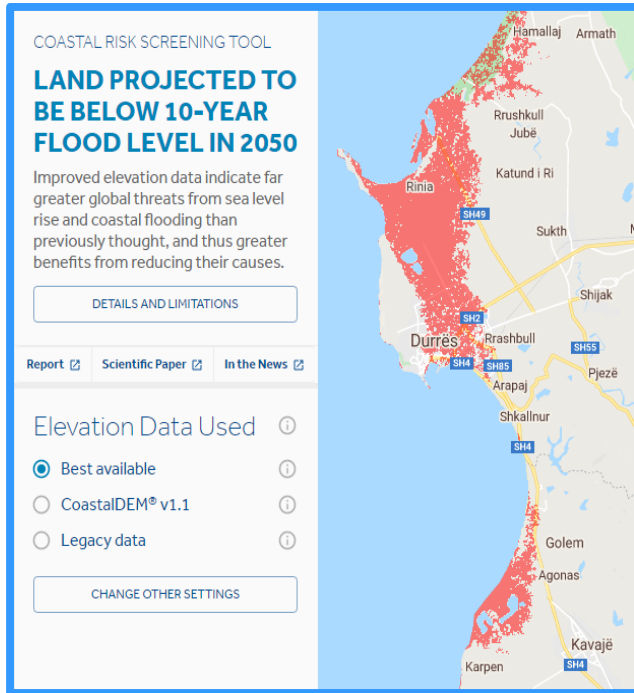
<sup>72</sup> BioScience, 2019, Vol. 70 No. 1, “World Scientists’ Warning of a Climate Emergency”

<sup>73</sup> IPCC – Special Report – Global Warming of 1.5°C, IPCC 2018

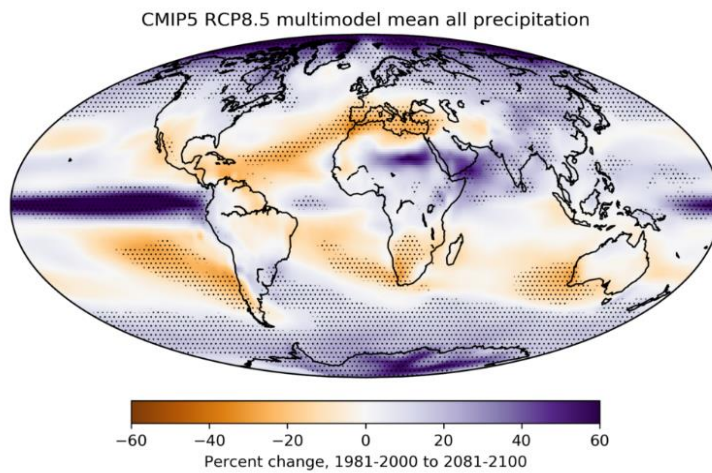
<sup>74</sup> World Bank – ‘Quality Unknown – The Invisible Water Crisis’, WB Group 2019

<sup>75</sup> Climate Central - FLOODED FUTURE: Global Vulnerability to Sea Level Rise Worse than Previously Understood, 2019

**Figure 4-4 - Projected 10 Year Coastal Flood Inundation Zones by 2050**



**Figure 4-5 – IPCC Multi-model Global Precipitation Changes – RCP8.5 <sup>43</sup>**



**Table 4-3 – Indicative % Changes to Global Temperature – IPCC – Base 1990**

Years	2030	2050	2080	2100
Annual	1.0 (0.7 to 1.2)	1.7 (1.3 to 2.2)	2.8 (2.0 to 3.5)	3.2 (2.4 to 4.1)
Winter	0.8 (0.7 to 0.9)	1.2 (1.0 to 1.4)	2.8 (1.7 to 2.3)	2.4 (1.9 to 2.7)
Spring	1.0 (0.8 to 1.12)	1.5 (1.3 to 1.8)	2.6 (2.2 to 3.0)	3.1 (2.6 to 3.6)
Summer	1.6 (0.5 to 1.8)	2.5 (2.1 to 2.8)	4.3 (3.8 to 4.9)	5.3 (4.6 to 6.0)
Autumn	1.0 (1.0 to 1.1)	1.6 (1.5 to 1.8)	2.8 (2.7 to 3.0)	3.5 (3.2 to 3.7)

**Table 4-4 - Indicative % Changes to Global Precipitation – IPCC – Base 1990**

Years	2030	2050	2080	2100
Annual	3.84 (-35.4 to 27.7)	-8.46 (-56.0 to 47.4)	-14.37 (-78.6 to 81.1)	-18.13 (-89.7 to 94.9)
Winter	-5.96 (-15.9 to 4.0)	-10 (-27.9 to 7.7)	-14.3 (-44.6 to 16.1)	-18.1 (-55.8 to 19.6)
Spring	-2.45 (-11.9 to 7.0)	-7.26 (-25.3 to 10.75)	-14.26 (-45.1 to 16.6)	-17.7 (-55.3 to 19.8)
Summer	-10.4 (-12.8 to -7.9)	-19.7 (-24.1 to -15.3)	-41.9 (-49.2 to -34.5)	-50.4 (-59.4 to -41.3)
Autumn	0.5 (-10.1 to 11.1)	-2.5 (-21.3 to 16.3)	-6.9 (-38.1 to 25.2)	-9.5 (-48.1 to 29.1)

#### 4.2.5 Local Climate Change Test – Ishem and Erzen Basins

Whilst Global Climate Models (GCM) and IPCC Reports provide a general overview of possible future scenarios, there is no substitute for an analysis of local data, particularly if long records exist. The single most useful analysis to carry out is a statistical ‘significant difference test’ of two long-term precipitation mean annual values. For this test to be valid, at least 40+ years (2 x 20) of annual mean data is required from a reliable meteorological station that has remained in the same place throughout the evaluation period.

A long-term meteorological Station has existed in Tirana since the 1950’s. The meteorological record (precipitation) should be simply divided to two equal WMO climate normal periods, (1961-1990) and (1991-2020), and a significant difference test is carried out for the two long-term means ( Table 4-5). A P value  $\leq$  to the confidence level ( $\alpha$ ) means that there is a statistically significant difference between the two-period means. This difference is therefore attributable to climate change effects. The magnitude of the difference in the precipitation means is a direct indicator of the change in available water resources since precipitation is the driving force of all water resources.

**Table 4-5 – Statistical Difference Test – Long-term Precipitation Means**

DATA PERIOD	LONG-TERM MEAN (mm)	N	VARIANCE	STANDARD DEVIATION	ALPHA CL $\alpha$ (5%)	t-STAT	P (T $\leq$ t) (1-tail)	P (T $\leq$ t) (2-tail)
1961-1990	1358	30	85.77	101.50	0.05	2.8129	0.0024565	0.0049130
1991-2020	1396	30	117.22					

Due to the virtual collapse problem of an effective surface water flow monitoring system since 1992, the AWRM is not currently able to quantify accurately any water resource availability changes in the Ishem basin for the period 1991 – 2020. The flow data are available for the period 1960-1990, and some data are elaborated for better understanding the river regime change for the period 1992-2008. The precipitation data provided covers an entirely different period 1991-2018, and consequently since the two datasets do not match completely and create difficulty for the

**Table 4-6 – General Water Balance of the Ischem Basin**

WATER BALANCE (ACTUAL FLOWS)	DATA PERIOD: 1991-2008	WATER BALANCE OF THE ISHEM BASIN (all units are Million m <sup>3</sup> )						SUB-BASIN: SEASON: Annual					
NATURAL INFLOWS BY SOURCE	Transboundary Surface Inflows	Direct Precipitation to the River Basin						Transboundary Groundwater <sup>76</sup> Inflows					
RECHARGE ANNUAL GROSS INFLOW	0	1046.166											
	Annual Recharge of Surface Water 1046.166	Annual Recharge of Groundwater											
NATURAL LOSSES	Actual Evapotranspiration (ET <sub>A</sub> ) <sup>77</sup> 516.56	Outflows to Transboundary Groundwater											
ANNUAL RENEWABLE RESOURCE (A)	Annual Renewable Resource (ARR: SW) 631.34	Annual Renewable Resource (ARR: GW)											
PRIMARY ECONOMIC WATER USE SECTORS	IMPORTS MUNICIPAL INDUSTRY AGRICULTURE ENERGY EXPORTS	IMPORTS	MUNICIPAL	INDUSTRY	AGRICULTURE	ENERGY	EXPORTS	IMPORTS	MUNICIPAL	INDUSTRY	AGRICULTURE	ENERGY	EXPORTS
WATER SUPPLIED TO SECTOR <sup>78</sup>	Detailed Annual Consumption of Surface Water by sectors						Detailed Annual Consumption of Groundwater by sectors						
CONSUMPTION BY SECTOR <sup>79</sup>													
SURFACE RETURNS TO GROUNDWATER <sup>80</sup>													
GROUNDWATER RETURNS TO SURFACE													
NET CONSUMPTION BY SECTOR	(Evaluated 57.38 million m <sup>3</sup> )												
NET CONSUMPTION TOTALS BY SOURCE	Annual Consumption of Surface Water 57.38	Annual Consumption of Groundwater											
ANNUAL NET OUTFLOW (A – B)	Surface Net Discharge (including Baseflow)	Groundwater Net Discharge (as Baseflow) <sup>81</sup>											
WATER EXPLOITATION INDICES	Surface Water Exploitation Index (SWEI <sup>+</sup> ) 10.07 %	Groundwater Exploitation Index (GWEI <sup>+</sup> )											

<sup>76</sup> Trans-boundary groundwater transfers into the basin across the surface watershed boundary

<sup>77</sup> Actual evapotranspiration (ET<sub>A</sub>) from all land surfaces, excluding the net difference attributable to agriculture

<sup>78</sup> Water supplied for economic use is assumed to equal abstraction + supply-side losses

<sup>79</sup> Water supplied to the sector and NOT returned to either surface water or groundwater. Same for groundwater

<sup>80</sup> Water supplied from surface sources but returned to groundwater. Vice-versa for water supplied from groundwater

<sup>81</sup> The quantity of groundwater reaching the surface water system and discharging from the river basin

## 4.3 Hydrogeology and Groundwater

### 4.3.1 Overview

The data on hydrogeology and groundwater potential is derived from hydrogeological map 1:200 000 of Albania.<sup>82</sup> Seven principal hydrogeological types were identified, derived principally from the aquifer productivity potential. The aquifers are further classified by their lithology, typically into consolidated rock, in the form of sedimentary rocks (sandstone, conglomerates, shale, limestone, flysch and dolomite), and magmatic and metamorphic rocks (basic and ultrabasic, volcanic and metamorphosed conglomerates and sandstones).

In terms of hydrogeological formations, the Albanian classification system is not fully aligned with the EU WISE reporting system<sup>83</sup>, but approximations between these systems have been summarised in Table 4-7.

### 4.3.2 Geological Formations and Properties – Ishem Basin

Table 4-7 and Map 4-2 provide the hydrogeological overview for the Ishem Basin. Significant features of the hydrogeology are:

- Extensive formations of the 'Type 1' alluvial aquifers on the coastal plain between Kamëz and the coast. This aquifer provides approximately 13.27 Mm<sup>3</sup> or 14% of the potable water for Tirana city<sup>84</sup>. This groundwater is abstracted via pumped boreholes, typically at pump depths of 30 -40 m. The aquifer thickness is typically 50 m below ground level (m BGL) at the south-eastern limit near Tirana, but increasing to as much as 150 – 200+ m at the coast.
- The alluvial aquifers are characterised by high rates of transmissivity, this being indicative of high 'K' values.
- The alluvial or 'inter-granular' aquifers provide an easy source of relatively shallow groundwater extensively exploited by local municipal water systems and agriculture, although abstraction quantities have proved impossible to establish as many wells are without Permits. Agricultural practices may therefore influence levels of nitrate contamination in the aquifer.
- A significant portion of Tirana city overlies the south-eastern end of the alluvial aquifer, with increased potential for hydro-carbon contamination and pollution generally. Indeed, several of the major boreholes supplying the city network are located within the city areas (Laknas, Bukas, Pema) without any degree of surface protection in the form of Drinking Water Protection Areas (DWPAs).
- A significant import of pumped groundwater into the Ishem basin takes place from the adjacent Mati river basin. The well-field (7 – 9 wells) is distributed across the Thumanë area and pumps approximate 400 l/s (34.5 Million m<sup>3</sup>/day) via a major trunk line to Durres city.
- Yields of the individual wells vary in the alluvial aquifers, but can be as high as 65 l/s. Although more prevalent in the Mati river basin around the Laçi area, many of the wells in the coastal zone operate under artesian pressures, the hydraulic head being generated from the surrounding elevated outcrops of sandstone and flysch formations.
- There is a thermal artesian spring and spa at Bilaj near Fushë-Krujë.
- A significant feature of the hydrogeological system is the distinctive karst outcrops running on the SE to NW axis. These elevated areas provide numerous high yielding springs, the majority of which have been tapped for local and regional use. For example, Tirana Water utilises the yield of three major karst springs east of Tirana; Selite, Shen Merise and Boville e Vjeter. Collectively, the karst springs typically have ranges of 400 – 700 l/s, and provide approximately 32.370 Mm<sup>3</sup> or 43% of the system input to Tirana.

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<sup>82</sup> Harta Hidrogjeologjike e Shqipërisë, Ministry of Energy & Industry, Albanian Geological Service, 2015

<sup>83</sup> WISE 2016, EU CIS Guidance 2016 Reporting schema element: <Geological Formation>

<sup>84</sup> 2018 production figures, Tirana Water Utility

- The karst system in Albania forms part of the vast ‘Dinaric Karst’ system extending from Slovenia to Greece following the Adriatic coast, and has importance not only for groundwater recharge and water supply but also groundwater dependent ecosystems and niche habitats, significant components of waterbody ecological status.

Geology of Ishem catchment, as per the Geological Map of Albania 2002, comprises formations of Cretaceous, Paleogene and Quaternary age. These formations are classified into four lithological groups: carbonate formation, flysch formation, molasse formation and Quaternary formation.

Carbonate formations are the oldest in the basin and are represented from limestones and dolomitic limestones of Upper Cretaceous (Cr2) and limestones of Eocene (Pg2). Limestones of upper Cretaceous are encountered in the Makareshi anticline at the surface and under molasse formations of Tiranë-Ishem depression, while Eocene limestones divide the Tiranë-Ishem syncline from the Makareshi structure.

Flysch formation is represented by Paleogene (Pg) formations on the east side of the Ishem basin and separate structures of Makareshi anticline, Dajti Mountain, Mali me Gropa and at south, the basin also. The lithology of flysch is represented from clay, siltstones, sandstones and conglomerates. Neogene (N) formations which are laid at south and southwest of the basin. Their lithology is represented by sandstone, siltstone, clay, marl, conglomerate and lithotamnic limestone.

Molassic formations surround the Tirana depression at the southern, eastern and western sides of upper Miocene (Tortonian, Mesinian) and Pliocene. They are spread from Krraba, Mushqeta to Manez villages at west and from Skuterrë-Priskë and Burizanë villages at east. The lithology of Miocene is dominated from sandstones intercalated with clays, siltstone and lithotamnic limestones while the lithology of Pliocene formations is represented from sandstone and conglomerate.

Quaternary formations expand on the centre of Ishem basin along the rivers and main streams at the foot of hills as well as mountain slopes. They are represented by:

- Proluvium (Qp-h ) that have limited spread at south, southeast and more few at west part of the basin. They generally represent formations formed by streams flowing into major river valleys. Lithology is dominated from sand, gravel and siltstone, with thicknesses of 3.0 – 8.0 m.
- Alluvium (Qh ) are spread at the centre of the basin beginning from Tirana toward northwest of Rinas, Fushë–Krujë to Ishem. These formations composed from gravel, pebble and sand. They are encountered in the earth surface of the terraces of Tirana, Tërkuza, Zeza and Droja rivers. They are expanded at a big surface beginning from Tirana, Rinas, Fushë–Krujë till to Ishem. Their lithology is represented from gravelly sand, with granules and grit which are covered by brown to yellow clay and sand, friable and porous with iron oxide content. Their thickness changes toward the northwest. So, from Tirana to Laknas, it varies from 5.5 m, 20 m to 75 m, while at Fushë–Krujë–Mamurras, their thickness increased, at east to west direction, from 20 m to 101 –119 m. Thickness of clay cover increased from 60-80 m.

In the southwestern part of Ishmi Basin is alluvium of the first terrace of early Holocene, while at outlet of Ishem river are encountered those of late Holocene. They are represented from siltstone, fine sand and more few clays. Along the terraces and valleys of the rivers and their meanders are marshy formations (Qh ) spread at the northwest part of the Basin. They are characterized from the presence of peats and abundant organic material as well as intercalation of clay, siltstone, sand and grits. Based on the Hydrogeological Map of Albania, we distinguish five types of aquifers and rocks in the Ishem Basin:

1. Water bearing layers, wide and porous with high permeability and rich in GW;
2. Water bearing layers, local and poor in GW;
3. Karstic water bearing layers rich in GW;
4. Fissured and porous rocks with low water bearing;
5. Rocks, practically without GW.

**Table 4-7 – Summary of Main Geological Formations and Groundwater Potential**

HYDRO-GEOLOGICAL DESCRIPTION <sup>85</sup> <b>PREVALENT LITHOLOGY</b>	ALBANIA TYPE CODE	EU TYPE CODE	AREA (km <sup>2</sup> )	AREA %	TRANSMISSIVITY (T) (m <sup>2</sup> /DAY) <sup>86</sup>	GROUNDWATER POTENTIAL <sup>87</sup>
Inter-granular porosity. Extensive aquifers, with very high to medium productivity. <b>Sand + gravel, sand + gravel + mud/silt</b>	1	1	156	22.2%	> 10 <sup>3</sup>	Porous – Highly productive
Inter-granular porosity. Extensive aquifers, with very high to medium productivity. <b>Clay + sand + silt + gravel</b>	2	2	0		10 <sup>2</sup> – 10 <sup>-1</sup>	Porous – Moderately productive
Porous/fissured porosity. Extensive aquifers, with medium to very low productivity. <b>Sandstones, claystones, conglomerates.</b>	3	2	0		10 <sup>2</sup> – 10	Porous – Moderately productive
Fissured/carstified porosity. Extensive aquifers, strongly alternating, with very high productivity. <b>Limestones, dolomites.</b>	4	3A	91	12.9%	10 <sup>4</sup> – 10 <sup>-1</sup>	Fissured – Highly productive
Fissured porosity. Extensive aquifers, alternating, with medium to low productivity. <b>Basic rocks, ultrabasic</b>	5	4B	215	30.5%	10 <sup>2</sup> – 10 <sup>-1</sup>	Fractured – Moderately productive
Practically non-aquiferous rocks. <b>Clay formations, flysch, evaporite</b>	6	5	-		< 10 <sup>-1</sup>	Insignificant aquifers. Limited groundwater
Porous/fissured porosity. Localised aquifers, with low to very low productivity. <b>Sandstones, siltstones.</b>	7	5	0		< 10 – 10 <sup>-1</sup>	Insignificant aquifers. Limited groundwater

<sup>85</sup> Harta Hidrogeologjike e Shqipërisë, Ministry of Energy & Industry, Albanian Geological Service, 2015. Albania Type Code corresponds to the GIS .shp file categories

<sup>86</sup> Transmissivity (T) is the rate of flow through unit width of aquifer, defined as hydraulic conductivity (K, m/day) x aquifer saturated thickness (b, m), hence T = m<sup>2</sup>/day

<sup>87</sup> Corresponds to the EU CIS Guidance 2016 Reporting schema element: <Geological Formation>

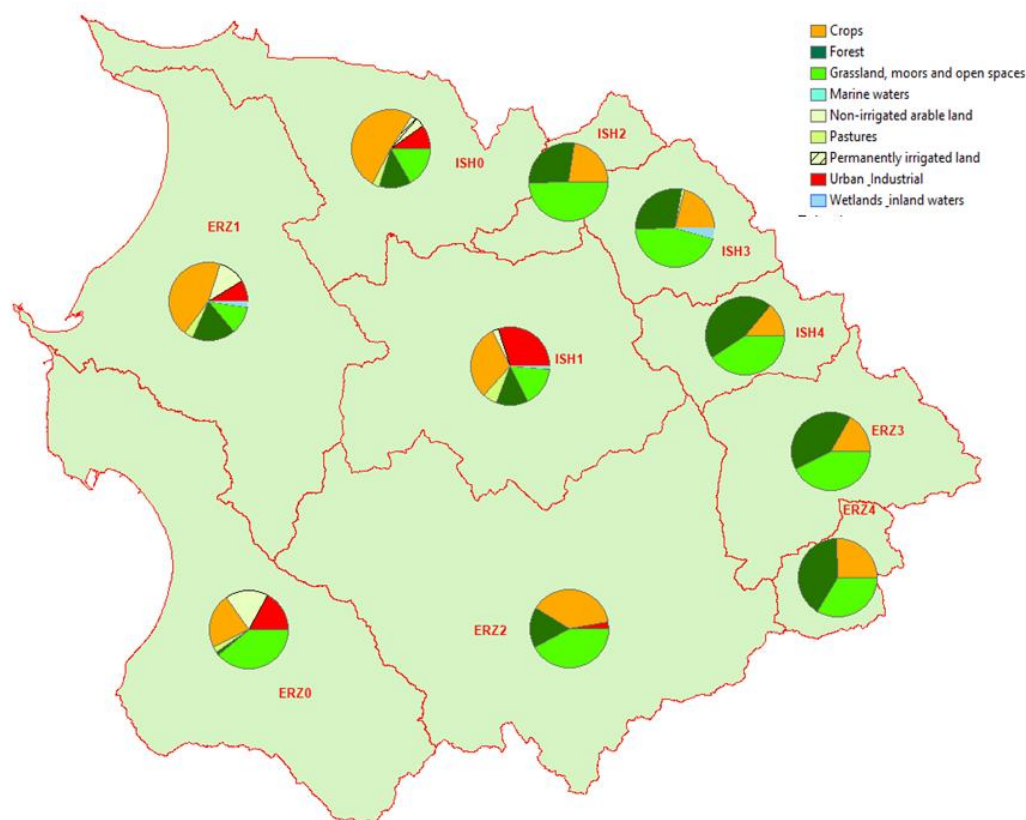
## 4.4 Topography and Land-use

### 4.4.1 Ishem River Basin

Figure 4-6 and Map 4-3 summarises the principal sub-basins and land uses in the Ishem river basin, derived from the EU CORINE land-cover database (2018).<sup>88</sup> The rationale for the sub-basin delineation has been described in the Overview of Significant Water Management Issues report.

Tabela 4.13 summarises key land-use statistics at sub-basin level, including population, the key index flows of  $Q_{50}$  and  $Q_{90}$  where it is possible to calculate them<sup>89</sup>, and a % breakdown of principal land-use types according to the CORINE Land Cover Dataset (2018).<sup>90 91</sup> Irrigated areas are believed to be substantial under-estimates of land actually irrigated.

Figure 4-6 – Principal Land Use Types by Sub-basin



## 4.5 Municipal Districts and Population Distribution

### 4.5.1 Municipal Administrative Units and Population

Figure 4-7 and Map 4-5 show the administration districts and main agglomerations of the river basin. An approximation of population distribution is provided in Table 4-13. The river basin sub-unit boundaries do not coincide with municipal administration boundaries, therefore requiring municipalities to cooperate across topographical watersheds to achieve river basin plan objectives.

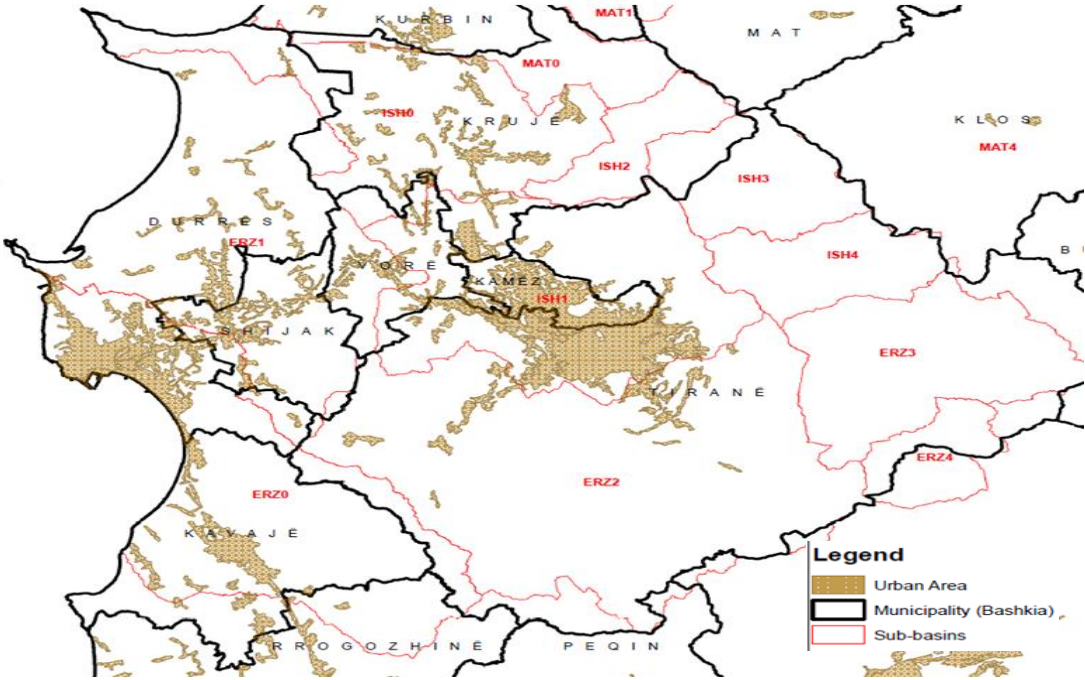
<sup>88</sup> <https://land.copernicus.eu/pan-european/corine-land-cover>

<sup>89</sup> Hydrometric flow data not available after 1995. These values approximated from gauging station data 1960-1995, and applied to sub-basins by simple area correction. These data are not reliable, indicative only.

<sup>90</sup> <https://www.eea.europa.eu/publications/COR0-landcover>

<sup>91</sup> <https://www.eea.europa.eu/data-and-maps/data/copernicus-land-monitoring-service-corine>

Figure 4-7 – Principal Municipal Authorities and Urban Areas



4.6 Principal Water Uses and Infrastructure

4.6.1 Overview

The purpose of this section is to summarise existing major activities or operations (‘artificial influences’ or ‘drivers’) that may have an impact on environmental objectives or the status of specific waterbodies. The extent to which these operations act as pressures at sub-basin level or directly influence status at waterbody level is addressed in Chapter 10.

Of particular importance is infrastructure associated with either large abstractions or transfers of water, since these are likely to be impacting on environmental flow and/or water resource availability at local scale. A detailed assessment of water use infrastructure, water allocation and water abstraction should be provided under the subsidiary Water Resources Management Plan.

Broadly, principal drivers that are likely to influence waterbody characteristics and/or status are defined by the WFD WISE reporting enumeration lists, and formally listed as per Table 4-8 in Annex IV on pressures.

4.6.2 Summary of Water Services

Under WFD definitions, ‘water services’ means all water related operations which provide for households, public institutions or any economic activity and which may have a significant impact on the status of water:

- (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater
- (b) wastewater collection and treatment facilities which subsequently discharge into surface water

Table 4-8 provides an overview water balance of the main sectors as required by WFD Article 9(1). Of particular importance with respect to environmental impacts of the “water services” and cost-recovery of environmental and resource costs specifically is the parameter of ‘consumption’, which in simple terms is the volume permanently lost from the river basin due to economic activity. Water services also potentially fundamentally impact on the internal water balances of water sources, whereby abstracted surface water may be transferred to groundwater after use, and vice-versa.

**Table 4-8 – Summary of Main Sectoral Abstractions, Uses of Water and Consumption**

SECTORAL DATA	SURFACE ABSTRACTED <sup>92</sup> (million m <sup>3</sup> )	GROUNDWATER ABSTRACTED <sup>93</sup> (million m <sup>3</sup> )	RETURNED TO SURFACE <sup>94</sup>	RETURNED TO GROUNDWATER <sup>95</sup>	Σ RETURN (MCM)	CONSUMPTION (MCM) <sup>96</sup>	EXPLOITATION INDEX WEI (%) <sup>97</sup>	WATER SERVICE UNITS <sup>98</sup>	GVA € M
HOUSEHOLDS <sup>99</sup>	70.00	30.35						Population	
INSTITUTIONAL	-	-						Units	
COMMERCIAL	-	-						Megawatt Hours	
INDUSTRIAL <sup>100</sup>	0	0.419353						Units	
AGRICULTURE <sup>101</sup>	43.002	0.3775						Hectares	
HYDROPOWER	36.795	0						MWh	
OTHER		0.0459							
<b>TOTAL</b>	<b>149.80</b>	<b>31.20</b>							

<sup>92</sup> Defined as water abstracted for use internal to the basin or exported to an adjacent basin from rivers, reservoirs and springs (but based on production data)

<sup>93</sup> Defined as water abstracted for use internal to the basin or exported to an adjacent basin from below ground sources (but based on production data)

<sup>94</sup> Defined as the total water quantity (whether from surface water and/or groundwater) that is returned or imported to the surface water system. Estimate only.

<sup>95</sup> Defined as the total water quantity (whether from surface water and/or groundwater) that is lost, returned or imported to the groundwater system.

<sup>96</sup> Defined as the difference ( $\Sigma$  water abstracted –  $\Sigma$  water returned) and conforms to UN SEEAW definition that "Total abstraction = Total returns + Consumption"

<sup>97</sup> Defined as Water Exploitation Index (WEI+) = [(Abstractions + Exports) – (Returns + Imports)] / Annual renewable water resource

<sup>98</sup> Defined as the number of service units supplied with water: population, population equivalent, irrigated hectares, megawatt hours

<sup>99</sup> Based on published water utility data for Tirana, Kruje water utilities - Enti Rregullator I Ujit (ERRU), Raport Bilanci i Ujit i Shoqërive UK 2018.

<sup>100</sup> Defined as major activity generally utilising own sources of water

<sup>101</sup> Agricultural consumption includes transmission losses by evaporation and evapotranspiration demands of irrigated crops

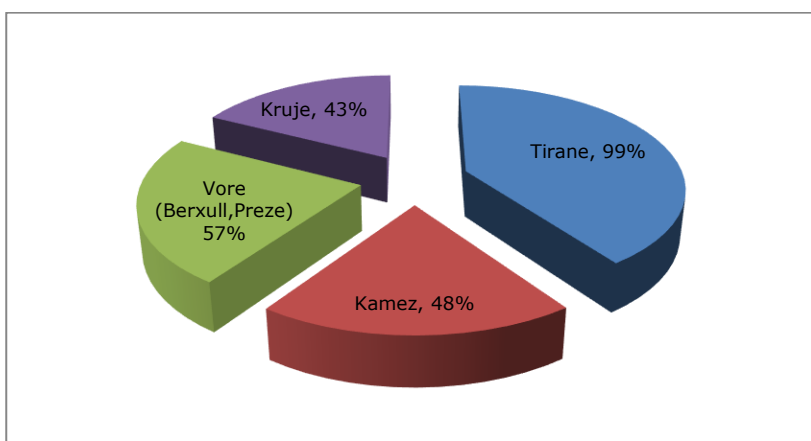
### 4.6.3 Infrastructure Related to Drinking Water Abstraction

The water supply is one of the sectors of a particular importance and high sensitivity, as it directly affects the quality of life of the citizens.

In Ishem River Basin currently operate 4 public water utilities which supply drinking water to only a part of the population living in the basin. Only 2 water utilities (U.K. Kruje, U.K. Kamez) operate within the river basin territory; the other two ones (U.K. Tirana, U.K. Vora) operate partly in the Ishem river basin territory and partly in the Erzeni river basin territory. In particular referring to Tirana, only a minority of its customers (about 10%) are situated outside the Ishem RB, the rest are within its territory.

These utilities are subject to monitoring by the Agency for Water Supply, Sewerage and Waste Management (AKUM), through performance assessment of the services provided against technical and financial key performance indicators. Additionally, utilities have signed performance contracts with their respective municipalities to show as such their accountability on the service provided. Recent data indicate that about 87% of the population of the basin is connected to a water supply network. The service continuity is significantly higher in urban areas in comparison to the rural areas nevertheless the values are quite low across the river basin

**Figure 4-8 Population served with water supply for each Municipality belonging to Ishem RB.**



The population compensate for low values of the “continuity of service” by purchasing and installing water pumps and water storage tanks that fill up when the distribution system is under pressure. The main factors that cause this low continuity of water supply are the loss of water from un-metered over-consumption, illegal connections, and technical losses in the networks due to leakages / aged infrastructure.

The safety of water supplies is affected by the protection of sources, which are largely wells and natural springs in the Ishem RB, and the chlorination of supply entering the distribution systems. There is national policy (laws and regulations) addressing the natural spring protection, and well head/well field protection. The final aim of these regulations is that no water source contamination has occurred at the sources. Despite the safety measures applied at the sources, all water utilities in Albania apply continuous chlorination treatment to eliminate contamination from micro-organisms that could find their way into the distribution network. The safety of the water supply is monitored by the Institute of Public Health (IPH). The IPH tests for residual chlorine at various points of use, as well as for faecal coliform bacteria.

The Table 4-9 provides data on the water supply system and related companies operating in Ishem River Basin Area.

Table 4-9: Water supply and sanitation in Ishem River Basin District<sup>102</sup>

County	Municipality	Administrative Unit	Urban/ Rural	Population	Population served with water supply	Water Connections	Coverage	Continuity of Water Supply Service	Water Utility
TIRANE	Tirane	Tirane, Dajti, Zall Bastar, Zall Her, Kashar	U+R	782,750	774,474	233 946	99%	15.4	Sh.a U.K Tirane
	Kamez	Kamez, Paskuqan	U+R	137,886	65,880	15 976	48%	4.0	Sh.a U.K Kamez
	Vore	Berxull, Preze	U+R	14,600	8,250	1 835	57%	8.0	Sh.a U.K Vore
DURRES	Kruje	Kruje, Fushe-Kruje, Thumane, Bubq, Cudhi, Nikel	U+R	80,807	35,140	6 126	43%	8.0	Sh.a U.K Kruje

The performance indicator on service continuity, for 2020 remained at the average of 13.8 hours/day, which is considered very low for the quality of the services to the customers. In the basin area are many utilities providing less than the above average, such as UK Kamez, UK Kruje and UK Vore supplying drinking water from 4 to 8 hours a day. This indicator, besides the aspects of the low level of service provided, is related to the problems of public health risk from the possibility of entering the groundwater pipelines under negative pressure created while the pipelines are empty.

Drinking water supply system for households, companies and institutions includes (i) Abstraction, (ii) Storage, (iii) Treatment, and (iv) Distribution. The only source of water used both for households and industrial uses is groundwater (*captured at springs or pumped from wells*). The only exception to this practice is the U.K. Tirane, which uses surface water from Lake Bovilla. The water is then treated at the Water Treatment Plant, with a production capacity of 1800 l/s. The Bovilla water treatment plant expanded with a storage capacity of 15,000 m<sup>3</sup> with parameters identical to that of the existing plant, with total production capacity 3000 l/s.

Groundwater is subject to climatic, morphological, hydrological, geographical and anthropogenic factors. The most important factor, on which groundwater levels rely, is precipitation. The water is in good quality and does not require any secondary treatment: disinfection (by chlorination) only is sufficient. Therefore, industrial activities also benefit from the good water quality at a low cost, even if provision of lower quality of water would often be more than enough for their purposes.

<sup>102</sup> Water Regulatory Authority (Performance Report of Water Supply and Sewerage Companies for 2019 and 2020)

For each well, a protection zone is usually identified by water utilities. However, these areas are usually too small, and the average distance of the wells from residential houses is too little for establishing a reliable protection.

Table 4-10 shows the level of water tariffs, which are below an efficient and sustainable level. To remedy this situation, future action includes an ambitious program of efficiency improvements comprised of enhanced efficiency with respect to energy use, staff and other operational efficiency, collection efficiency and decreases in non-revenue water. Customers generally might accept an increase in the price of a given service only when such service has been substantially improved. In any case these tariffs can be increased only to a limited level based on the affordability to pay by the average households. At such a tariff level, the free cash flow from operations can finance approximately half of the investments needed over the 20-year period to 2040. The remaining must be funded by bridge funding in through loans and grants for capital investments.

Currently, there is very little commercial funding available to the sector. International experience illustrates that even with an appropriate legal and institutional framework, commercial financing of the water supply and sewerage (WSS) sector in Albania (whether in the form of loans, concessions or other PPPs) will only be possible if very substantial tariff increases have been introduced to generate a cash flow that supports debt repayments.

**Table 4-10 - Water fee tariffs for each water supply and sewerage in the Ishem River Basin**

Water Utility	Drinking Water lek/m3			Fixed tariff lek/client/month			For wastewater		
	Family	State	Private	Family	State	Private	Family	State	Private
U.K Tirane	65	140	155	200	200	200	11	30	35
U.K Vore	65	140	155	200	200	200	15	30	35
U.K Kamez <sup>103</sup>									
U.K Kruje	35	80	100	100	200	200	8	12	12

#### 4.6.4 Infrastructure Related to Wastewater Treatment

At present most of the water utilities which offer sewerage service to customers in the Ishem-RB have a sewage network, at least in urban areas, and also collect some of the wastewater in the area. The coverage of the sewage network is much lower than the coverage of the water supply network. In urban areas, wastewater is mostly collected through public sewers. Sewer systems are combined ones, hence collecting together wastewater and storm water. Due to poor maintenance of sewage canals and small dimensions of the pipes, leakage from these channels often is the risk of contamination of drinking water. In many suburban areas and rural areas of cities there is lacking of sewerage systems and wastewater are collected in septic tanks.

In rural areas extensive dispersed settlements are found. Households use their own means of wastewater discharge, usually collecting them to septic tanks, and using private trucks for removing them away from the settlements. Large demographics inflows have brought overpopulation of the cities and suburban areas, the population of areas close to rivers, leading to increased untreated urban and industrial water discharges therefore increasing the level of pollution in surface waters. In the big

<sup>103</sup> Tariffs not yet approved by the ERRU.

cities with high population densities and in coastal areas, where socio-economic activities are more intensive in comparison with the rest of the country, the problem of surface water pollution is more acute.

The existing sewer system for Tirana and Kamez are planned to use at maximum. For new area where there is no public sewer system, a separate sewer system is planned.

The Table 4-11 provides a snapshot of the current situation in relation to wastewater collection in the basin.

**Table 4-11 - Current situation in relation to wastewater collection in the Ishem river basin area**

Region	Municipality	Administrative Unit	Comment
<b>TIRANE</b>	Tirane	Dajti	The partial sewerage system and then discharged without treatment.
	Tirane	Zall Bastar	No sewerage connection.
	Tirane	Tirane	The existing wastewater collection system is a combined sewerage system for the drainage of mixed domestic wastewater and storm water. This system is discharged in the Lana and Tirana river. The existing sewer system is planned to use at maximum. For new area where there is no public sewer system, a separate sewer system is planned. The WWTP of Tirana is under construction, but the works for its construction have been suspended.
	Tirane	Zall Her	No sewerage connection.
	Tirane	Kashar	The partial sewerage system and then discharged without treatment.
	Kamez	Kamez	The wastewater system covers only the area of the city Kamez. The existing wastewater collection system is a combined sewerage system for the drainage of mixed domestic wastewater and storm water. This system is discharged in the river Tirana. The existing sewer system is planned to use at maximum. For new area where there is no public sewer system, a separate sewer system is planned.
	Kamez	Paskuqan	The partial sewerage system. Wastewater are collected from the public network and then discharged in the river Tirana, without treatment.
	Vore	Berxull	No sewerage connection.
	Vore	Preze	No sewerage connection.
	<b>DURRES</b>	Kruje	Cudhi
Kruje		Nikel	No sewerage connection.
Kruje		Bubq	No sewerage connection.
Kruje		Kruje	The existing wastewater collection system is a combined sewerage system for the drainage of mixed domestic wastewater and storm water. This system is discharged without treatment.
Kruje		Fushe-Kruje	The wastewater system covers only the area of the city Fushe-Kruje. Wastewater are collected from the public network and then discharged in the river Zeze, without treatment.

	Kruje	Thumane	The wastewater system in the Administrative Unit of Thumane cover only in part of the population and this mainly in the area of the city Thumane.
	Durres	Ishem (partial)	No sewerage connection.

In the entire Ishem River basin there is no operational wastewater treatment plant. All sewer pipes discharge directly into the closest water body without treatment. The wastewater treatment plant (WWTP) of Tirana is under construction, but the works for its construction have been suspended. The WWTP of Tirana is under construction. It is situated in Tirane, near Kashar financed by the JICA, (8,168,997,956 JPY construction + 1,555,999,618 JPY supervision). The construction works of the WWTP of Tirana are currently suspended.

The WWTP is equipped with the biological system of Trickling filter and continuous inflow comparable with European standards. It occupies a total area of about 53 ha and is designed for treating sewage water for 345 000 residents. The Sewerage Master Plan for Greater Tirana proposes two WWTPs, one in Kashar and the other in Bexhulle. Both plants use a trickling filter process which requires a larger site area but requires less sophisticated operation and maintenance technology than the alternative activated sludge process.

Sewage treatment produces sludge on a daily basis. Sludge is removed from primary and secondary sedimentation tanks. It is then thickened and digested. This can be carried out by naturally drying the sludge or by undertaking mechanical dewatering. Natural drying (using drying beds) requires a large area, but the energy requirements are low. The study proposes that natural drying be implemented to the extent possible within site area constraints. This would result in less energy, and therefore a lower operational cost. The area covered by the sewerage plan includes all or part of the following areas: 1) Tirana municipality, 2) Kamza municipality, 3) Kashar, 4) Paskuqan, 5) Bexhulle. The planning area was defined with consideration of the location of existing houses and buildings, topography, extent of the river basin, boundary of municipalities/communes, piped water supply area and the Strategic Plan.

#### 4.6.5 Infrastructure Related to Irrigation

The total area of agricultural land in Albania is 657,000 ha<sup>104</sup>, which covers 23% of the country, where 80% of which is under private ownership and 20% is state owned. The main crops are vegetables, fruit trees and vineyards, grains and olive groves.

Agriculture in Albania requires additional water for irrigation in summer since rainfall during this season is only about 20% of the total annual precipitation. Water deficits between June and August vary between 400 and 500mm, making irrigation necessary for effective crop production. On the other hand, drainage is important during winter, to alleviate flooding, erosion and water logging.

A considerable irrigation and drainage systems disintegrated due to lack of investment together with insufficient budget for operation and maintenance. Moreover, land privatization generated, at national level more than 400,000 small farms (between 0.5 and 3.0 ha). These small private farms have fundamentally changed the character of agriculture and complicated the agriculture services including irrigation process. In response, the Government of Albania adopted a policy allowing for the transfer of the operational responsibilities of secondary irrigation canals to the water users.

Currently, the State is the owner of the irrigation schemes, meanwhile the operation and maintenance of the schemes is delegated to the municipalities. But the law Nr. 24/2017 provides room for the transfer of this right to the Water User's Associations, Agricultural Collaborative Associations, or other means of transfer that can be done through a Decision of the Council of Ministers.

The Water Users' Associations (OPU) are farmer's voluntary associations, which are established and carry out activities according to the provisions of law Nr. 24/2017. The OPU is a legal entity, self-

<sup>104</sup> Ministry of Agriculture and Rural Development

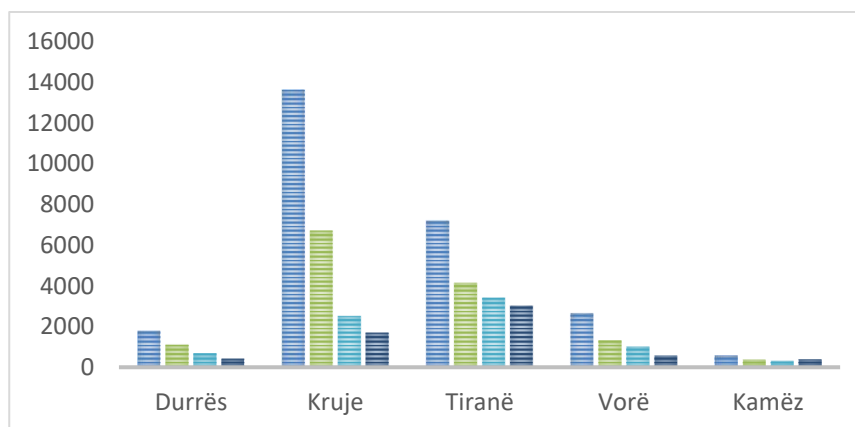
financing, for non-profitable purposes. Till now no OPU have been formalized yet. The farmers are currently supplied with water provided through irrigation schemes and public water resources managed by the municipalities. There are also farmers who irrigate outside of these irrigation schemes. There is no information available for these ones.

In this basin, irrigation management is performed by 4 municipalities (Kruje, Kamez, Vore and Tirana), where some of them are entirely located within the territory of the basin, while the rest only partly, because they do not fall fully within the given river basin. The Directorate of Irrigation and Drainage of Durres operates in the Ishem River Basin.

The agriculture land in Ishem river basin, according to the MARD is about 26,000 ha. The area where the farmers have access to irrigation is about 8000 ha, against the irrigation potential area which is about 14000 ha. In 2020 the area of irrigated lands in this basin is approximately 6000ha.

At RB level, approximately 54% of agriculture land is irrigation potential area and 31% of agriculture land is irrigated land (23% in 2020). Figure 4-9 shows the situation for each municipality in the Ishem River Basin.

**Figure 4-9 – Total of arable land, Irrigation potential and Irrigated land in 2020 for each municipality in the Ishem River Basin**

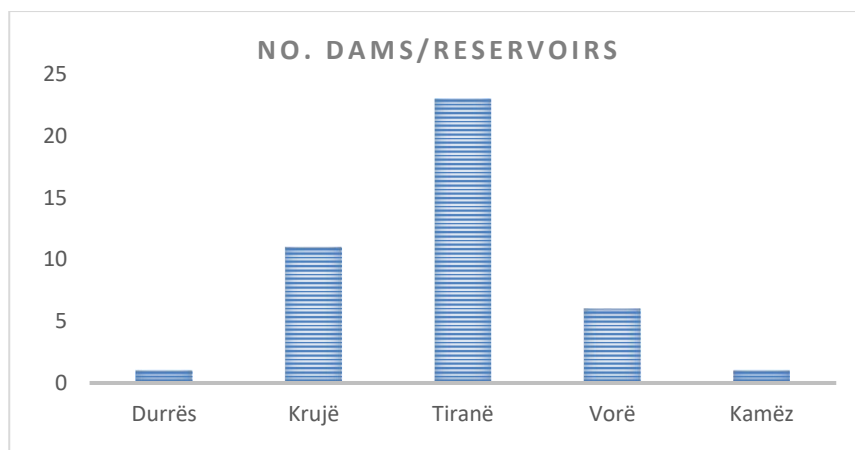


Due to rapid infrastructure development during the last decades, currently only a part of arable land can now be irrigated or used permanently for agriculture production. Figure 4-9 shows that the percentage of irrigated land in the Ishem River Basin varies from 20%-56%.

The water sources of irrigation are irrigation reservoirs, rivers or groundwater using pumping stations. The type of irrigation is either by gravity or pumping stations, or sometimes a combination of both. The main irrigation method is irrigation through open canals or furrow irrigation, which distributes water thorough a secondary and tertiary network. Large scale irrigation is mainly practiced in the flat and coastal areas, where most of the irrigation scheme is currently amortized. There are many minor irrigation schemes in the Ishem basin, but most of them are currently not operational. In Ishem River Basin there are about 416 km main irrigation canals (256 km primary canals and 160 km secondary).

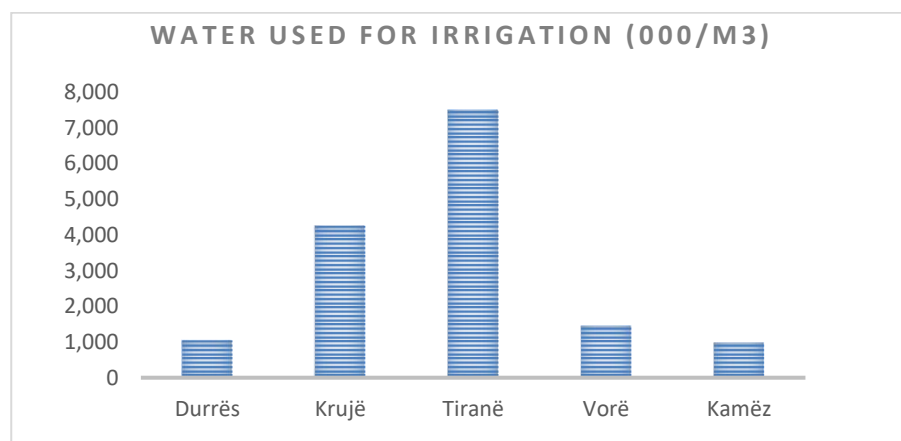
In general surface water is used as source for irrigation, with the Ishem and Zeza Rivers as major source. Upstream of the Ishem basin several reservoirs have been constructed for irrigation purposes in order to meet the demand. There is a total of 42 irrigation dams (reservoirs) in Ishem River Basin (Figure 4-10). Based on the data available the initial designed capacity of irrigation reservoirs, after more than 40 years of life operating is reduced about 50%.

**Figure 4-10 – Irrigation dams for each municipality in the Ishem River Basin**



For the last irrigation season (2020) based on the planted areas and the applied irrigation norms (water in the plot for surface irrigation), at national level, there is approximately 473 million m<sup>3</sup> of water available for about 182 000 ha irrigated area. The total water volume, in Ishem river basin used for irrigation is approximately 15 million m<sup>3</sup> for about 6,000ha irrigated area with the Tirana being the biggest user of water for irrigation (season 2020). Figure 4-11 shows the situation for each municipality in the Ishem River Basin.

**Figure 4-11 – Water volume used for irrigation in 2020 for each municipality in the Ishem River Basin**



One critical factor contributing to the vulnerability in the agricultural sector is the excess of water during floods events, which is causing damage to agriculture production by limiting crop growth or destroying the plants. The drainage service is built mainly before 1990s. Due to rapid infrastructure development during the last decades, the drainage service currently covers only a part of the agriculture land. In Ishem River Basin there are about 486 km main drainage canals and about 17,615 ha of drainage network system.

Based on the water resources and irrigation infrastructure in the Ishmi River Basin, measures have to be taken to decrease vulnerability and so increase flexibility of agriculture. These measures are mainly related to modernization of agriculture (adopting Best Practices), improvement of irrigation and drainage infrastructure and introducing the new method of irrigation (spring and drip irrigation).

#### **4.6.6 Infrastructure Related to Hydropower**

There are 4 hydropower plants in the Ishem river basin, which 3 of them are in operation and 1 of them is under construction. The total set power is 7.14 MW. The installed flow is 5.91 m<sup>3</sup>/sec. The mean annual flow is 4.496 m<sup>3</sup>/sec. (see Technical Annex III).

#### 4.6.7 Infrastructure Related to Installations under the IED Directive <sup>105</sup> (integrated pollution prevention and control)

Directive 2010/75/EU on industrial emissions (IED) applies to the operations-installations from different industrial sectors and introduces set of rules in order to prevent, reduce and as far as possible eliminate pollution arising from industrial activities in compliance with the 'polluter pays' principle and the principle of pollution prevention. Operations of the installations shall be based on the best available technology (BAT) which is developed for specific industrial sectors.

Directive 2010/75/EU on industrial emissions (IED) is transposed only partially by a large number of legal acts which cover different parts of the directive. The legal framework for industrial pollution includes the following main acts:

- Law no. 10448, dated 14.7.2011 "On environmental permits", as amended, is partially aligned with the Industry Emissions Directive 2010/75 / EU, thus further actions are needed for its transposition.
- Law no. 10431 dated 9.6.2011 "on the Protection of Environment", as amended
- Law no. 10463, dated 22.09.2011 "on Integrated Waste Management", as amended
- DCM no. 419, dated 25.6.2014 "On the approval of special requirements for the examination of environmental permit applications of types A, B and C, the transfer of permits from one entity to another, the conditions for the relevant environmental permits, and the detailed rules for their scrutinizing by the competent authorities until the issuance of these permits by the National Licensing Centre", partially transposes Directive 2010/75/EU, of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
- DCM no. 178 of 6.3.2012 "on Waste Incineration".

The main problems are related to the BAT and the Emission Limit Values regarding their transposition and implementation. However, permitting of the installations which are under the scope of this directive is not integrated and still the same installation should receive several permits in order to be able to operate. Permitting is not fully compliant with all legal requirements and there is no independent monitoring of industrial pollution. The limited data on industrial pollution relies on companies' self-monitoring and declaration. There is in place a procedure to apply, deliver and control the permitting process from the central level to the local level, by three levels of application - national (MTE and NEA), regional branches of NEA and the Inspectorate and requirements of self-monitoring reports prepared by the operators themselves. However, implementation of BAT or referring to it is missing.

It is estimated that about 20 installations are under the scope of the IED, thus, installations equipped with environmental permits of type A, referring to the definitions of national legislation in force, however there is no register of these installations, nor their level of implementing the directive's requirements is assessed. NEA is responsible for monitoring implementation and compliance with the environmental standards during the permitting process (issuing Type A & B environmental permits). Furthermore, a map with relevant coordinates is missing where all industrial installations equipped with environmental permits are located, at least those of type A, which makes it difficult to identify them and assess the pressure they exert on water basins and to identify their cumulative impact on Ishem river basin. In addition, data on pollutant discharges from these installations into surface or groundwater are missing.

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<sup>105</sup> European Commission – Directive 96/61/EC - concerning integrated pollution prevention and control

This directive is not in force anymore. it has been repealed by DIRECTIVE 2010/75/EU on industrial emissions (integrated pollution prevention and control)

#### 4.7 Basin, Waterbody and Database Unified Coding System Proposed for Albania

Implementation of a logical national coding system for Albania is beyond the scope of this RBMP; however, it has been necessary to impose a workable coding system for all water management related objects within the river basin, and the coding system, innovative and powerful, may serve as a useful model for other river basins. The approach used logically harmonises river basins (at EU level), waterbodies, monitoring locations, pressures and measure in a consistent numerical coding system and is summarised in Technical Annex II.

In summary, the numerical coding system used for the Ishem River Basin Management Plan is based on the European wide Catchment Characterisation and Modelling (CCM) datasets, within which every major river and catchment in Europe has a unique reference code.<sup>106 107</sup> River basins are identified in a clockwise rotation relevant to the receiving ocean (Mediterranean, M) and sea (Eastern Mediterranean, 4).

With respect to the identification of specific waterbodies, the more technically competent Member States are generally using the Pfafstetter coding system. This system has been recommended by the GIS Working Group under the CIS and is described technically in this reference.<sup>108</sup>

The European commencement code for the Ishem river basin has been determined from GIS analysis to be **3514**. Referring to Technical Annex II is the map for Mediterranean Elements of the CCM European Basin Coding System (Figure 4 14)

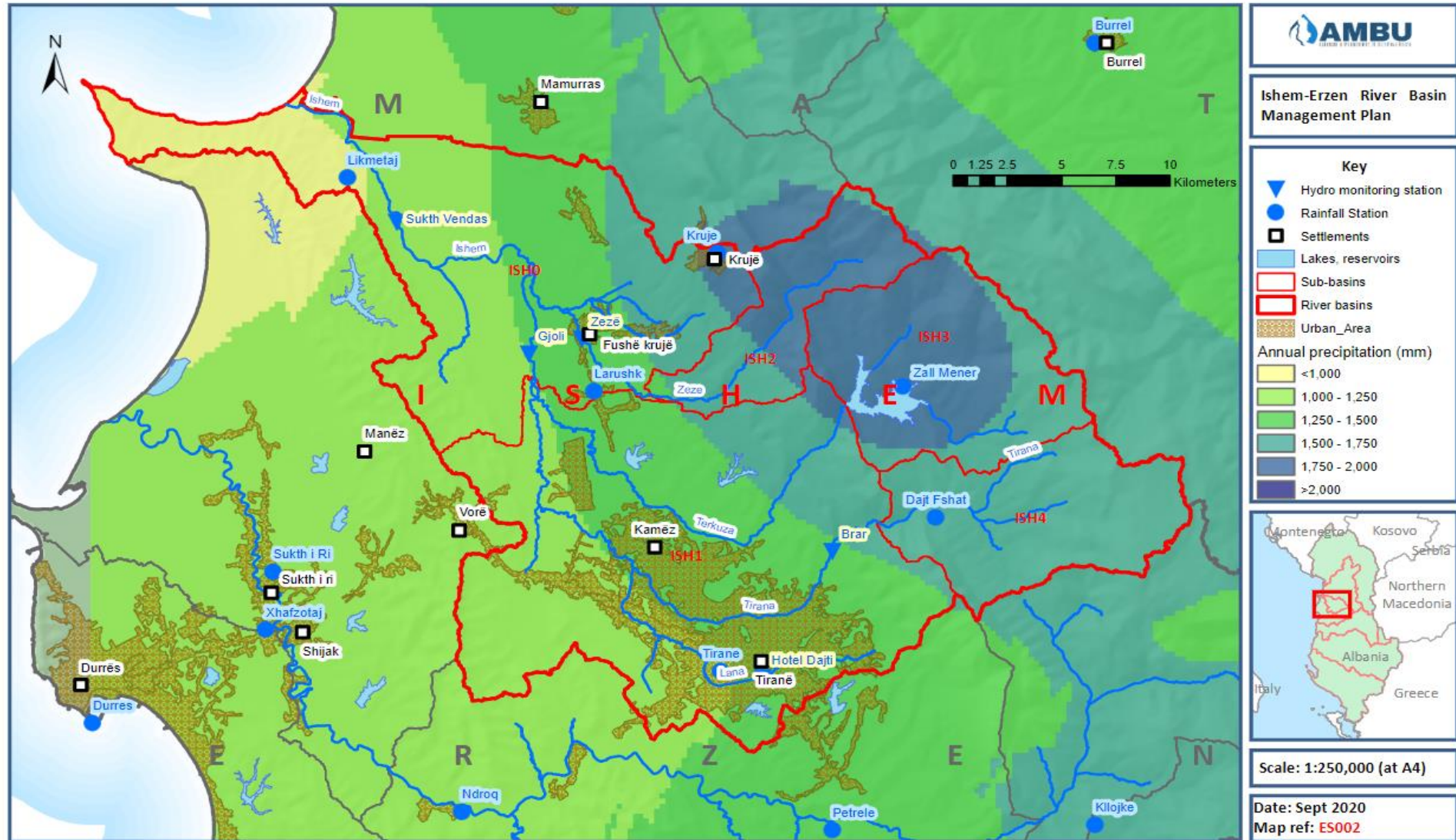
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<sup>106</sup> <https://ec.europa.eu/jrc/en/publication/reference-reports/pan-european-river-and-catchment-database>

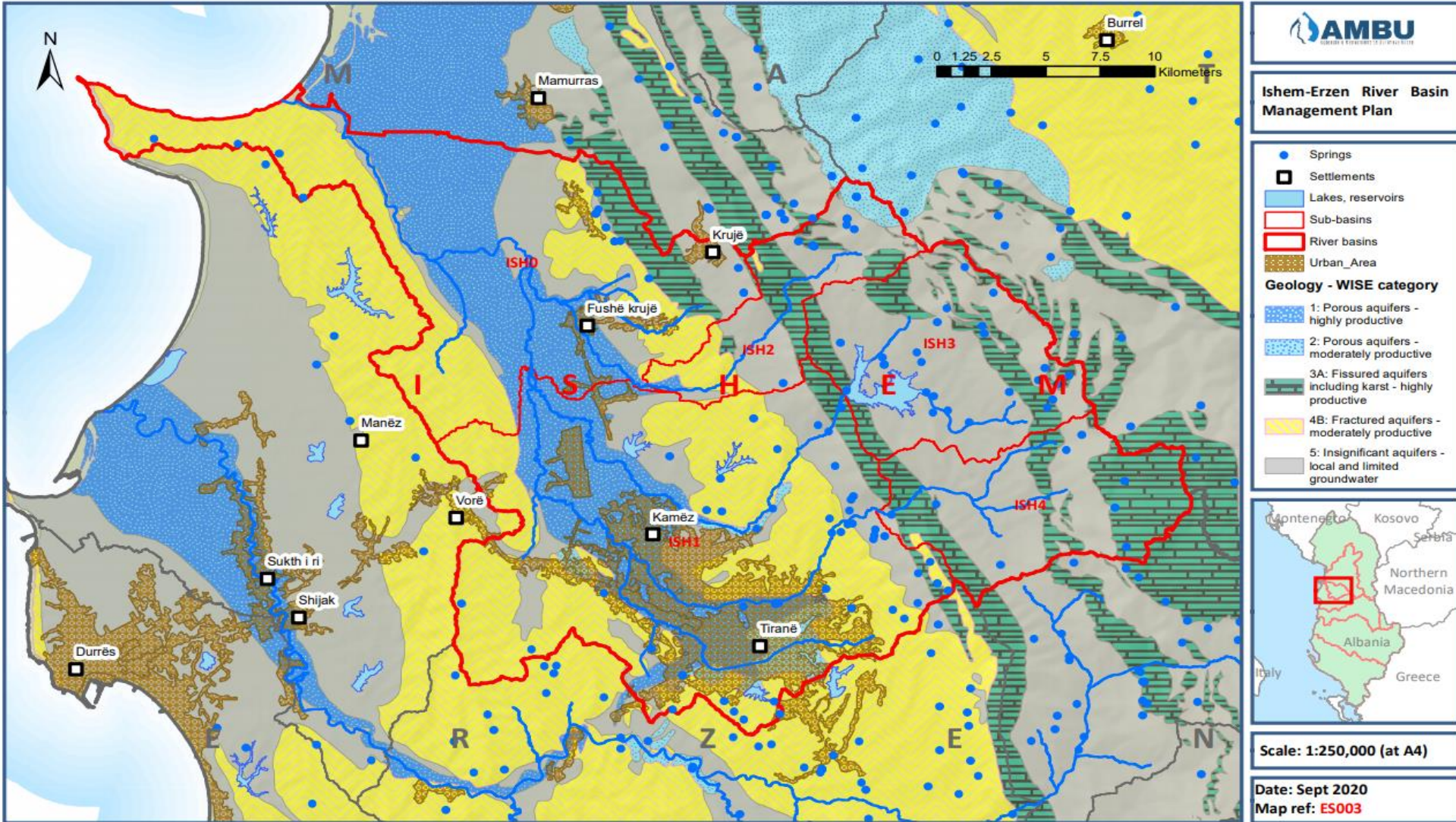
<sup>107</sup> European Commission - A pan-European River and Catchment Database, JRC 2007

<sup>108</sup> De Jager, A.L. & Vogt, J.V. (2010) - Development and demonstration of a structured hydrological feature coding system for Europe, Hydrological Sciences Journal, 55(5) 661-675.

Map 4-1 – Precipitation Distribution, Main Rivers and Hydrometric Networks



Map 4-2 – Principal Hydrogeological Formations

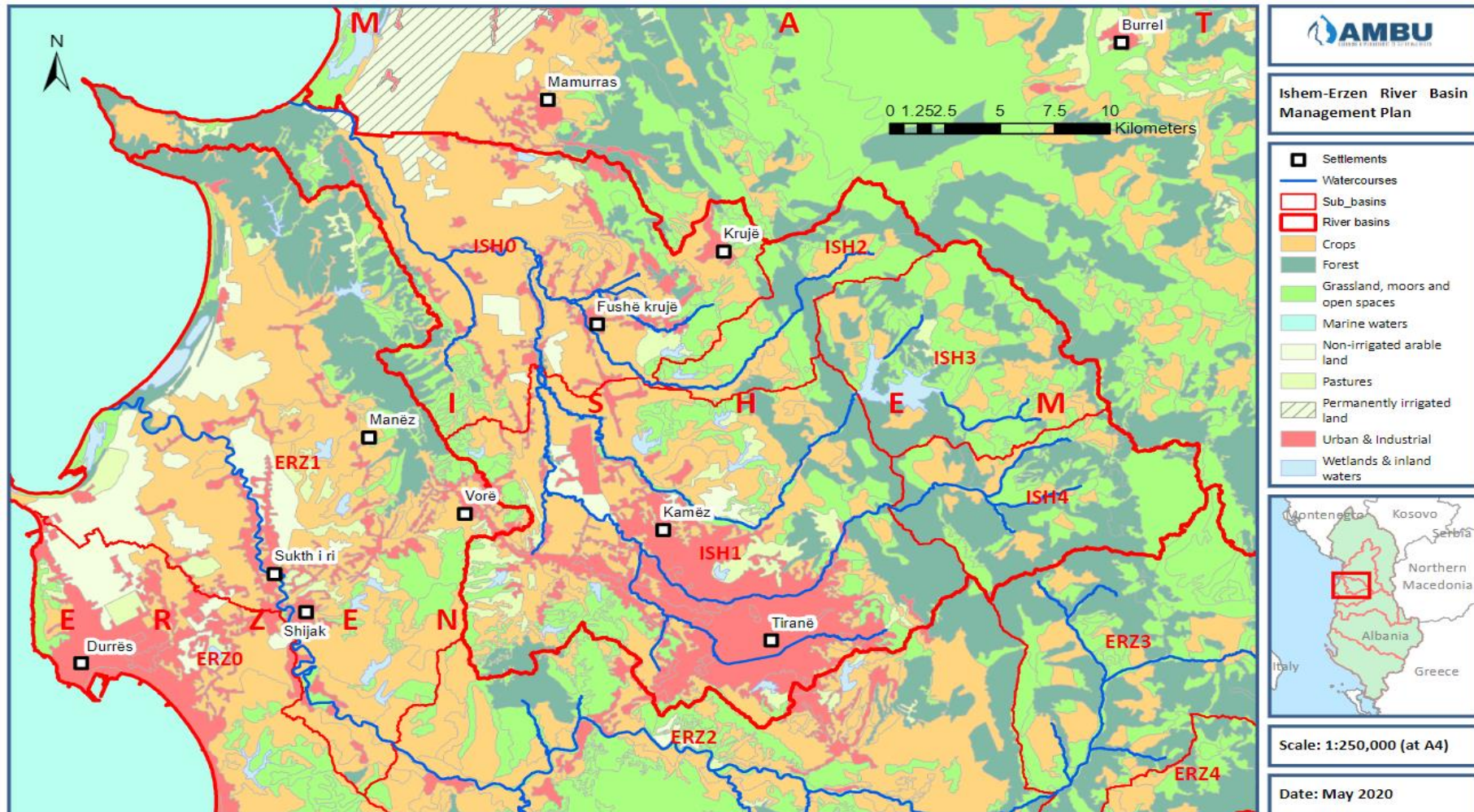


**Table 4-12 – Summary Key Statistics for the Ishem Sub-basins**

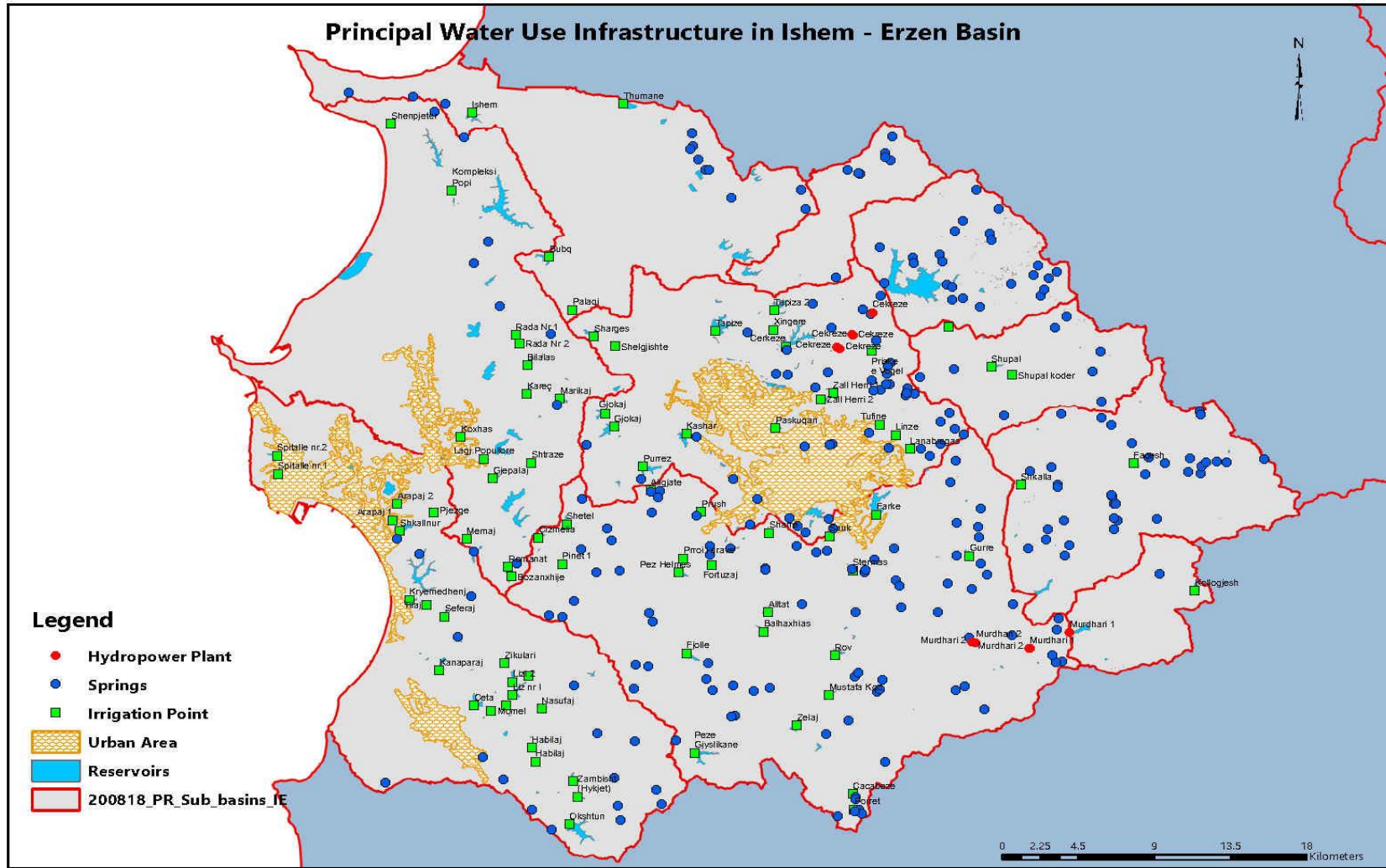
ISHEM	Area (km <sup>2</sup> )	Annual P (mm)	Q50	Q90	Population <sup>109</sup>	Urban Area (%)	Arable Area (%)	Irrigated Area (%)	Permanent Crops (%)	Pasture (%)	Forests (%)	Natural Areas	Water Bodies	Marine Waters
ISH0	213	1279	4.21	1.56	51,816	10.11	3.31	2.44	51.26	2.77	12.99	16.74	0.31	0.07
ISH1	286	1351	4.99	1.84	683,373	29.78	2.51	0.00	31.00	6.08	12.96	16.45	1.23	0.00
ISH2	51.6	1749	1.08	0.41	531	0.00	0.00	0.00	22.29	0.00	27.89	49.26	0.57	0.00
ISH3	94.4	1795	3.28	2.02	852	0.00	0.00	0.00	21.03	1.51	27.94	45.05	4.47	0.00
ISH4	80.7	1578	3.21	2.16	591	0.00	0.00	0.00	13.72	0.00	45.47	40.81	0.00	0.00
<b>Total</b>	726	1441	16.77	7.99	737,163									

<sup>109</sup> Based on Census 2011 data and INSTAT 2019 forecast at Bashkia level, and GIS derived weighted approximation of urban v rural populations within sub-basins

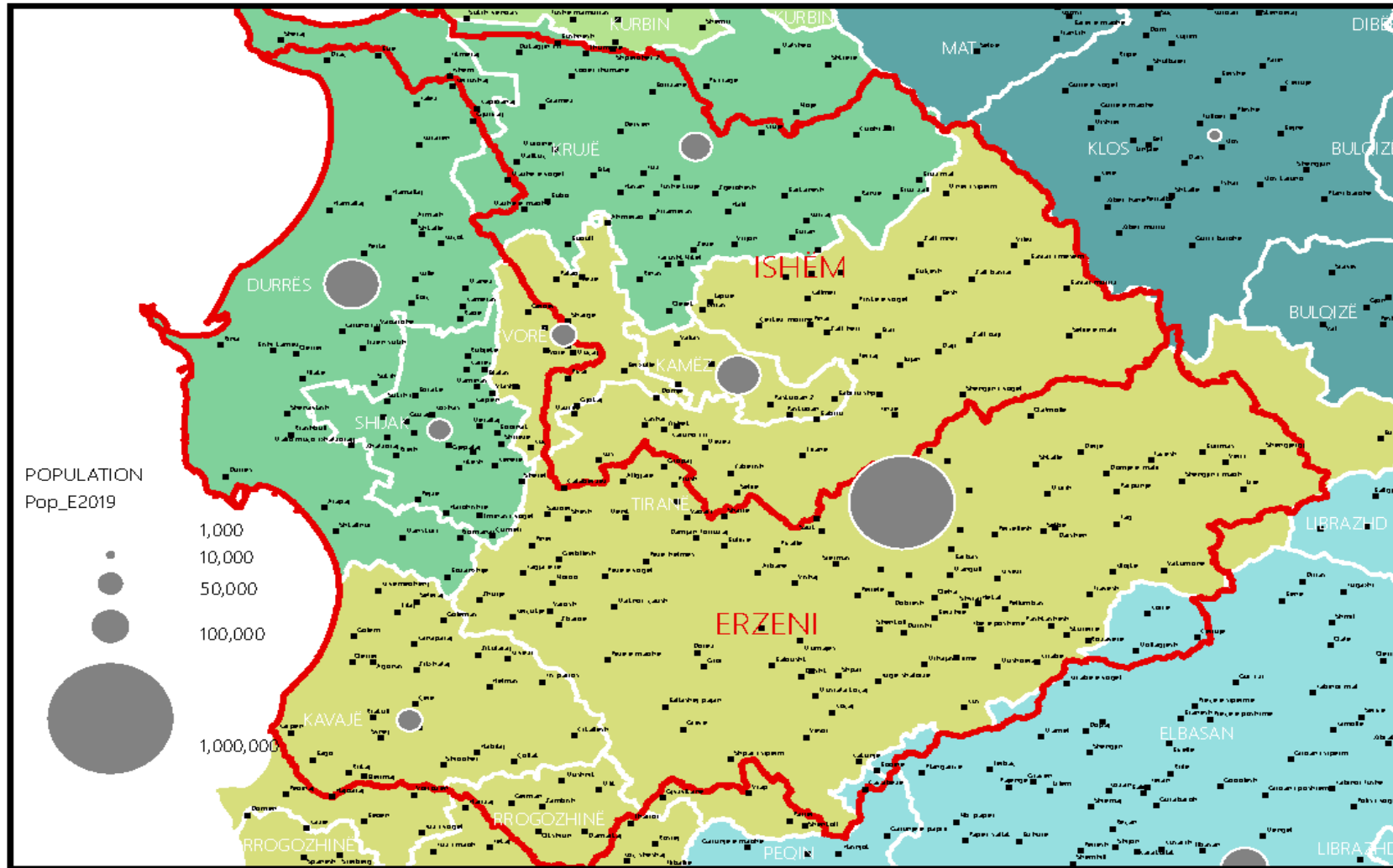
Map 4-3 – Sub-basins and Land Use



Map 4-4 – Principal Water Use Infrastructure in Ishem Basin



Map 4-5 – Population by administration districts and main agglomerations of the river basin



# 5 Characterisation and Delineation of Surface Water Bodies

## 5.1 Overview

### 5.1.1 European Union

WFD establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. The success of the application of the directive in achieving this purpose and its related objectives will be mainly measured by the status of “waterbodies”. Waterbodies are therefore the fundamental units that must be used for analysis, reporting and assessing compliance with the directive’s principal environmental objectives.<sup>110</sup> Each waterbody should be a coherent sub-unit in the river basin (or river basin district) to which the environmental objectives of the directive apply. Hence, the main purpose of identifying waterbodies is to enable the status to be accurately assessed and compared to environmental objectives i.e. a waterbody must be capable of being assigned to a single ecological status class with sufficient confidence and precision through the monitoring programmes.

## 5.2 Categorisation and Typology of Surface Waterbodies

### 5.2.1 Surface Waterbody Categories

The waterbody characterisation is clearly defined in the WFD<sup>111</sup>. Surface waterbodies within the river basin district must be identified as falling within either one of the following surface water categories - rivers, lakes, transitional waters or coastal waters or as artificial waterbodies or heavily modified waterbodies. Each of these categories must be identified and reported separately within the framework of the RBMP

**River** water bodies are defined under WFD Article 2(4) as bodies of inland waters flowing for the most part on the surface of the land but which flow underground for part of its course.

**Lakes** are defined under WFD Article 2(5) as bodies of inland standing waters.

**Transitional waters** are defined under WFD Article 2(6) as bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows in terms of flow regime or salinity. Transitional waters are usually characterised by their morphological and chemical features in relation to the size and nature of the inflowing rivers.

**Coastal waterbodies** are defined under WFD Article 2(7), and extend 1 nautical mile (1852 m) from the landward edge.<sup>112</sup> All Transitional and Coastal waterbodies in Albania lie within Ecoregion 6 (Mediterranean Sea).

**Artificial and heavily modified waterbodies** are defined under WFD Article 2(8) and (9). Under certain conditions the WFD permits Member States to identify and designate artificial water bodies (AWB) and heavily modified water bodies (HMWB) according to WFD Article 4(3). Such designations and the reasons for them shall be specifically mentioned in the river basin management plans.

The relevance and importance of these designations with respect to the environmental objectives of the RBMP are that HMWBs are discrete bodies of water which, as a result of physical alterations by human activity, are substantially changed in character and cannot therefore meet "Good Ecological Status" (GES). The assignment of less stringent environmental objectives to these waterbodies (derogations) is set out under WFD Articles 4(4) and 95).

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<sup>110</sup> European Commission – CIS Guidance Document No 2 - Identification of Water Bodies

<sup>111</sup> European Commission – Directive 2000/60/EC – Annex II

<sup>112</sup> Along highly indented coastlines the baseline can be drawn as a straight line. WFD CIS Guidance Document No 5

As the ecological water quality of AWBs and HMWBs are assessed in relation to the “original” category, we consider HMWBs and AWBs as a specific form of one of the other categories. This means that each waterbody is characterised (i) as one of the categories: rivers, lakes, transitional waters or coastal waters; and (ii) as one of the forms: heavily modified, artificial or natural.

### 5.2.2 Surface Waterbody Types

For each surface water category, the relevant surface waterbodies within the river basin district should be further differentiated according to TYPE. These types are those defined using either ‘System A’ or ‘System B’ of the WFD (Annex II). In this plan the System A procedure was applied.

The type coding of waterbodies is at the conceptual core of the ‘ecological status’ approach of the WFD. The prime objective is to achieve at least ‘Good Status’ (defined as ecological + chemical status) for each waterbody (Section 8). It follows that in order to establish the actual or current status of waterbody X, it must be compared to a ‘reference condition’ for that waterbody type. Fundamentally, different TYPES of waterbodies even within the same CATEGORY (e.g. rivers) have different reference conditions. The greater the deviation of the waterbody condition from the reference condition defines its relative status.

The fully natural (reference) condition of most waterbodies has been determined through expert judgement to most significantly depend on three primary hydro-ecological descriptors:

- **Altitude** – this parameter most significantly affects diurnal, seasonal and annual temperature regimes of aquatic ecosystems.
- **Size** – this parameter (e.g. the catchment area of a river waterbody or the surface area of a lake waterbody) has complex influences, but most obviously influences the quantity of water within the aquatic ecosystem (flow or storage magnitude), the seasonal flow or storage regime, and possibly the extent of the ecosystem habitat and its continuity.
- **Geology** – this parameter most significantly influences the chemistry of receiving waters, and thereby has a direct and profound influence on aquatic species specifically adapted to those physical-chemical conditions. Principal geochemical influences can be separated to calcareous (carbonate), siliceous (silica) or organic (humic) geological formations.

To ensure consistency of analysis and reporting of ecological status reference conditions across Member States, the process of ‘inter-calibration’ has been in progress for many years (using both System A and System B). The most definitive recent work on this issue to redefine broad typologies for European rivers and lakes better aligns with the European wide intercalibration types and has therefore been adopted within the remit of this RBMP.<sup>113</sup>

According to WFD Annex II, 1.1.v, the typology differentiation for artificial (AWB) and heavily modified waterbodies (HMWB) should be undertaken in accordance with the descriptors for whichever natural surface water category most closely resembles the AWB or HMWB concerned. Similarly, the quality elements should be those applicable to whichever natural surface water category most closely resembles the AWB or HMWB (WFD Annex V, 1.1.5). This means that reservoirs made by damming rivers may be categorised as heavily modified rivers but should be typified and assessed using the elements and tools for lakes, as lakes is the natural surface water category which reservoirs most closely resemble.

### 5.2.3 Surface Waterbody Typology Affecting Delineation

Waterbody delineation (determination of precise geographic divisions within rivers, lakes, groundwaters to smaller elements) is described in section 5.4, and forms the third stage of the characterisation process. With respect to typological classes, since a change in the waterbody typology

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<sup>113</sup> Science of the Total Environment - A new broad typology for rivers and lakes in Europe: Development and application for large-scale environmental assessments, Elsevier, 2019

is very likely associated with a change in reference conditions, and the reference conditions must be uniformly applicable to that single waterbody, it follows that a change of waterbody type must also result in a delineation boundary for that waterbody.

For example, for a similar river waterbody of the same catchment area class and geology, the transition from high altitude (> 800 m) to mid-altitude (> 200 < 800 m) would necessitate a division to two waterbodies to reflect potentially different reference conditions (and possibly, current status). A delineated waterbody should not cross a major typological boundary, as defined by the altitude, size and geology classes of WFD Annex II.

In respect of the special case of artificial waterbodies (AWBs) or heavily modified waterbodies (HMWBs), typological boundaries equally apply to these categories. According to WFD Annex II, the typology differentiation should be undertaken in accordance with the descriptors for whichever natural surface water category most closely resembles the AWB or HMWB concerned.

#### 5.2.4 Surface Waterbody Pressures and Impacts Affecting Delineation

Sufficient delineation must take place so as to result in an accurate determination of status of each individual waterbody, without creating innumerable sub-divisions of ever-smaller waterbodies that do not contribute meaningfully to the purposes of the directive. Providing they are of the same TYPE (section 5.2.2), contiguous elements of surface water with the same status can be combined to a single waterbody, for example numerous small tributaries in the basin headwaters.

However, where the waterbody is subjected either to a significant diffuse or point pressure e.g. concentrated wastewater discharge, then it is likely that a disaggregation is required to separate at least the waterbodies upstream and downstream of the pollutant discharge, since the status will be different. At Annex II are in more details Table 5 1 – Broad Typology Descriptors and Intervals – Rivers and Table 5 2 - Broad Typology Descriptors and Intervals – Lakes.

### 5.3 Waterbody Coherence and Delineation Methodology

The aggregation-disaggregation principles covered in section 5.2.4 should take account not only of current status, but possible changes to status within an otherwise single waterbody due to future expected pressures and impacts. For example, urban expansion, flood-protection works, provision of wastewater treatment, hydropower installations or new water supply intakes or outfalls are all likely to impact on status at various points along a river.

These point or diffuse pressures may mean that the currently aggregated waterbody has to be disaggregated into several smaller waterbodies in the future so that the status of each is still correctly identified. For reasons of efficient database management and avoidance of reassignment of the unique waterbody codes (EU Surface Water Body Code)<sup>114</sup> it is preferable in some cases not to oversimplify some waterbodies initially even though their current characteristics and status may be uniform. This caveat applies increasingly as the waterbody length increases.

A second practical issue of relevance in Albania is that the surface water and groundwater surveillance monitoring programmes are generally insufficient to cover all waterbodies i.e. the status of many delineated waterbodies is simply unknown. This remains the case for the 2022-2027 Plan. Consequently, judgement is required as to where a change in status may be likely now or in future as a result of natural characteristics or anthropogenic pressures.

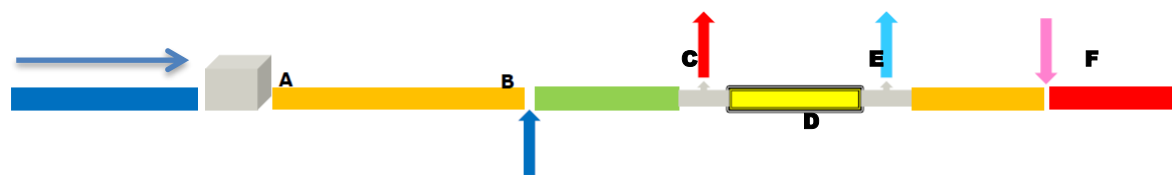
Figure 5-1 illustrates the delineation methodology applied. It is assumed that this is initially a single river waterbody of contiguous type of 'High Status'. However, proceeding left to right, a hydropower installation at (A) will impact markedly on the hydro morphological elements downstream, with a consequent deterioration in status. This impact may be offset to some degree by a natural inflow tributary at (B), depending on the relative proportions of flow. Water abstractions for industry (C),

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<sup>114</sup> European Commission - WISE GIS Guidance on the Reporting of Spatial Data to WISE, Version 6.0.6, 2016

flood protection works (D), municipal water supply (E) and urban wastewater discharge (F) all impact in a highly complex sequential way resulting in several changes of status within the waterbody.

**Figure 5-1 – Example Waterbody of Contiguous Type with Varied Status**



In this example six waterbodies should be delineated so as to correctly fulfil the requirements of the WFD. In practice waterbody delineation may not always be as complex as this example, but it serves to demonstrate that current and/or future potential pressures, status or impacts are all factors of waterbody delineation, beyond the simpler delineations that arise from geographical, hydro-morphological or typological boundary conditions.

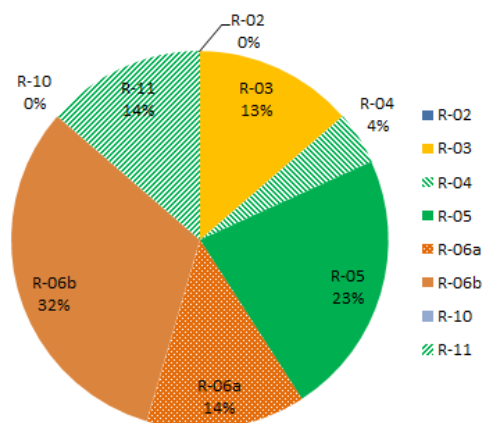
## 5.4 Surface Waterbodies in the Ishem Basin

### 5.4.1 River Waterbodies

22 River waterbodies (RWs) have been determined for the Ishem river basin. The characterisation of these waterbodies follows System A of the WFD Annex II, and is given in Table 5-1. Numbering follows the Pfafstetter system and is shown in Map 5-1.<sup>115</sup>

**Figure 5-2 – Proportions of River Waterbody Types by Frequency – Ishem**

Type	Altitude	Size	Geology
R-02	<200	Medium-Large	Siliceous
R-03	<200	Small	Siliceous
R-04	<200	Medium-Large	Calcareous/mixed
R-05	<200	Small	Calcareous/mixed
R-06a	<200	Small	Organic/siliceous
R-06b	<200	Medium-Large	Organic/siliceous
R-10	200-	Medium-Large	Calcareous/mixed
R-11	200-	Small	Calcareous/mixed



The characterisation procedure used in Albania recognises the importance of river flow regime as a critical element of the reference condition of varying waterbody types. Accordingly, where data is available, Table 5-1 also presents a summarised ‘annual flow regime’, describing ‘indicator flows’ of  $Q_{10}$ ,  $Q_{50}$ ,  $Q_{90}$ , indicating high, median and low flow values respectively.<sup>116</sup> The median flow describes

<sup>115</sup> As of 2020, the general coding system of hydrological features in Albania (basins, sub-basins, waterbodies, monitoring stations etc.) is unfit for purpose. The principal monitoring Agencies (AMBU, AGS, NEA) do not use a logical or consistent system between Agencies. This RBMP has defaulted to the European-wide river basin numbering system derived from the EC JRC ‘Catchment Characterisation and Modelling (CCM) coding system. Typically, waterbody codes will take the first 4-6 digits of the river basin (the so called ‘commencement code’), followed by a sequential number. For river waterbodies, the Pfafstetter coding system has been rigorously applied. Further systematic work will be required by AMBU to introduce a logical and WISE compliant feature coding system into the National Water Resources Cadastre.

<https://www.eea.europa.eu/data-and-maps/data/external/ccm-v.2>

<sup>116</sup> Flow values are derived from the Flow Monitoring Stations data described in Section 4.2, factored by Area. These values are however based on data from the period 1965-1995, and are therefore totally unreliable for current analysis.

the long-term flow with a 50% probability of occurrence, and is the most representative indicator of 'average flow'.  $Q_{10}$ ,  $Q_{50}$  and  $Q_{90}$  are all 'environmental flow indicators'.

Significant variation of these flows from the natural condition (e.g. due to storage, diversion or excessive abstraction) will therefore be an indicator of pressure on the waterbody and a likely reduction of ecological status (see section 3.3.5).

$Q_{90}$  is of extreme importance with respect to reference conditions for environmental flow. The ratio  $Q_{90}/Q_{50}$  value from the relevant Flow Duration Curve is typically representative of the groundwater contribution to river flow, known as the 'Base Flow Index' (BFI). In the Albanian river basins, groundwater typically contributes at least 30% of the total river flow on an annual basis.<sup>117</sup> During summer low flow periods, groundwater is likely to be the predominant component of flow. In these periods therefore the groundwater contribution accounts for the entire environmental flow and should be protected as such. Groundwater discharge and its % contribution will vary throughout the year but the annual  $Q_{90}$  serves as an approximate reference value.

#### 5.4.2 Lake Waterbodies

Lake Waterbodies in the Ishem basin are also characterised using WFD Annex II System A. Broadly these follow the same typology descriptors as for Rivers, namely altitude, geology, size of lake, and also depth. The normal minimum reporting lake area is 0.5 km<sup>2</sup> (WFD Annex II, 1.2.2). However, because numerous reservoir or Lake Waterbodies in Albania have no previous monitoring, in this first development of the Ishem RBMP, four waterbodies of < 0.5 km<sup>2</sup> have been included for completeness.

Since many 'lake' waterbodies in Albania operate as hydropower storage reservoirs, the System A reporting for Albania includes a  $\Delta$  depth parameter, which describes the typical annual fluctuation of water level, a significant influence on habitat morphology.

4 Lake Waterbodies (LWs) have been determined for the Ishem river basin. This includes the major public water supply reservoir of Bovilla, under the operation of city of Tirana water utility. The characterisation of these waterbodies is given in Table 5-2 and Map 5-1.

Typically, the Ishem basin lakes/reservoirs are small (< 1 km<sup>2</sup>), low altitude and of siliceous origin. The exception is Bovilla Reservoir (4.07 km<sup>2</sup>, 78 Mm<sup>3</sup>), activated in 1998 by the damming of the Tërkuzë River. The contributing river basin (ISH3) is 94.4 km<sup>2</sup>, with a mixed siliceous and calcareous geology (see Map 4-2). The Bovilla Reservoir is characterised by large (7-10 m) fluctuations in seasonal water level as a result of being used predominantly for municipal water supply. A further point of note is the extremely high Base Flow Index (BFI) for the ISH3 sub-basin (0.71), indicating that 70% of the catchment outflow (to Bovilla) derives from groundwater discharge.

Virtually all of the LWs in the Ishem basin are ungauged and unmonitored so the inflow regime is not known. The exception is Bovilla Reservoir, where historical data (1951-1987) gives the mean annual inflow as 3.3 m<sup>3</sup>/s.<sup>118</sup>

#### 5.4.3 Transitional Waters

Transitional waters are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows (WFD Article 2(6)).

In Albania, transitional waters have not been previously delineated and no specific reference condition currently exists. In the Ishem RBMP the boundary between the River waterbody and its downstream Transitional waterbody has been approximated by measurements of river electrical conductivity indicating salinity level made during the RBMP reconnaissance survey (see section 8.3). One

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<sup>117</sup> Science Academy of Albania, Institute of Hydro-meteorology – "The Hydrology of Albania", Tirana, 1984

<sup>118</sup> Documentation held by Tirana Water Utility. Inflow since 1990 highly likely to have been influenced by climate change.

Transitional waterbody has been determined for the Ishem river basin. The characterisation of these waterbodies follows System A of the WFD Annex II, and is given in Table 5-3 and Map 5-1.

#### 5.4.4 Coastal Waterbodies

When assigning a stretch of coastal water to a river basin, the aim is to ensure that coastal waters are assigned to the closest possible or the most appropriate natural management unit and to minimise any unnecessary splitting of coastal stretches.

Coastal lagoons, (which are present in the Ishem river basins) may be either coastal waters or transitional waters, depending on whether the lagoon fits the definition of transitional waters in the Directive under WFD Article 2(6). One Coastal waterbody has been determined for the Ishem river basin. The characterisation of these waterbodies follows System A of the WFD Annex II, and is given in Table 5-4 and Map 5-1.

#### 5.4.5 Heavily Modified and Artificial Waterbodies

In accordance with WFD Article 4(3), HMWBs are natural bodies of water which, as a result of physical alterations by human activity are substantially changed in character and cannot therefore meet the objective of 'good ecological status' (GES). Instead of 'good ecological status', the environmental objective for HMWBs and AWBs is 'good ecological potential' (GEP). AWBs are distinguished from HMWBs in that the waterbody is created in a location where no waterbody previously existed. Minor elements of surface water (ephemeral ponds, streams etc.) can be discounted.<sup>119</sup>

WFD Article 2(9) defines HMWBs as:

- Physically altered – e.g. dams, reservoirs, canalisation, flood protection works
- Substantially changed in character – importantly this would also include alterations to the flow regime
- Qualifying under the criteria of Article 4(3) – i.e. alterations to the waterbody to achieve GES would adversely affect the activities for which the HMWB is designed, or the beneficial objectives served by the modifications cannot for reasons of technical feasibility or disproportionate cost be achieved by other environmentally superior means.

8 AWB or HMWB waterbodies of various categories have been determined for the Ishem river basin. The characterisation of these waterbodies follows System A of the WFD Annex II, and is given in Table 5-1 and Table 5-2. Numbering follows the Pfafstetter system and is shown in Map 5-1.

HMWBs and AWBs are included in the characterisation Tables for the waterbodies that they most closely resemble, as this is how the ecological potential of the AWB/HMWB will be determined (Chapter 10). At Annex II are listed Table 5 3 – Standard List of HMWB-AWB Uses and Table 5 4 – Standard List of HMWB-AWB Exemption Types.

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<sup>119</sup> European Commission – CIS Guidance Document 4 - Identification and Designation of Heavily Modified Waterbodies (3.1.2)

**Table 5-1 – Ishem River Basin - Waterbody Characterisation – Category RIVERS <sup>120</sup>**

RIVER NAME	LOCAL SUB-BASIN	WATERBODY EU CODE (RW)	ALTITUDE mASL	AREA km <sup>2</sup>	GEOLOGY TYPE	TYPOLOGY EU CODE	RIVER FORM	LENGTH km	WIDTH m	ACTUAL FLOW REGIME			
										Q10	Q50	Q90	BFI
Ishem	ISH0	351413	<200	693	Org + Sil	R-06b	Natural	23.8	21	33.53	15.97	7.61	0.48
Zeze	ISH0	351421	<200	100	Cal + Mix	R-04	Natural	4.1	11	5.48	1.88	0.72	0.38
Zeze	ISH0	351422	<200	28	Cal + Mix	R-05	Natural	17.5	7	1.53	0.53	0.20	0.38
Zeze	ISH0	351423	<200	65.5	Cal + Mix	R-05	Natural	7.1	28	3.95	1.35	0.52	0.38
Zeze	ISH0	351425	<200	51.7	Cal + Mix	R-05	Natural	6.9	55	3.16	1.08	0.41	0.38
Zeze	ISH0	351427	>200<800	32.1	Cal + Mix	R-11	Natural	8.4	19	2.18	0.75	0.29	0.38
Ishem	ISH0	35143	<200	474	Org + Sil	R-06b	Natural	6.7	22	28.05	14.09	6.89	0.49
Terkuza	ISH1	351441	<200	176	Org + Sil	R-06b	Natural	13.3	28	7.67	4.82	3.07	0.64
Terkuza	ISH1	351443	<200	129	Org + Sil	R-06b	HMWB	13.8	60	6.85	3.89	2.54	0.65
Terkuza	ISH3	351444	>200<800	15.2	Cal + Mix	R-11	Natural	3	66	1.14	0.76	0.49	0.64
Terkuza	ISH3	351445	>200<800	40.7	Cal + Mix	R-11	Natural	7.4	88	2.99	1.99	1.28	0.64
Tirana	ISH1	35145	<200	286	Org + Sil	R-06b	Natural	8.1	20	20.38	9.27	3.82	0.41
Tirana	ISH1	35146	<200	31.4	Sil	R-03	Natural	3.8	4	2.51	1.14	0.47	0.41
Tirana	ISH1	35147	<200	211.5	Org + Sil	R-06b	Natural	7.6	34	17.87	8.13	3.35	0.41
Lana	ISH1	351481	<200	61.8	Sil	R-03	Natural	4.8	11	1.60	0.86	0.52	0.60
Lana	ISH1	351482	<200	14.1	Sil	R-03	Natural	3.2	6	0.41	0.22	0.13	0.60
Lana	ISH1	351483	<200	41.5	Org + Sil	R-06a	Natural	4.2	10	1.19	0.64	0.39	0.60
Lana	ISH1	351485	<200	31.0	Org + Sil	R-06a	HMWB	7.2	7	0.89	0.48	0.29	0.60
Lana	ISH1	351487	>200 <800	9.9	Org + Sil	R-06a	Natural	1.8	4	0.31	0.17	0.10	0.60
Tirana	ISH1	351491	<200	127	Org + Sil	R-06b	HMWB	10.1	35	6.22	4.70	3.16	0.67
Tirana	ISH1	351493	<200	99.2	Cal + Mix	R-05	HMWB	6.4	27	5.10	3.85	2.59	0.67
Tirana	ISH4	351495	>200 <800	80.7	Cal + Mix	R-05	Natural	18.4	45	4.25	3.21	2.16	0.67

<sup>120</sup> In compliance with WFD Annex II, 1.2 System A – includes AWBs and HMWBs appropriate to the classification. For clarity, AWBs and HMWBs are also summarised under Table 5-9.

**Table 5-2 – Waterbody Characterisation – Category LAKES**

LAKE NAME	LOCAL SUB-BASIN	WATERBODY EU CODE	ALTITUDE mASL	AREA km <sup>2</sup>	GEOLOGY TYPE	TYPOLOGY EU CODE	DEPTH m	Form	LENGTH km	Δ LEVEL m	ACTUAL INFLOW REGIME			
											Q10	Q50	Q90	BFI
Bovilla	ISH3	LW351401	317	4.068	Calcareous/mixed	L-14	45	Artificial	3.9	10	4.35	3.28	2.32	0.71
Tirana City	ISH1	LW351402	116	0.406	Siliceous	L-15		Artificial			0.21	0.06	0.03	0.50
Çerkezës	ISH1	LW351403	94	0.590	Siliceous	L-13		Artificial			0.63	0.18	0.09	0.50
Tapizes	ISH1	LW351404	46	0.651	Siliceous	L-13		Artificial			1.323	0.378	0.189	0.50

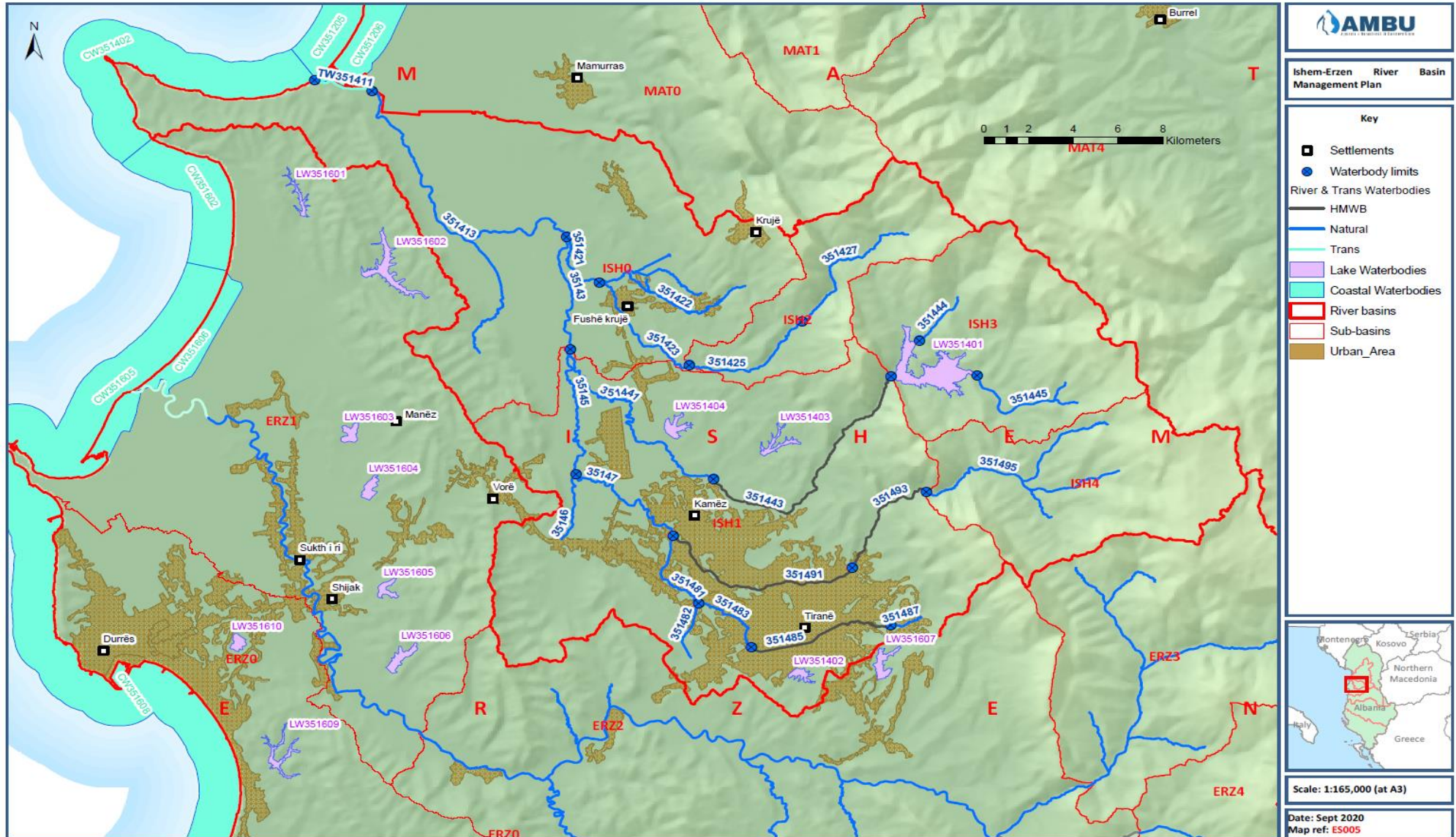
**Table 5-3 - Waterbody Characterisation – Category TRANSITIONAL Waters**

TRANSITIONAL NAME	LOCAL SUB-BASIN	WATERBODY EU CODE	FORM	LENGTH	MEAN ANNUAL SALINITY	ELECTRICAL CONDUCTIVITY	MEAN TIDAL RANGE	MEAN WATER TEMPERATURE	TURBIDITY	
Ishem	ISH0	TW351411	Natural	2.8						

**Table 5-4 - Waterbody Characterisation – Category COASTAL Waters**

COASTAL NAME	LOCAL SUB-BASIN	WATERBODY EU CODE	FORM	LENGTH	MEAN ANNUAL SALINITY	MEAN DEPTH	MEAN TIDAL RANGE	MEAN WATER TEMPERATURE	TURBIDITY	
Luka Rodini	ISH0	CW351402	Natural (Coast)	15.0						

Map 5-1 – Surface Waterbody Category and Delineation



## 6 Characterisation and Delineation of Groundwater Bodies

### 6.1 Overview

The RBMP should deliver an initial characterisation of all groundwater bodies to assess their uses and the degree to which they are at risk of failing to meet environmental objectives, namely the achievement of good quantitative and good chemical status. Those groundwater bodies that have been identified as being at risk of failing environmental objectives require a further characterisation and investigation in order to establish a more precise assessment of the significance of such risk and identify any measures required.

#### 6.1.1 Albania

The principal competent authority in Albania to identify and report on groundwater resources, trends and impacts is the Albanian Geological Survey (AGS). The activities of the AGS are closely connected to those of the NEA (through monitoring), and the AMBU (via Permitting and allocation of resources).

#### 6.1.2 European Union

A key purpose of the WFD is to prevent further deterioration of and enhance the status of aquatic ecosystems, and with regard to their water needs, terrestrial ecosystems directly depending on aquatic ecosystems. The objective of protecting and restoring good groundwater status is designed to help achieve this purpose. The requirements for groundwater identification and assessment are closely aligned to the objectives of supporting Directive 2006/118/EC and Directive 91/676/EEC.<sup>121 122</sup> These Directives establish a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater.

## 6.2 Categorisation and Typology of Groundwater Bodies

### 6.2.1 Groundwater Body Categories

Groundwater is not 'categorised in the same way as surface water', as it is considered a single entity. However, important distinctions are drawn between general groundwater (all water below the land-surface), aquifers (strata of sufficient permeability to allow significant quantities of abstraction), and groundwater bodies (being distinct or delineated volumes or zones of groundwater within recognised aquifers).

The WFD test for whether or not a groundwater body is of sufficient potential to act as an aquifer depends on two criteria:

- a) Is the resource sufficient to provide > 10 m<sup>3</sup>/day or for 50 persons?
- b) Would abstraction of the groundwater resource impact on the ecological status of a surface waterbody or dependent ecosystem?

The minimum size of a groundwater body is normally 10 km<sup>2</sup>, set to correspond with the minimum catchment area of surface water body as set out in WFD Annex II (1.2.1). Smaller units are feasible if the groundwater body requires specific management in terms of protection of a dependent ecosystem or localised supplies of potable water for > 50 people. At Annex VII is shown the definition of aquifer according to Water Frame Directive Figure 6 1.

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<sup>121</sup> European Commission – Directive 2006/118/EC - On the protection of groundwater against pollution and deterioration – and as amended by Directive 2014/80/EU

<sup>122</sup> European Commission – Directive 91/676/EEC - concerning the protection of waters against pollution caused by nitrates from agricultural sources

## 6.2.2 Groundwater Body Types and Basic Delineation

International best practice conventionally distinguishes aquifers according to their resource potential. Typically, this divides to a) principal aquifers b) secondary aquifers c) unproductive strata. These distinctions are broadly recognised in the WFD typology for groundwater, where groundwater is classified according to eight principal types. It is feasible and permissible that an entire aquifer could also form a single groundwater body, but only if it is entirely homogenous in terms of its hydraulic properties, natural chemistry variations and pressures and impacts.

Below the high-level criteria of the groundwater body resource potential, further delineation of aquifers into discrete groundwater bodies should generally take account of:

- Groundwater flow divides, using surface water catchments and geological boundaries as proxies where information is limited.
- Natural chemistry variations, where they impose a limit on the value of the resource for potable abstraction, or where they influence the susceptibility to, and management of pressures.

**Table 6-1 – Principal Groundwater Types in Albania Reporting**

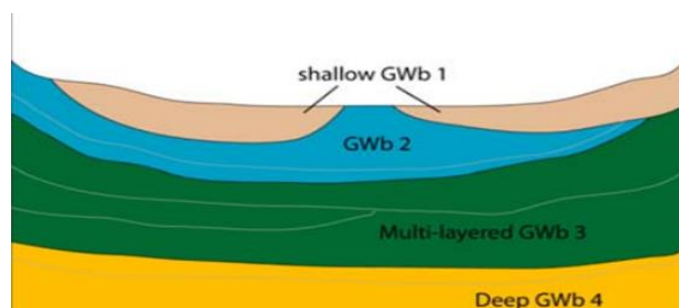
ALBANIA CODE	ALBANIA REPORTING GEOLOGICAL FORMATION <sup>123</sup>	EQUIVALENT WISE REPORTING GEOLOGICAL FORMATION <sup>124</sup>
1	Porous – high productivity	Porous – highly productive
2	Porous –medium productivity	Porous - moderately productive
3	Porous –low productivity	Porous - moderately productive
4	Fractured – high productivity	Fissured aquifers including karst – highly
5	Fractured – medium productivity	Fissured aquifers – moderately productive
6	Fractured – low productivity	Fissured aquifers – moderately productive
7	non-aquifer	Insignificant aquifers – limited
8	Not available or Unknown	Unknown

## 6.2.3 Delineation Influenced by Groundwater Body Horizons

The Albanian system differentiates aquifers on the basis of their productivity: high (10 – 100 l/s) and very high (> 100 l/s) are equated with the WISE category of highly productive; the medium (1 – 10 l/s) and low (0.1 – 1 l/s) are equated with the WISE category of moderately productive; and very low (<0.1 l/s) is equated with the with the WISE category of practically non-aquifer.

Geological formations (including aquifers) exist in 3-dimensions, and frequently comprise complex geological characteristics which may influence a) the yield of individual waterbodies b) vulnerability to pollution pressures c) connection to surface water systems.

**Figure 6-1 – Illustration of Multiple Waterbodies within Single Aquifers**



<sup>123</sup> Albanian Geological Service – 1:200 000 Hydrogeological Map of Albania, 2015. Tabulations of aquifer Types in Albania reporting is inconsistent between the 1:200 000 map and the GIS .shp files. The GIS .shp Type definitions have been used as the delineation type.

<sup>124</sup> WFD – WISE GIS Reporting Guidance 2016 – schema GWB – schema element – *Geological Formation*

Figure 6-1 illustrates the potential 3-dimensionality of some aquifers. Where the properties of each vertical horizon are significantly different with respect to a) to c) above, then potentially each horizon or strata should be identified as a separate groundwater body. Conventionally, horizons are numbered in increasing sequence from the surface.

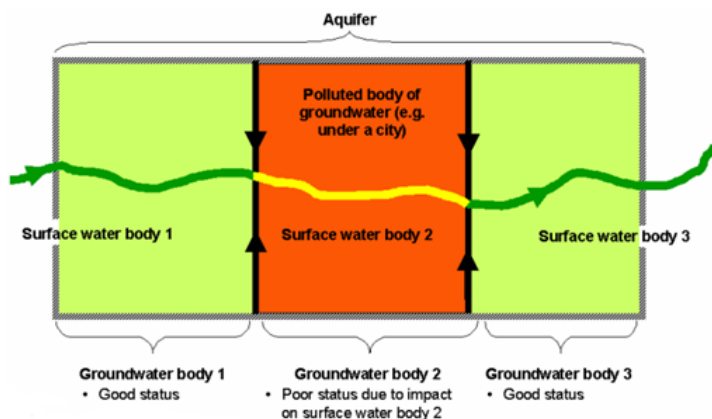
#### 6.2.4 Delineation Influenced by Groundwater Body Pressures and Impacts

As for surface water, delineation of the groundwater bodies should ensure the accurate determination of the quantitative and chemical status of each waterbody. In the example of Figure 6-2, a single aquifer may encounter significant localised pollution from overlying influences, resulting in different chemical status across the aquifer.<sup>125</sup> In this case three groundwater bodies would need to be delineated to accurately reflect change in status.

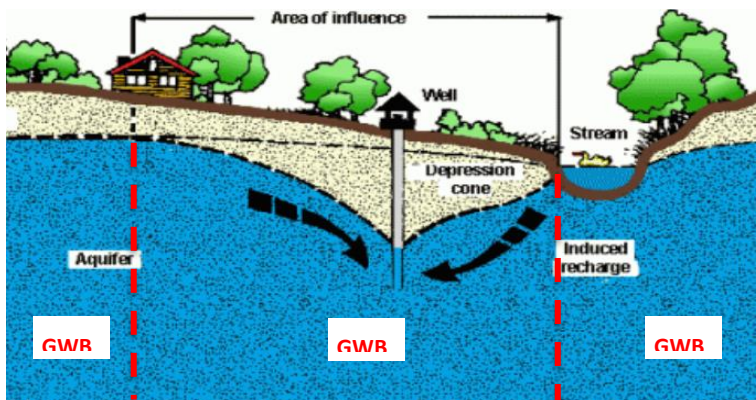
The same criteria would apply for zones of intensive abstraction which may be creating localised pressures on groundwater level. In the case of Figure 6-3, pumping creates a 'cone of depression' and possibly a significant change to the quantitative status of the local groundwater. The 'area of influence' would therefore be delineated as a separate groundwater body even though it is part of a contiguous aquifer. In this example, induced recharge from the adjacent surface waterbody is also occurring, which creates additional criteria for delineation if the surface water ecosystem is significantly dependent on groundwater discharge.

Therefore, the final stage of waterbody delineation is an iterative process, in which the anthropogenic pressures and impacts also need to be assessed across single aquifers in order to distinguish differing degrees of status within the aquifer.

**Figure 6-2 – Groundwater Body Delineation Arising from Change in Chemical Status**



**Figure 6-3 - Groundwater Body Delineation Arising from Change in Quantitative Status**



<sup>125</sup> European Commission – CIS Guidance - Technical Report on Groundwater body Characterisation, 2004.

## 6.3 Previous Assessments of Groundwater Bodies

### 6.3.1 Principal Hydrogeological Formations

Groundwater in Albania is present in different formations ranging from the Quaternary to Palaeozoic periods. The geological structure of the Albanian mountains typically exhibits carbonate based karstic sediments (e.g. limestone formations). These and the highly permeable gravel aquifers in the lowland areas both form highly productive aquifers. Both types are extensively present in the Ishem basins.

**Table 6-2 – National Summary of Hydrogeological Formations** <sup>126</sup>

ALBANIA CODE	TYPE OF AQUIFER	INDICATIVE LITHOLOGY	NUMBER OF GW BODIES	FEASIBLE YIELDS l/s
ALG1	Carbonate aquifers	Limestone, dolomite	18	4500 - 6100
ALG2	Porous aquifers	Alluvium	12	1200 - 1300
ALG3	Magmatic aquifers	Basic and ultrabasic intrusive rocks	6	345 - 630
ALG4	Conglomerate/sandstone	As stated	9	430 - 570
ALG5	Low permeability		10	< 300

### 6.3.2 Preliminary Identification of Groundwater Bodies in Albania

Preliminary work on aquifer characterisation and groundwater body delineation was carried out with participation of AGS. This work identified five major hydrogeological formations throughout Albania, with 55 discrete groundwater bodies delineated (Table 6-2).

However, the CEMSA 2008 characterisation was deficient in a number of areas:

- No account was taken of the importance of sub-dividing the major regional aquifers to smaller GWBs on the criteria of pressures and impacts of abstraction, pollution status or dependent terrestrial ecosystems at local scale. These are all fundamental 'tests' to distinguish a specific GWB from the wider aquifer.
- The groundwater body numbering system, although usefully related to 'type' as per Table 6-2, was extremely coarse in scale (55 GWBs for the whole of Albania based predominantly on the hydrogeological formations).
- The groundwater numbering system was based on an arbitrary national sequence, without reference to the river basin within which the groundwater occurs. Whilst many groundwater bodies are 'trans-boundary', in practice the hydrogeological boundary often mirrors the surface topographic divide.
- The groundwater bodies in different river basins are often managed by different competent authorities, and therefore it is an administrative convenience to allocate a groundwater numbering system that recognises the river basin in which the GWB predominantly occurs (whilst recognising the importance of ensuring consistent management across trans-boundary bodies).

However, this initial work has been superseded by a much greater level of detail on hydrogeological formations with the publication of the 1:200 000 scale Hydrogeological Map of Albania, 2015. This comprehensive assessment now provides the basis for a more detailed identification of potential individual groundwater bodies in the Albania new RBMP reporting framework.

In the new phase of RBMPs in Albania, identification and reporting of all waterbody attributes is intended to align much more closely with the EU WISE reporting schema than was carried out by

<sup>126</sup> Albanian Geological Service - Inventory of Groundwater Resources and their Utilisation Patterns – CEMSA Project, 2008

previous studies.<sup>127</sup> This means that the principal hydrogeological types as defined in Table 6-1 are the ones that have been used, as opposed to that of the CEMSA 2008 project which did not use standard definitions.

## 6.4 Groundwater Bodies in the Ishem Basin

Since there is a significant lack of reliable detail and data about water quality, quantitative status, pressures and impacts on most groundwater bodies in Albania, this first pass delineation (2024-2029) has inevitably relied substantially on expert judgement. However, the breakdown to further smaller waterbody units based on anticipated abstraction pressures, pollution levels, and dependent terrestrial ecosystems is a significant step forward in a more structured and analytical approach to future groundwater management generally. Chapter 10 more fully reports on groundwater body pressures, current status and impacts on these specific waterbodies.

### 6.4.1 Revised Numbering System for Groundwater Bodies

The numbering system adopted for delineated groundwater bodies in the Ishem adopts the same general approach as for Rivers, Lakes and Coastal waters (identified by the appropriate WISE category prefix)<sup>128</sup>, adopting the protocol that GW represents a groundwater body. It is useful to retain some indication of the aquifer potential within the code system, based on the Albania categories referenced in Table 6-1.

GW + CCM Basin Commencement Code (4 digits) + Aquifer Potential Type (1 to 7) + Unique Serial Number (2 digits). Aquifer potential type is derived from the seven types identified in the AGS 1:200 000 Hydrogeological Map of Albania (Table 6-1). The serial code is a subset of the aquifer potential type i.e. for aquifer type 04 (highly productive karstic aquifer), there may be 01, 02, 03 individual groundwater bodies of Type 4 within the river basin. e.g. GW 3514 04 09 represents the ninth discrete groundwater body of Type 4 in the Ishem basin (3514). There is no fixed logic to the sequential numbering, other than as a general arbitrary rule, the higher the number, the further distant is that GWB from the surface outlet of the river basin. This system allows for 99 specific groundwater bodies to be therefore identified in any one river basin, in any flexible sequence.

### 6.4.2 Delineated Groundwater Bodies in the Ishem Basin

13 discrete groundwater bodies have been established in the Ishem basin. These are reported under Table 6-4 and Map 6-1. As for many groundwater systems, it is noted that several of the groundwater bodies are trans-boundary between adjacent river basins. Groundwater management regimes must therefore take account of these trans-boundary connections.

For reporting purposes, three Groups of groundwater bodies have been defined on the basis of (i) geological similarity and continuity; (ii) absence of significant monitoring information; (iii) absence of significant abstraction pressure and (iv) absence of significant pollution pressure. The three reporting groups are listed in Table 6-3.

Table 6-4 notes the occurrence of surface waters and groundwater dependent ecosystems in the alluvial and karst groundwater bodies. There is uncertainty surrounding the significance of these impacts due to shortage of data. First, baseflow from alluvium to the Gjola and Terkuza Rivers has probably reduced and possibly reversed in recent decades. Second, baseflow contributes to dry season discharge and wetlands in karst aquifers but will have been significantly reduced by spring capture. A short description of the defined groundwater bodies and groups follows, with full descriptions provided in Technical Annex VII.

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<sup>127</sup> Water Framework Directive Reporting Guidance - [http://cdr.eionet.europa.eu/help/WFD/WFD\\_521\\_2016](http://cdr.eionet.europa.eu/help/WFD/WFD_521_2016)

<sup>128</sup> WFD – WISE GIS Reporting Guidance 2016 – schema GWB – schema element – *SurfaceWaterBodyCategory* – RW, LW, TW, CW

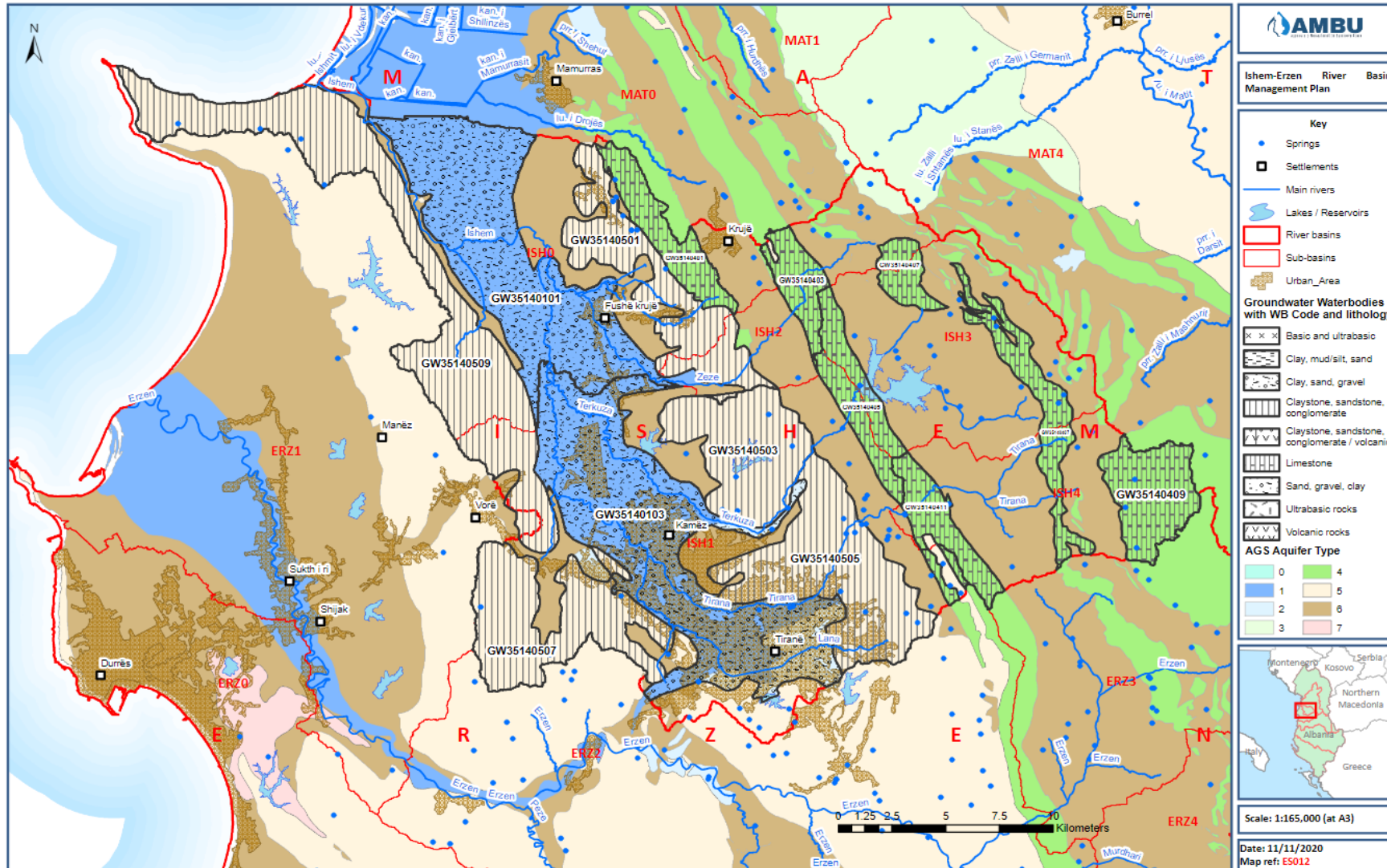
**Table 6-3 –Groundwater Body Reporting Groups in the Ishem Basin**

Group	TYPE OF AQUIFER	LITHOLOGY	GEOMETRY	GWB CODE	GWB NAME	AREA Km <sup>2</sup>
<b>A</b>	T4: Fissured inc. karst aquifers - high to very high productivity	Limestone	Contiguous	GW35140403	Kroi I Madh	9
				GW35140405	Bovilla	17
				GW35140411	Dajt	11
<b>B</b>	T5: Porous / fissured porous aquifers - medium to low productivity	Conglomerate, sandstone and mudstone	Contiguous	GW35140501	FUSHË-KRUJË	31
				GW35140503	QINAM	30
				GW35140505	BRAR	45
<b>C</b>	T5: Porous / fissured porous aquifers - medium to low productivity	Conglomerate, sandstone and mudstone	Contiguous	GW35140507	KASHAR	37
				GW35140509	BUBQ	72

Table 6-4 – Characterisation and Delineation of Groundwater Bodies

	Name	Reporting Group	LITHOLOGY	AQUIFER TYPE & PRODUCTIVITY	OVERLYING STRATA	CONFINED	HORIZON	AREA km <sup>2</sup>	DEPTH m	SY %	K m/d	T m <sup>2</sup> /d	TRANS-BOUNDARY	DEPENDENT ECOSYSTEM
<b>GW35140101</b>	Thumane	-	Alluvium	Type 1	Sandy clay	Y	1	69.0	25-40	21	148	10 <sup>2</sup> -10 <sup>-1</sup>	Y	Gjola River
<b>GW35140103</b>	Tirane	-	Alluvium	Type 1	Sandy clay	N	2	87.2	30-60	24	300	>10 <sup>3</sup>	Y	Tirana, Terkuza Rivers
<b>GW35140401</b>	Makareshi	-	Limestone	Type 4	Thin soil or bare rock	N	1	13.6	700	14		10 <sup>4</sup> – 10 <sup>-1</sup>	Y	N
<b>GW35140403</b>	Kroi I Madh	A (Dajti Massif)	Dolomitic limestone	Type 4	Thin soil or bare rock	N	1	9.1	500	14		10 <sup>4</sup> – 10 <sup>-1</sup>	Y	N
<b>GW35140405</b>	Bovilla							17.0	500	14		10 <sup>4</sup> – 10 <sup>-1</sup>	Y	N
<b>GW35140411</b>	Dajt							11.1	500	14		10 <sup>4</sup> – 10 <sup>-1</sup>	Y	N
<b>GW35140407</b>	Pas Mali i Dajtit	-	Limestone	Type 4	Thin soil or bare rock	N	1	22.1	1700	14		10 <sup>4</sup> – 10 <sup>-1</sup>	Y	N
<b>GW35140409</b>	Selite I Malit		Limestone	Type 4	Bare rock	N	1	18.3	300	14		10 <sup>4</sup> – 10 <sup>-1</sup>	Y	N
<b>GW35140501</b>	Fushe-Krujë	B (Kruje)	Sandstone, conglomerate and claystone	Type 5	Flysch	Y	1	31.2	1100	27	0.05	10 <sup>2</sup> - 10	Y	N
<b>GW35140503</b>	Qinam							30.4	1650	27	0.03	10 <sup>2</sup> - 10	Y	N
<b>GW35140505</b>	Brar							44.7	1450	27	0.03	10 <sup>2</sup> - 10	Y	N
<b>GW35140507</b>	Kashar	C (Kashar-Bubq)	Sandstone, conglomerate and claystone	Type 5	Flysch	Y	1	36.9	1700	21	0.03	10 <sup>2</sup> - 10	Y	N
<b>GW35140509</b>	Bubq							72.2	1100	21	0.03	10 <sup>2</sup> - 10	Y	N

Map 6-1 – Groundwater Body Category and Delineation



# 7 Characterisation and Delineation of Protected Areas

## 7.1 Overview

### 7.1.1 Albania

The importance of delineation of Protected Areas is to build on previous efforts and illustrate a comprehensive scientific methodology for delineating the boundaries of the ecosystems encompassing individual protected areas. In particular, identifying the zone around each protected area wherein human activities may influence important ecological processes as well as the viability of populations of native organisms within the protected areas. This larger zone becomes the logical focus of monitoring, research, and collaborative management needed to maintain protected area function and condition. We refer to these zones as protected area-centered ecosystems.

### 7.1.2 European Union

Under WFD Article 6 and Annex IV, it is a requirement to establish a Register of all areas within each river basin district which have been designated as requiring special protection under specific Community legislation for the protection of surface water and groundwater or for the conservation of habitats and species directly depending on water. Maps indicating the location and extent of each protected area and a description of the national or Community legislation under which they have been designated are also required.

## 7.2 Areas Designated for Water for Human Consumption

### 7.2.1 Overview

Under WFD Article 7 (derived from Directive (EU) 2020/2184)<sup>129</sup> all bodies of water that supply > 10 m<sup>3</sup>/day or 50 persons require delineation, so called Drinking Water Protected Areas (DWPAs). CIS guidance directs that in the case of groundwater, DWPAs should apply to the whole of the delineated groundwater body, as opposed to a subsidiary part of it.<sup>130</sup> Therefore, for a contiguous aquifer supplying potable water not separated into discrete waterbodies (see section 6.2.4) the entirety of the aquifer would be designated as a DWPA.

The DWPAs should be clearly distinguished from ‘safeguard or protection zones’ (WFD Article 7(3)). Safeguard zones are demarcated zones within the DWPA specifically intended to directly restrict harmful operations or activities that may pollute the groundwater or surface water source. Under international best practice typically there will be three designated zones surrounding a well-field or reservoir, with regulations becoming more restrictive the closer to the source.

The outer zone is typically described as the ‘source catchment’ or the DWPA as defined above. General policy and protection measures will be required in these areas such as limitation of untreated wastewater from upstream villages in the case of a reservoir supplying drinking water e.g. Bovilla Reservoir. In the case of groundwater abstraction underlying agricultural areas, the entire area of the DWPA may be declared a Nitrate Vulnerable Zone (NVZ)<sup>131</sup> (see section 7.5).

Outer Zone 2 is typically a buffer zone in which risks of contamination from priority hazardous substances and river basin specific pollutants (RBSPs) should be strictly controlled. In both surface water and groundwater sources, the extent of the outer zone is predominantly determined through the hydraulic properties of the medium i.e. average river velocities draining to the reservoir, or the hydraulic conductivity (k) of the geological formation(s). These identify the minimum travel time for a

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<sup>129</sup> European Commission – Directive(EU) 2020/2184 on the quality of water intended for human consumption

<sup>130</sup> European Commission – CIS Guidance Document 16 - Guidance on Groundwater in Drinking Water Protected Areas

<sup>131</sup> European Commission – Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

hazardous substance to reach the source. Inner Zone 1 is generally a security area around the well-head or abstraction point. The illustrative figure is on Annex VIII.

### **7.2.2 Drinking Water Protection Areas in Ishem**

There are significant deficiencies in the current management of DWPAs throughout Albania at present. Many major abstraction sources do not have Abstraction Permits, and their locations are not accurately mapped. Relatively few have source protection zones identified, especially for groundwater sources.

The Register of Drinking Water Sources presented by Water Utility is presented in Technical Annex III. There remain many inconsistencies and missing data due to poor quality of data reporting. Currently, it is reported that all the monitored pumping stations have one protection zone with radius 10-15 m, and occasionally up to 25m, which is circled with a metal fence, or brick or stone wall.

In the first phase of the RBMP development for Ishem 2024-2029, it may be sufficient for most DWPAs to demarcate a simple boundary defining the source catchment e.g. for major reservoirs such as Bovilla, or an arbitrary buffer zone of e.g. 500 m around all groundwater sources as per Figure 7-1. Such maps are easily prepared via the GIS, but may require further secondary legislation to enforce such buffer zones.

Principal DWPAs that can be defined at this interim stage (but not necessarily protected in legislation) are presented in the DWPA Register, Table 7-3. A Map overview of either legally identified or provisionally identified DWPAs is shown in Map 7-1.

An urgent priority as part of the Programme of Measures is to identify, register and enforce all Permits of such abstractions and delineate and publish the source protection zones. These Maps should be made available to all competent authorities engaged in water utilisation or land-use activities that may impact on DWPAs, including especially water utilities that have the primary responsibility to protect and restrict harmful practices within the DWPAs.

## **7.3 Areas Designated for Economically Significant Aquatic Species**

### **7.3.1 Overview**

Some areas of estuarine and coastal waters are to be designated as shellfish waters. Shellfish waters are areas requiring protection or improvement to support shellfish life and growth in order to contribute to the high quality of shellfish for people to eat.

Fish is at the very top of the aquatic ecosystem food chain and is widely used as a water quality indicator organism. Rich fish diversity contributes to not only the provision of social-economic services, but also to the maintenance of the ecological balance of natural resources. The restoration of fish habitats and the increases in populations of endangered fish can, thus, contribute to an improved provision of various ecosystem services. On the contrary a decrease in fish biodiversity may have an adverse impact on the value of cultural services of aquatic ecosystems such as recreation, ecotourism, and education. Once the cultural value is distorted it can never be replaced. Therefore, fish biodiversity conservation confers wider environmental benefits and also protects aquatic biodiversity for future generations.

### **7.3.2 Economically Significant Protection Areas in Ishem**

The objective for shellfish waters designated under the Shellfish Water Directive is to protect and, where needed, improve the quality of shellfish waters in order to support shellfish (bivalve and gastropod molluscs) life and growth, and thus contribute to the high quality of shellfish products directly edible by man.

This objective will be achieved by meeting the imperative standards and endeavouring to observe the guideline standards of the Shellfish Water Directive.

**Table 7-1 – List of economically significant protection areas**

WATERCOURSE NAME	DESIGNATION	COMPLIANCE STATUS
Boville reservoirs	<i>Cyprinid</i>	Imperative pass
Ishem river 1	<i>Cyprinid, Salmonid</i>	Imperative pass
Zeze	<i>Cyprinid, Salmonid</i>	Guideline fail
Terkuza	<i>Cyprinid</i>	Imperative pass
Hamallaj	<i>Cyprinid</i>	Imperative pass
Tirana river	<i>Cyprinid</i>	Imperative pass

A Map overview of either legally identified or provisionally identified economically significant areas (ESPA) is shown in Technical Annex VIII.

## 7.4 Areas Designated for Recreational and Bathing Water

### 7.4.1 Overview

Bathing waters are designated waters and beaches that large numbers of bathers use. The objective for bathing waters is to preserve, protect and improve the quality of the environment and to protect human health by meeting the 'sufficient' water quality standards of the Bathing Waters Directive and to take such realistic and proportionate measures considered appropriate with a view to increasing the number of bathing waters classified as 'excellent' or 'good'.

According to the hygiene-sanitary regulation (DCM nr.797, dated 29.9.2010) "on management of washing water quality" Bathing waters is any surface water element where the competent authority expects to have a large number of people to bathe and where it has not established a permanent ban on bathing or a permanent recommendation not to bathe.

The criteria are designed to protect the public from exposure to harmful levels of pathogens while participating in water-contact activities, such as swimming, wading and surfing, in all water bodies designated for such recreational uses.

The assessment of a beach or water should take into account several key considerations, including:

- the presence and nature of natural or artificial hazards;
- the severity of the hazard as related to health outcomes;
- the availability and applicability of remedial actions;
- the frequency and density of use; and
- the level of development.

Integrated coastal area management (ICAM) and integrated river basin management (IBM) are usually initiated in response to issues relating to one or more of the following: fisheries, recreation/tourism, hazards and mangrove depletion. Therefore, recreational water hazards are just one of a wide range of issues, interests and constraints that affect the planning and management of coastal areas or river basins. Decisions relating to management of hazards should be made with reference to all relevant government policies and other factors that affect coastal/river basin amenity and use. Social, economic, aesthetic, recreational and ecological factors all need to be considered. ICAM and IBM provide umbrellas for coordination among different areas of intervention, covering the economic, abiotic/biotic and social systems.<sup>132</sup>

<sup>132</sup>World Health Organization. Guidelines for safe recreational water environments. Volume 1, Coastal and fresh waters.

Bathing waters are to be classified as 'poor' if, in the set of bathing water quality data for the last assessment period (1), the percentile values (2) for microbiological enumerations are worse (3) than the 'sufficient' values set out in Technical Annex VIII, Table 2, column D.

Bathing waters are to be classified as 'sufficient' if, in the set of bathing water quality data for the last assessment period, the percentile values for microbiological enumerations are equal to or better (4) than the 'sufficient' values set out in Technical Annex VIII, Table 2, column D; and if the bathing water is subject to short-term pollution.

Bathing waters are to be classified as 'good': if, in the set of bathing water quality data for the last assessment period, the percentile values for microbiological enumerations are equal to or better (4) than the 'good quality' values set out in Technical Annex VIII, Table 2, column C; and if the bathing water is subject to short-term pollution

Bathing waters are to be classified as 'excellent' if, in the set of bathing water quality data for the last assessment period, the percentile values for microbiological enumerations are equal to or better than the 'excellent quality' values set out in Technical Annex VIII, Table 2, column B and if the bathing water is subject to short-term pollution.

#### 7.4.2 Recreational and Bathing Waters Protection Areas in Ishem

Coastal and marine areas are the richest in terms of biological diversity. The complex ecosystems of coastal lagoons shelter more than 70 % of vertebrate fauna in the country particularly migratory and wintering birds. Annually there are around 70 waterfowl and water bird species found in the coastal lagoons and large lakes inside the country, with a total population of 180,000 individuals during the winter.

In the basin of the Ishem river we find:

##### **Protected Area "Kune-Vain-Patok-Fushekuqe-Ishem"**

- Managed Natural Reserves, Category IV IUCN, approved with DCM No. 60, dated 26.01.2022.
- Important area for birds (IBA) as habitats for migratory birds (Order of the Minister of Environment No. 283, dated 10.04.2013).

Important habitats:

- Mati and Ishem river estuaries
- Coastal lagoons (Patoku, Gryka e Patoku, Godulla)
- Coastal dunes with *Juniperus oxycedrus subsp. Macrocarpa*
- Coastal dune forests with *Pinus halepensis*, *P. pinea*, *P. pinaster*

Another area is **Cape Rodoni – Lalzi bay – Ishemi forest** (25 km), that has been proposed as a Protected Landscape/Seascape. The Rodoni Cape is situated in the most western part of the hilly chain of Preza-Rodoni which separates the Erzeni watershed (ending in the Lalzi bay) from the Ishem watershed (ending in the Rodoni Bay). It is formed by terrigenous material and is encompassed by high vertical banks of up to 25 m. The material is eroded and washed out continuously by the waves of the sea. The coastline, represented by Tortonian sandstone-clay banks, is an erosive area and generally barren. Terrestrial vegetation is dominated by Mediterranean macquis. The site includes several important habitats, as well as several species of conservation interests. The marine hydro-dynamics or the climate changes have intensified the erosion in the Lalzi. It is enhanced also by human impact. The land reclamation and drainage of the wetlands has been excessive as elsewhere in the country. Moreover, new irrigation reservoirs in the catchment and intense gravel mining in riverbeds over the last decades have strongly disturbed the hydrological system of the coast and the river deltas of Erzeni

and Ishem. The Rodoni cape belongs also to the checklist of Natural Monuments of Albania for its special natural values.<sup>133</sup>

High natural biological diversity: It includes interesting marine and coastal habitats with a rich variety of habitats and species. The presences of wetland near increased the natural biodiversity. Representativeness: sandy and rocky coastal in the Adriatic Sea.

Productivity: High; as a result of river affluent and wetlands presence

Important for a species: Sea turtle, dolphins, etc.

A Map overview of either legally identified or provisionally identified recreational protection areas (RBPA) is shown in Technical Annex VIII.

## 7.5 Areas Designated as Nutrient Sensitive Areas

### 7.5.1 Overview

EU legislation defines two forms of area that should be protected from surface pollution:

- Areas actually or potentially used for drinking water abstraction, where the concentration of nitrates as a result of surface practices could exceed 50 mg/l, under the Nitrates Directive.<sup>134</sup> These should be declared as 'nitrate vulnerable zones' (NVZs) with appropriate land-management practices applied.
- Areas designated under the Urban Waste Water Directive (UWWTD)<sup>135</sup> as 'nutrient sensitive areas'. These are areas where waterbodies are already eutrophic or which may become eutrophic if protective action is not taken, or where further treatment of wastewater is required to protect habitats or species (UWWTD, Annex II).

Nitrate Vulnerable Zones (NVZs) are designated where nitrate concentrations in water bodies are high or increasing, or water bodies are, or may become, eutrophic due to agricultural nitrate pollution. Farmers within NVZs must comply with mandatory action programme measures to reduce agricultural nitrate losses. In addition, a code of good agricultural practice has been established for voluntary implementation by all farmers.

### 7.5.2 Nutrient Sensitive Areas in Ishem

Identification of Nutrient Sensitive Areas in Ishem Basin is not completed and there is no map to identify different areas.

NVZs are areas designated as being at risk from agricultural nitrate pollution. Waters will be defined within the Nitrates Directive and Nitrate Regulations as polluted if they:

- contain or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l;
- are eutrophic, or become eutrophic, if preventative action is not taken.

To designate the NVZs it is necessary that farmers will need to keep records of the sources of nutrients in the farm and fertilisers applied to the fields. The main focus will be on the follow up of volumes of slurry, dirty water, poultry layer manure, poultry litter and other solid manure generated on a farm. With these records, the tool will estimate the quantities of nutrients (Nitrogen and others) produced by the farm. Then, knowing where the farm and plots are located, it can calculate the amount of fertiliser to be applied on each parcel, to comply with the NZV regulations. The tool also calculates the minimum slurry and poultry manure storage requirements, enables farmers to prepare fertilisers' application calendars or add soil analysis results in order to improve calculations.

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<sup>133</sup> Miho A., Kashta L., Beqiraj S. (2013): *Between the Land and the Sea*

<sup>134</sup> European Commission – Directive 91/676/EEC - concerning the protection of waters against pollution caused by nitrates from agricultural sources

<sup>135</sup> European Commission – Directive 91/271/EEC - concerning urban waste-water treatment

A Map overview of either legally identified or provisionally identified as NVZs or as nutrient sensitive protection areas (NSPA) is shown in Technical Annex VIII.

## 7.6 Areas Designated for the Protection of Habitats and Species

### 7.6.1 Overview

As applicable national legislative in non-EU countries is not fully harmonized with EU standards, a complete inventory of PA as required by the WFD cannot currently be drawn up for the basin as a whole. Therefore, a modified approach could be applied, which takes into consideration:

- National standards for the delineation of PA;
- A different status within Bern Convention implementation and NATURA 2000 network design within the country;
- The different level of adaptation of national legislation to EU legislation and standards in non-EU countries;
- The general lack of registers and/or effective databases of PA in country;
- Shared responsibility regarding maintenance and the protection of drinking water zones between national and sub-national level competent authorities;
- Shared responsibility for the monitoring of drinking water protection areas.

### 7.6.2 Habitat Protection Areas in Ishem

Five protected areas assigned in accordance with Albanian law are located along the borders of the Ishem River Basin. The approach for assigning and managing protected areas in Albania is described in Law for Protected Areas. The law regulates the protection of six (6) categories of protected areas. The categorization of areas, status and level of protection for each area is based on the criteria of World Centre of Nature Conservation.

**Table 7-2 - Protected Areas in the Ishem River Basin**

IUCN Category	Surface (ha)	Description of PA category	Name of PA	DCM of establishing
IV	1,471.84	Natural Park	Qafe Shtame	DCM no.10, date 28.12.2020
II	19,837.71	National Park	Pas Mali i Dajtit	DCM no.402, date 21.06.2006
IV	8092	Managed Nature Reserve	Patok-Fushe kuqe-Ishëm	DCM no.60, date 26.01.2022
IV	749.23	Natural Park	Mali me Gropa-Bize-Martanesh	DCM no.10, date 28.12.2020
V	1,441.50	Protected Landscape	Kraste-Verjon	DCM no. 468, date 26.7.2018

Only recently the work has commenced on managing Natura 2000 sites.<sup>136</sup> In framework of the project NaturAL the potential distribution of the Natura 2000 Sites of Community Interest (SCIs) was identified, resulting in the preliminary list of 43 proposed sites. There are identified three Natura 2000 (Table 7 3 - Protected areas according to Natura 2000 in Ishem Basin and Figure 7 4 –Map of Protected areas in Ishem River Basin on Annex XX) sites of community interest in Ishem River Basin.

Based on the relevant legislation of protected areas, these categories of PAs should be managed according to their management plans. From the current management situation of these areas, it results that not all PAs within the Ishem River Basin have their own management plans. Of the five PAs listed, four of them have management plans. Patok-FusheKuqe-Ishem Protected Nature Reserve together with the other three areas have a management plan prepared. Specific programs of measures are integral part of these plans comprising relevant measures related to monitoring and evaluation of the water resources and dependent ecosystems. A summary information on each protected area is included under the Technical Annex VII

<sup>136</sup> EU - Strengthening National Capacity in Nature Protection – Preparation for Natura 2000 Network, March 2019

**Table 7-3 – Register of Protected Areas – Category DRINKING WATER PROTECTED AREAS**

NAME OF PROTECTED AREA	SUB-BASINS	FUNCTION	DATE ESTABLISHED	NATIONAL LEGISLATION RELEVANT	EU LEGISLATION RELEVANT	RELEVANT WATERBODIES	CURRENT STATUS	BOUNDARIES PUBLISHED
BOVILLA RESERVOIR CATCHMENT SOURCE PROTECTION ZONE	ISH3	DWPA			Directive 2000/60/EC	351444	2	
					Directive 91/676/EEC	351445	2	
SELITA WATER RESOURCE	ISH3	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC	351444	2	
SHEN MERI WATER RESOURCE	ISH2	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC			
QAF – MOLLE WATER RESOURCE	ISH3	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC			
WATER SOURCE TUJAN CAVE	ISH3	DWPA			Directive 2000/60/EC	351495	4	
					Directive 91/676/EEC	351493	2	
LAKNAS WATER SOURCE	ISH2	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC	351481 35147	5 5	
BERXULL WATER SOURCE	ISH1	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC	35146	3	
YZBERISHT WATER SOURCE	ISH1	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC	351483	5	

FUSHE KRUIJE WATER SOURCE	ISH1	DWPA			Directive 2000/60/EC Directive 91/676/EEC Directive 91/272/EEC	351423	3	
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**Table 7-4 - Register of Protected Areas – Category ECONOMICALLY SIGNIFICANT AQUATIC SPECIES**

NAME OF PROTECTED AREA	SUB-BASINS	FUNCTION	DATE ESTABLISHED	NATIONAL LEGISLATION RELEVANT	EU LEGISLATION RELEVANT	RELEVANT WATERBODIES	CURRENT STATUS	BOUNDARIES PUBLISHED
Boville reservoirs	ISH3	DWPA			Directive 2000/60/EC Directive 91/676/EEC	351444	2	
Ishem river 1	ISH0	DWPA			Directive 2000/60/EC Directive 91/676/EEC	351413	4	
Zeze	ISH2	DWPA			Directive 2000/60/EC Directive 91/676/EEC	351425 351423	3	
Terkuza	ISH2	DWPA			Directive 2000/60/EC	351441	5	
					Directive 91/676/EEC	351443	4	
Hamallaj	ISH0	DWPA			Directive 2000/60/EC Directive 91/676/EEC			
Tirana river	ISH2	DWPA			Directive 2000/60/EC	351495	4	
					Directive 91/676/EEC	351493	2	
						351491	5	

**Table 7-5 - Register of Protected Areas – Category RECREATIONAL AND BATHING WATER**

NAME OF PROTECTED AREA	SUB-BASINS	FUNCTION	DATE ESTABLISHED	NATIONAL LEGISLATION RELEVANT	EU LEGISLATION RELEVANT	RELEVANT WATERBODIES	CURRENT STATUS	BOUNDARIES PUBLISHED
Kune-Vain-Patok-Fushëkuqe-Ishëm	ISH0	PAMNR	DCM nr.60, dated 26.01.2022	Law 81/217 date 04.05.2017	Directive 2006/7/EC	351411	3	yes

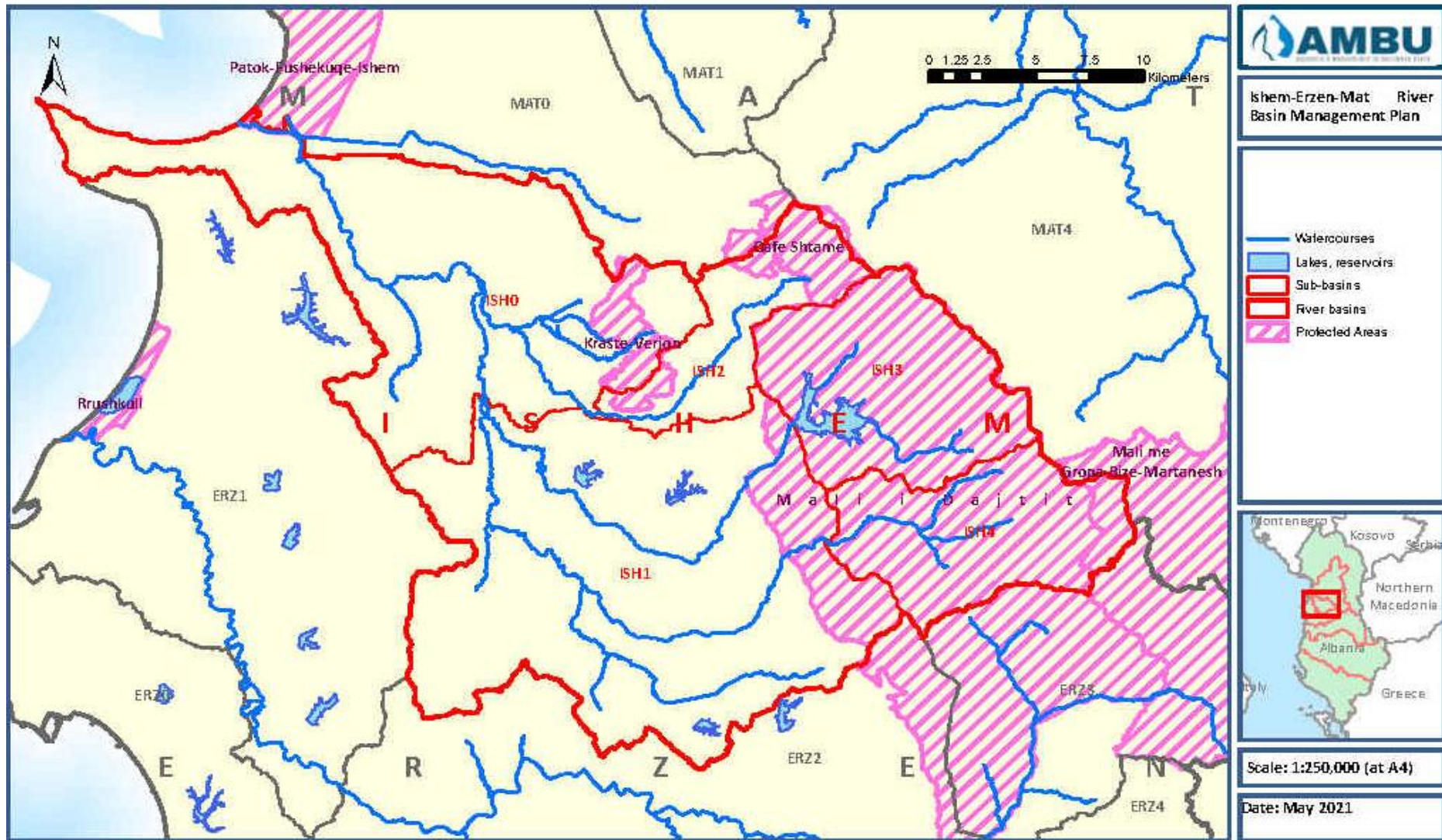
**Table 7-6 - Register of Protected Areas – Category NUTRIENT SENSITIVE AREAS**

NAME OF PROTECTED AREA	SUB-BASINS	FUNCTION	DATE ESTABLISHED	NATIONAL LEGISLATION RELEVANT	EU LEGISLATION RELEVANT	RELEVANT WATERBODIES	CURRENT STATUS	BOUNDARIES PUBLISHED
	ISH3	RBPA			Directive 91/676/EEC Directive 91/272/EEC			

**Table 7-7 - Register of Protected Areas – Category HABITATS AND SPECIES PROTECTION**

NAME OF PROTECTED AREA	SUB-BASINS	FUNCTION	DATE ESTABLISHED	NATIONAL LEGISLATION RELEVANT	EU LEGISLATION RELEVANT	RELEVANT WATERBODIES	CURRENT STATUS	BOUNDARIES PUBLISHED
Qafe Shtame Nature Park	ISH3	RBPA	DCM nr.10, dated 28.12.2020	LAW no. 81/2017 ON PROTECTED AREAS	Directive 91/676/EEC Directive 91/272/EEC	351427	1	yes
Mali i Dajti National Park	ISH3	RBPA	DCM nr.402, date 21.06.2006	LAW no. 81/2017 ON PROTECTED AREAS	Directive 91/676/EEC Directive 91/272/EEC	351495	4	
Kune-Vain-Patok-Fushekuqe-Ishëm Managed Nature Reserve	ISH0	PAMNR	DCM nr.60, dated 26.01.2022	LAW no. 81/2017 ON PROTECTED AREAS	Directive 91/676/EEC Directive 91/272/EEC	351411	3	yes
Natural Park Mali with Gropa-Bize-Martanesh	ISH3	RBPA	DCM nr.10, dated 28.12.2020	LAW no. 81/2017 ON PROTECTED AREAS	Directive 91/676/EEC Directive 91/272/EEC			
Kraste-Verjon Protected Landscape	ISH2	RBPA	DCM nr. 468, dated 26.7.2018	LAW no. 81/2017 ON PROTECTED AREAS	Directive 91/676/EEC Directive 91/272/EEC	351425	3	

Map 7-1 – Map of All Protected Areas – Ishem



## 8 Monitoring Networks and Surveillance Data

### 8.1 Legal Context

#### 8.1.1 Albania

The EU Directive 2008/105/EC has been transposed in the DCM No. 246, date 30.4.2014 "on setting environmental quality standards for surface water".<sup>137 138</sup> The present water monitoring programmes are prepared based on the DCM No. 1189 dated 18.11.2009 on "rules and procedures for drafting and implementing the national environment monitoring programme".

AMBU is to use the information collected via water monitoring, and any other relevant information including existing environmental monitoring data, for an assessment of the probability that surface water bodies within the water basin will fail to meet the environmental quality objectives of the designated for the bodies. AMBU may use modelling techniques to assist in such a decision.

Based on the characterization and impact assessment carried out in accordance with Annex 1, of DCM no. 1015, date 16.12.2020, for each period in which the water basin management plan is implemented, a surveillance monitoring program and an operational monitoring program shall be established, and in some cases should also establish investigative monitoring programs.

State institutions responsible for monitoring should monitor the parameters which are indicative of the status of each relevant quality element. The National Water Cadastre serves as a database of acquired Geo-Reference sources on GIS system bases. The publication of data for the layers, contained on the National Water Cadastre, is done on ASIG website.

#### 8.1.2 European Union

The WFD compliant monitoring program at national level aims at collecting data for baseline status assessments, identification of water quality trends, and reviewing the effectiveness of water protection measures applied. Annexes II and V of the WFD specify a comprehensive assessment and monitoring plan for waters. This applies to both surface water and groundwater bodies, and protected areas.<sup>139</sup>

Key aspects of monitoring programmes include:

- the monitoring types and objectives (reconnaissance,<sup>140</sup> surveillance, operational and investigative);
- the choice of monitoring sites (designed so as to provide a coherent and comprehensive overview of status of the waterbodies within each river basin);
- the quality elements (QEs) to be monitored, and the required monitoring frequencies.

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<sup>137</sup> Directive 2008/105/EC on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council

<sup>138</sup> The Directive 2008/105/EC has been amended by the Directive 2013/39/EU amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy

<sup>139</sup> Water Framework Directive, Annex V

<sup>140</sup> The term 'reconnaissance monitoring' is not used in the WFD, but is used in Albania to indicate a widespread and rapid assessment of biological and/or physical-chemical conditions where the national monitoring programme is insufficient, in order to derive a first approximation of likely waterbody status

## 8.2 Surface Water Quantity Monitoring Programme

### 8.2.1 Competent Authority

The competent authority responsible for the quantity monitoring of surface waters is the Institute of GeoSciences, Energy, Water and Environment (IGEWE). This is a national research unit that operates under the umbrella of the Polytechnic University of Tirana.

This institute has encountered significant management, funding and organisational difficulties in recent years with respect to the satisfactory delivery of basic, and reliable flow data, processed according to minimum acceptable international standards.<sup>141</sup> In spite of numerous repeated technical assistances from major international agencies since 2007, the majority of meteorological and hydrological monitoring stations are not functioning or have major calibration problems.

### 8.2.2 Relevance of the Surface Water Quantity Monitoring Network

A reliable and current hydrometric network is utterly essential for effective IWRM. Processed surface water flow data is essential on four counts:

- Determination of recent actual flow regimes and water resources availability, so that local, regional and national water resources can be accurately determined for water allocation purposes, through the mechanism of water balances
- Determination of trends in precipitation and resultant basin outflows to assess the impacts of climate change
- Determination of flow regimes generally and environmental flows specifically so that ecological aspects of waterbody status can be correctly established.
- Determination of correct flow volumes, so that pollutant loads in receiving waters (and the consequent necessary corrective measures) can be reliably calculated.

It is self-evident that without an efficient and functioning hydrometric network, the majority of objectives required under a comprehensive IWRM strategy for any river basin fail completely.

### 8.2.3 Status of the Surface Water Quantity Monitoring Network

Historically (1960-1992) an efficient and reliable national hydrometric network was maintained. However, this project could only be provided with historical flow data no later than 2008. The lack of recent reliable flow data raises many issues for the relevance and integrity of any IWRM strategy envisaged under this and other related reports and strategies. The use of old flow data, taking into account the many changes that have occurred in the river basin, not least probable climate change, is highly suspect.

## 8.3 Surface Water Quality Monitoring Programme

### 8.3.1 Competent Authority

The monitoring network of surface water quality (rivers, lakes, transitional and coastal waters) in the Ishem river basins, and the associated sampling programmes, is under the competent authority of the NEA of the Ministry of Tourism and Environment <sup>142</sup>. NEA publishes annually the National Environmental Monitoring Program, which sets out the intended monitoring sites and the target parameters. <sup>143</sup>

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<sup>141</sup> On the Establishment of Institutional and Regulatory Platform for Governance and Functioning of the National Water Resources Cadastre. World Bank/SIDA – May 2020

<sup>142</sup> Government of Albania - DCM No 1189 - "On the rules and procedures for implementation of the National Monitoring Program", 2009

<sup>143</sup> National Environmental Agency - [http://www.akm.gov.al/cil%c3%absia-e-mjedisit.html#raporte\\_publikime](http://www.akm.gov.al/cil%c3%absia-e-mjedisit.html#raporte_publikime)

### 8.3.2 Relevance of the Surface Water Quality Surveillance Monitoring Network

The surface water quality monitoring network should ideally be established in accordance with the requirements of WFD Article 8 and Annex V, 1.3. The monitoring network should be designed so as to provide a coherent and comprehensive overview of status within each river basin and should permit classification of water bodies into five classes consistent with the normative definitions of ecological status for surface water. The current surface water quality monitoring network operated by the NEA is shown in Map 8-1.

### 8.3.3 Status of the Surface Water Quality Surveillance Monitoring Network and Data

Currently, due to resource and capacity limitations, BQEs are not routinely sampled or analysed in Albania. The laboratory under NEA works in accordance with ISO 17025:2017 and is accredited for the main physical-chemical parameters: alkalinity, suspended solids, chemical oxygen demand, biochemical oxygen demand, nitrite, nitrate, ammonium, ortho-phosphorous and total phosphorous.

Priority substances (being those which present a significant risk to the aquatic environment)<sup>144</sup> are not routinely monitored at present. River basin specific pollutants (RBSP) (those pollutants deemed by the competent authority to be of particular importance in the river basin) are not yet defined.

The number of monitoring sites varies on an annual basis depending on budget limitations. Routinely monitored surface water quality data are available for seven river sites inside the Ishem River Basin. The surface water quality monitoring network as currently deployed by NEA is shown in Table 8-1. Selected results from the monitoring network are shown for the parameters of BOD<sub>5</sub>, Total P and NH<sub>4</sub> in the Technical Annex IX. These three parameters are good general indicators of pollution arising from anthropogenic sources that are likely harmful to aquatic systems. The related physical-chemical data from the NEA monitoring programmes 2014 – 2019 are provided in Technical Annex IX.

**Table 8-1 – RIVER Water Quality Monitoring Sites on Ishem Basin**

STATION NAME	STATION CODE	RIVER	LATITUDE WGS84	LONGITUDE WGS84	ALT mASL	MAF (Q m <sup>3</sup> /S)	SAMPLE FREQ <sup>145</sup>	PARAMETERS MONITORED							
-	-	-	-	-	-	-	-	BQEs (QE1)	HMORPH (QE2)	FLOW (QE2-1)	PCHEM (QE3-1)	ANNEX X PSS	RBSPs (QE3-3)		
<b>TIRANA, URA BRARIT</b>	AL_RV_041	Tirana	41.379000	19.859000	150	?	2 to 4							✓	
<b>TIRANA, URA k. KAMES</b>	AL_RV_043	Tirana	41.355000	19.772000	70	<i>not available</i>	2 to 4							✓	
<b>LANA, LANABREGAS</b>	AL_RV_044	Lana	41.330000	19.880000		<i>not available</i>	2 to 4							✓	
<b>2 to 4 VLANA, YRSHEK</b>	AL_RV_046	Lana	41.337993	19.776542		<i>not available</i>	2 to 4							✓	
<b>ISHEM, URA RINAS</b>	AL_RV_047	Ishem	41.436011	19.696884		<i>not available</i>	2 to 4							✓	
<b>ISHEM, URA GJOLES</b>	AL_RV_048	Ishem	41.466990	19.691910		?	2 to 4							✓	
<b>ISHEM, URA SALMER</b>	AL_RV_049	Ishem	41.541177	19.610505	4	?	2 to 4							✓	

<sup>144</sup> European Commission – Directive 2013/39/EU amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.

<sup>145</sup> Realised sampling frequencies throughout the period 2014-2019, per year

### 8.3.4 Rapid Reconnaissance Monitoring During 2019

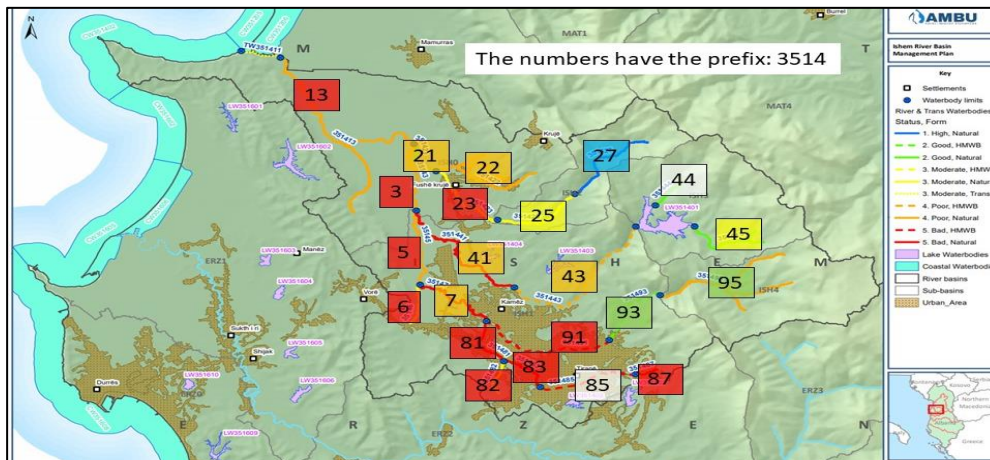
It is evident from Table 8-1 that the number of currently monitored stations is not widespread, and does not represent the majority of waterbodies delineated in the river basins. The current NEA programme does not fulfil the compliance requirements of WFD Annex V 1.3. In order to obtain a better quantification of potential waterbody status, a more comprehensive ‘reconnaissance monitoring’ was conducted throughout the Ishem in September 2019. The survey was conducted at 28 sites throughout the Ishem with 11 physical-chemical parameters analysed. The detailed analyses are presented in Technical Annex IX. The wider survey allowed a more quantitative assessment of potential status of all waterbodies in the river basins. Map 8-2 summarises these locations and gives values for two of the most important physical-chemical indicators of anthropogenic pollution and potential impact on BQEs, BOD<sub>5</sub> and NH<sub>4</sub> (mg/l). Complete data sets are provided in Technical Annex IX. BOD<sub>5</sub> levels > 15.0 mg/l (almost certain to result in Bad ecological status of any waterbody) are observed at 9 out of 28 sites sampled, principally in the urbanised lower reaches of the Lana, Tirana, Ishem and Terkuza rivers. NH<sub>4</sub> levels > 8.0 mg/l (almost certain to result in Bad ecological status of any waterbody) are observed at 9 out of 28 sites sampled, principally in the urbanised lower reaches of the Lana, Tirana, Ishem and Terkuza rivers. Full physical-chemical data from the reconnaissance monitoring is provided in Technical Annex IX.

### 8.3.5 Biological field surveys 2021

As already mentioned earlier above: hydrobiological quality elements are not routinely monitored in Albanian surface waters. During April – July 2021, the EUSIWM project organised field surveys, targeting at the delineated surface waterbodies inside the Ishem River Basin. Benthic invertebrate fauna was selected for the river-category waterbodies (April 2021) and phytoplankton for the lake-category waterbodies (June/July 2021). In addition, analyses were conducted for physical-chemical parameters. The detailed results and findings are included in Technical Annex V. Currently, no Albanian assessment method exists for calculating the biological status in accordance with the WFD requirements. Provisionally, the ASPT-index (Average Score Per Taxon) has been used. The ASPT-index is based on the BMWP-index (Biological Monitoring Working Party).<sup>146</sup> The results of assessing the status on the basis of the ASPT-index are shown in

Figure 8-1 and to Technical Annex VI for hydro biological assessment. This assessment is merely indicative, since it is based on single measurements and not yet meeting the overall WFD requirements for assessment of the ecological status.

Figure 8-1 - Preliminary ecological status assessment rivers



<sup>146</sup> Armitage PD, D Moss, JF Wright & MT Furse (1982). The performance of a new biological water quality score system based on macroinvertebrates over a wide range of polluted running-water sites. Water Res. Vol. 17, no3, pp: 333-347.

### 8.3.6 Hydro-morphological assessments

Under the WFD, the hydro-morphological quality elements are considered as supporting the biological quality elements. This acknowledges that the hydro biological quality elements not only can be affected by water quality, but also by hydrological and/or morphological conditions. Currently, there are no provisions in Albania that stipulate the assessment of the hydro-morphological status. On top of the poor state of the hydrological monitoring and the lack of systematic monitoring of morphological quality elements.

Nevertheless, a preliminary attempt has been made to assess the hydro-morphological status of the surface waterbodies delineated in the Ishem River Basin. Details about the approach and methodology are included in Technical Annex VI.

The biological assessment of the status of water bodies will be further elaborated in Chapter 10 and in the annexe pertaining to the biological assessment. There are also table 8-1 and 8-2 at Technical Annex IV.

## 8.4 Groundwater Monitoring Programme

### 8.4.1 Competent Authority

The groundwater monitoring network as fully deployed (varies annually) is shown in Technical Annex VII.<sup>147</sup>

### 8.4.2 Relevance of the Groundwater Quantity Monitoring Network

The groundwater monitoring network should ideally be established in accordance with the requirements of WFD Article 8 and Annex V, 2.2 and 2.3. The monitoring network should be designed so as to provide a coherent and comprehensive overview of groundwater quantity and chemical status of all discrete waterbodies. The primary measure of quantitative status is the depth to, or elevation of, groundwater level in purpose-built monitoring wells. This is fully applicable to the alluvial and sandstone-conglomerate aquifers (Types 1, 2 and 5). However, in the highly karst limestone massifs (Type 4 aquifers) where there is little pumping from drilled wells, spring flows are probably a better indicator of quantitative (and qualitative) status.

### 8.4.3 Status of the Groundwater Quantity Monitoring Network and Data

The monitoring of groundwater quantity comprises only the measurement of depth to water and is spatially and temporally incomplete. Levels were measured at selected abstraction well in the alluvial groundwater bodies GW35140101 (Thumane) and GW35140103 (Tirana) from 2015 to 2019:

- Shp. 16/97 Rruga e Kavajes,
- Laknas (wells 32/87, 33/87 and 33 Laknas)
- 416 Bilaj, Fushe Kruje.

Few old data series are available from reports of the AGS for a larger number of wells in the years 2000 (single measurement) and 2004 (four measurements), including the five wells listed above.

Selected results from the monitoring network are shown for the parameters of water level, Technical Annex VII. Level monitoring is required to fulfil the objective of maintaining a sustainable groundwater balance. Reductions in groundwater level over a sustained period (5+ years) will be indicative of over-abstraction which must be brought under control. The limited available data suggest a distinct drop in water level between 2004 and the post-2014 monitoring period; however, no clear trend in levels can be confidently confirmed or rejected in the 2015 to 2019 period. No water level data are available for any other groundwater bodies in the Ishem Basin. Ad hoc measurements of spring flow exist, including

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<sup>147</sup> The precise location and status of many groundwater monitoring sites could not be verified despite extensive communication with the Albanian Geological Service.

reference to seasonal variation, but no systematic compilation of time-series discharge is available. The available data under groundwater Technical Annex VII.

#### 8.4.4 Status of the Groundwater Quality Monitoring Network and Data

The WFD and the GD require monitoring of a wide range of chemical parameters in order to determine the qualitative status of groundwater. Currently only a fraction of the requisite parameters, comprising major anions (Cl, SO<sub>4</sub>, NO<sub>3</sub> and alkalinity) and cations (Na, K, Ca, Mg, Fe and NH<sub>4</sub>) and indicator parameters (pH, T, EC and TDS) are routinely measured. In addition, there is limited monitoring of heavy metals including Cu, Cr, Pb, Ni, Mn, Zn, Co and Cd, and for which no documentation is available regarding sampling and analytical protocols and quality control.

Groundwater quality monitoring is conducted at abstraction wells in the two alluvial groundwater bodies (GW35140101 and GW35140103). Abstraction wells mix water from different depths and from a large area, and so are effective at identifying the presence of contaminants but poor at locating their source or the concentrations in the source area. Large springs serve similar purposes in karst aquifers.

Regular, up to four times a year, measurements of major ions and heavy metals have been reported in the annual State of the Environment reports since 2012. The data are laboratory analyses of water samples collected by AGS from 13 to 15 abstraction wells including most of the same wells as used for water level monitoring. There is no routine monitoring of groundwater quality at wells or springs.

**Table 8-2 – Abstraction wells used for water level monitoring**

No	Wells	Location
1	1P Selite. Tirane	Well nr. 1. Unaza Re - Buka. Yzberisht - Tirane
2	2P Selite. Tirane Nr.13. Kombinat. Tirane	Nr.160. Thumane. Fushe - Kruje
3	Nr.2/97 Rinas. Tirane Nr.3/97 Valias - Rinas. Tirane	Drill nr. 1N Gramez. Fushe - Kruje
4	Nr.327. Fushe - Kruje	Drill nr. 30B Laknas. (Shinat e Trenit)
5	Nr.47. Bexull. Tirane Nr.59. Ura Gjoles	Drill nr.6. Laknas. Tirane Drill nr.16/97 Rr. Kavajes. Tirane

Selected results from the monitoring network are shown for the parameter of nitrate (NO<sub>3</sub> mg/l) and electrical conductivity (EC µS/cm) and can be found in Technical Annex VII. NO<sub>3</sub> monitoring detects adverse trends for one of the main pollutants due to nutrient sources, which may be hazardous to health (EQS < 50 mg/l), or the cause of eutrophic surface waters. In coastal areas, a highly elevated EC value (e.g. > 1500 µS/cm) in deep groundwater (> 30m) may be indicative of saline intrusion to the groundwater. Full physical-chemical data from the groundwater monitoring programmes 2014 – 2019 is provided in Technical Annex VII.

#### 8.4.5 Rapid Reconnaissance Monitoring During 2019

It is evident from the Map 8-3 that the number of stations in the current national hydrogeological monitoring programme is not widespread, and does not represent the majority of ground waterbodies delineated in the river basins. The current AGS programme does not fulfil the compliance requirements of WFD Annex V 2.2 and 2.4. To improve the characterisation of ground water bodies, the ‘reconnaissance monitoring’ conducted throughout the Ishem basin in November 2019 mainly for assessing surface water status included. 9 groundwater with 11 physical-chemical parameters were analysed. The analyses are presented in Technical Annex IX together with mapping of two of the most important physical-chemical indicators of anthropogenic pollution and potential impact on groundwater chemical status, electrical conductivity (µS/cm) and NO<sub>3</sub> (mg/l).

## 8.5 Protected Areas Monitoring Programmes

### 8.5.1 Competent Authorities

WFD Article 6 and Annex IV summarises several types of protected area to be addressed in the RBMP. These are:

- Areas designated to provide water for human consumption
- Areas designated for the protection of economically significant aquatic species
- Areas designated as recreational waters, including bathing waters under EU Directive 2006/7/EC
- Areas designated as 'nutrient sensitive' under EU Directives 91/676/EEC and 91/271/EEC
- Areas designated as important habitat areas, special areas of conservation (SAC) and Natura 2000 sites <sup>148</sup>

Coordination is required across several competent authorities, specifically:

- Regulation of water abstraction falls under the permit system of AMBU. Major operators such as the municipal water utilities are legally obliged to comply with the Water Permit limitations;
- The water utilities do not report directly to AMBU in terms of abstraction quantity; rather they report annually to the competent authority, the Water Regulatory Authority (ERRU) as part of annual compliance with service levels;
- Water utilities conduct their own routine monitoring programmes for their respective sources, as well as at (selected) taps;
- As part of recreational waters monitoring the specific requirement to monitor the quality of bathing waters is undertaken by the Institute of Public Health as the competent authority. <sup>149</sup>
- The National Agency for Protected Areas (NAPA) aims to halt the loss of biodiversity in Albania through improved management of its protected areas and setting the basis for the future implementation of European Natura 2000 network.

It is good to notice that the WFD Annex IV protected areas are situated inside waterbodies; like the Bovilla Reservoir being both a water body, as well as a source for drinking water abstraction. Thus, as such the WFD environmental objectives and monitoring requirements apply. The underlying assumption is that waterbodies of 'good status' also support the generic conditions regarding protected areas. However, their related Directives stipulate additional requirements for monitoring and assessment. For example, pathogens (bacteria, viruses, protozoans, fungi) are not part of the WFD water status definitions, but relevant for the quality of bathing waters and drinking water. Furthermore, protected areas have their own specific related monitoring sites and monitoring frequencies, on top of the ones already expected under the WFD.

### 8.5.2 National Monitoring and Reporting to the European Commission

Every four years Member States are required to report to the European Commission on:

- Nitrates concentrations in groundwater and surface waters
- Eutrophication levels of surface waters
- Assessment of the impact of action programme(s) on water quality and agricultural practices
- Revision of NVZs and action programme(s)

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<sup>148</sup> European Commission – Natura 2000 - [https://ec.europa.eu/environment/nature/natura2000/index\\_en.htm](https://ec.europa.eu/environment/nature/natura2000/index_en.htm)

<sup>149</sup> European Commission – Directive 2006/7/EC - concerning the management of bathing water quality and repealing Directive 76/160/EEC

- Estimation of future trends in water quality.

Albania is – besides Switzerland – the only non-EU country reporting the annual bathing water quality to the European Environmental Agency.<sup>150</sup> NEA reports the results of its surface water quality monitoring programmes to European Environmental Agency via 'WISE EIONET' (Water Information System for Europe, European environment information and observation network).<sup>151</sup>

### 8.5.3 Operational Status of the Protected Areas Monitoring Networks in Ishem

The protected areas in the country today account for about 21.4% of the territory of Albania. In the case of the Ishem river basin is AdZM Tirane respectively for the National Park "Dajti Mountain" and AdZM Durres for the National Park "Qafe Shtame" and the "Kraste-Vrion" Protected Landscape.

For the National Park "Dajti Mountain" and the National Park "Qafe Shtame" there are two draft Management Plans, but they have not yet been approved by the responsible institutions. The Draft Management Plan for the National Park "Dajti Mountain" is in advanced stage, after consultations with the actors involved, its approval is expected soon. Regarding the "Kraste-Vrion" Protected Landscape there is no information whether the draft Management Plan has been prepared, or any other document that regulates the proper management of the area.

For each Protected Area, another central institution involved in the management of protected areas is the National Park Management Committee (NPMC).

In the National Program of Environmental Monitoring of each year and respectively in that of 2021, is defined in the chapter on biodiversity the environmental indicators of the situation as follows:

- diversity of ecosystems and habitats in protected areas - statistical processing, list of species, habitats, in graphic table;
- Proximity of transport infrastructures to protected areas (protected areas) - Presentation in the table.

Wild fauna in environmentally protected areas, is included under chapter "NATURE CONSERVATION" (see for more information and tables 8-4, 8-5, 8-6 and 8-7 on Technical Annex VIII).

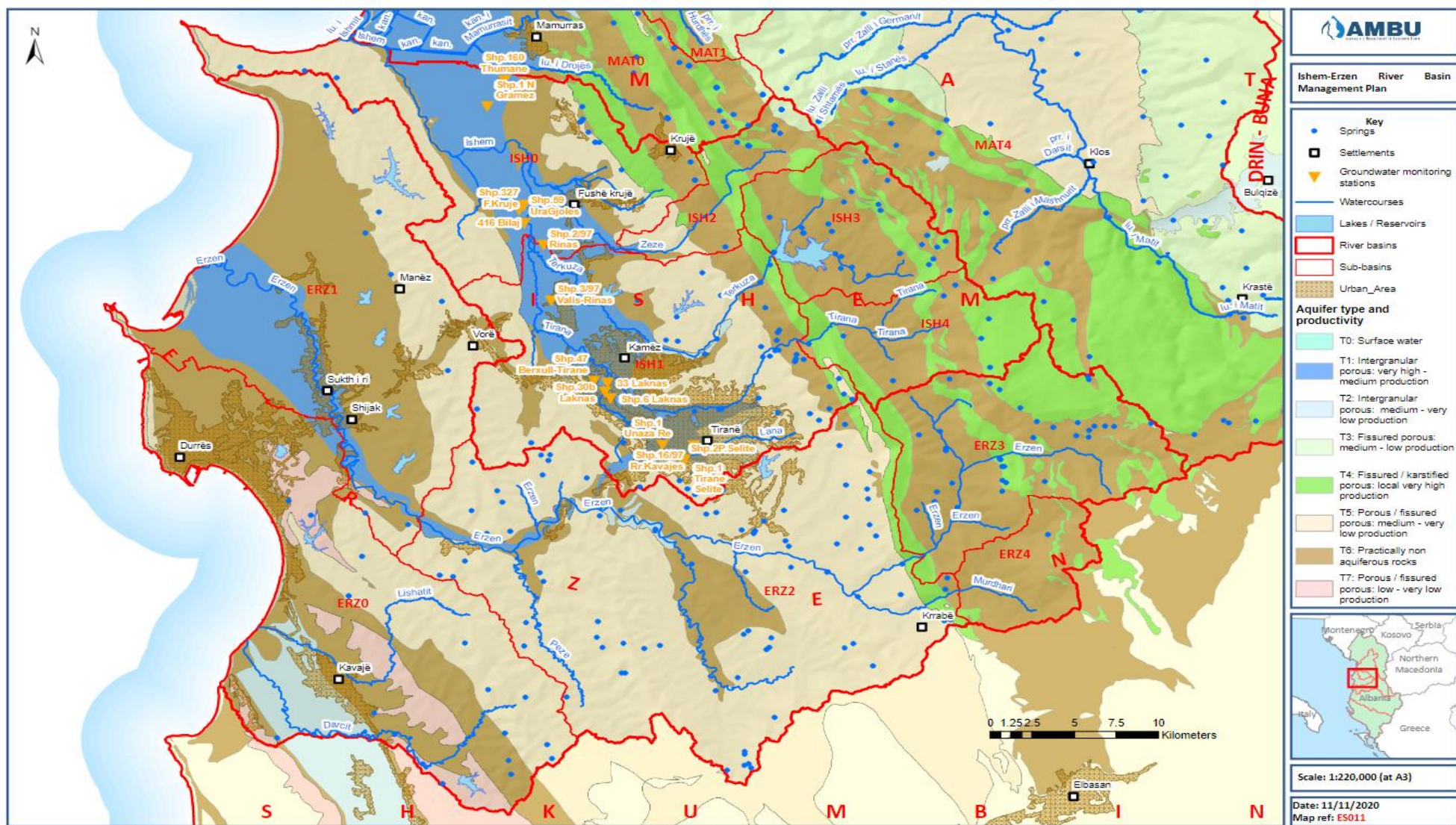
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<sup>150</sup> Compare, for example: Albanian bathing water quality in 2019 <https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/state-of-bathing-water/country-reports-2019-bathing-season/al-bw-country-reports-2020.pdf>

<sup>151</sup> Visit for example: [https://cdr.eionet.europa.eu/al/eea/wise\\_soe/wise6/envx\\_ilxq](https://cdr.eionet.europa.eu/al/eea/wise_soe/wise6/envx_ilxq)



Map 8-2 – Location of AGS Groundwater Quality and Quantity Monitoring Sites



## 9 Summary of Subsidiary Strategies and Plans

### 9.1 Overview

#### 9.1.1 Albania

The aim of Strategies, Policy Documents and Plans is to meet the challenges in the water sector, guarantee efficient management and governance of water resources, and governance of water resources.

The main Strategies, Policy Documents and Plans in the water sector, are:

- The **2030 Agenda for Sustainable Development**, specifies 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries, with the aim of achieving them by 2030. 2030 SDG Agenda is adopted by Albania in 2015.
- **National Strategy for Development and Integration (NSDI), 2015-2020**, represents the core strategic document that combs the EU integration agenda with the country's sustainable economic and social development. Pillar 4 of this strategy states ensuring growth through interconnection, sustainable use of resources and territorial development through:
  - a healthy and sustainable environment,
  - improving water supply, sewerage and waste management systems,
  - increase the coverage of the country with wastewater treatment plants for the population,
  - sustainable management of water resources.
- **National Strategy for Integrated Water Resources Management (2018-2027)**, is the main strategy, and serves as a base for water sector reforms. It enables institutions responsible for water resources management, to reach European standards by setting the main strategic objectives for this sector:

To enable the achievement of the fourth objective of NSWRIM (2018-2027), *"Securing trustworthy water and climate data and models, recognized by all stakeholders, and government advice adequate policy based on these data and models is provided by relevant institutional data owners"*, AMBU has established a National Water Cadastre which serves as a database of acquired geo-reference sources on GIS system bases. The publication of data for the layers, contained on the NWC, is done on website (<http://kadastraujore.gov.al/>).

- (Draft) **National Sector Program for Water 2018-2030**, for integrated water management aims to provide vital needs, competitiveness of use and reduction of the risk of water by paying special attention to the sustainability of aquatic ecosystems. The vision of this program is the water sector governance in accordance with the best European standards and practices, with the main purpose of promoting the sustainable use of water resources, their protection and protection from water.
- **National Strategy for Irrigation and Drainage 2019–2031**, has defined four strategic components:
  - Strategic component 1 "Irrigation",
  - Strategic component 2 "Drainage",
  - Strategic component 3 "Safety of dams and their use",
  - Strategic component 4 "Flood protection".
- Document of **Strategic Policies for the Protection of Biodiversity**.

The overall objective is to contribute at the national level on the prevention of biodiversity losses and the degradation of ecosystem services, through the full implementation of the Albanian and EU

legislative framework, the reduction of pressures on biodiversity, the restoration in a biologically fair and equal way of ecosystems, the transfer of relevant technologies, the channelling of biodiversity issues and values and the effective implementation of appropriate policies.

- **(Draft) National Strategy of Water Supply and Sewerage**

The purpose shall be to improve the quality provision of water supply and sewerage services to the citizens of Albania and to support the economic development of the country, based on the performance of a key infrastructure service.

- **National Civil Emergency Plan (2004)**, aims to:

- Prevent, alleviate and rehabilitate from any damage affecting the population, animals, property, cultural heritage and environment from civil emergencies;
- Provide conditions for the state, public and private institutions, economic activities and population, for the transition to an emergency situation, with the smallest possible losses.
- Guarantee the use of all possible state resources for the purpose of public safety, continuous preservation of the national economy, localization of the emergency zone and the mitigation of the consequences.

- **Integrated Cross-sectoral Plan for Tirana-Durres Area (ICSP)**

PINs Tirana-Durres comes in response to territorial and socio-economic development in the last 25 years and serves as a guide for economic, social and environmental development of the region, promoting the economy and improving the environment. PINs Tirana-Durres aims to guide the development of the territory through a vision that will serve as a common denominator for local government units (LGUs). The plan will also serve as a guide for LGUs, for their coordination of their local policies, projects and plans, as well as for vertical coordination and collaboration. It also serves as a guarantee for foreign investors and businesses, which plan on getting involved in the further development of the Tirana-Durres metropolitan region.

- **Integrated Cross-sectoral Plan for the Coast**

The Integrated Cross-sectoral Plan for the coast (PINS) serves as a regulatory system to ensure standards in planning and guaranteeing instruments that enable quality tourism services. The objectives and principles are to ensure the sustainable use and management of coastal areas, in order to preserve natural coastal habitats, landscapes, natural resources and ecosystems, in accordance with international standards and norms legal in force.

- **General Local Plan.**

From 2017 to date the process of preparing general local plans for all municipalities of the country is ongoing, from the municipalities that are part of Ishem river basin. Municipalities of Tirana, Kamez, Vora and Kruja have GLP, while the GLP of Durres municipality is in finalizing process.

### **9.1.2 European Union**

River basin management plans may be supplemented by the production of more detailed programmes and management plans for sub-basin, sector, issue, or water type, to deal with particular aspects of water management. Implementation of these measures does not exempt Member States from any of their obligations under the rest of the WFD.

In accordance with best international practice, the RBMP framework for Albania envisages additional subsidiary strategies and/or Plans coordinated with but distinct from the core RBMP document (the measures of 1.5.1.). In some cases, these secondary Plans are recognized explicitly within the WFD

e.g. FD or implicitly by way of European Commission policy such as that for water scarcity and droughts.<sup>152</sup>

These strategies or plans (substantial analyses in themselves) are cross-referenced to the WFD ‘core Plan’ (this document) only with reference to how the respective strategy or its proposed activities or schemes will impact on the environmental objectives of the river basin. Schemes that adversely impact on environmental objectives i.e. the status of waterbodies - will have to either i) implement adequate mitigation measures to maintain ecological status ii) demonstrate that the beneficial objectives served by those modifications or alterations of the waterbody cannot for reasons of technical feasibility or disproportionate cost be achieved by other means that are a significantly better environmental option.<sup>153</sup>

### 9.1.3 A Water Resources Management Plan

The Water Resources Management Plan primarily ensures that river basin water balances (both surface water and groundwater) are properly identified and how so managed for long-term sustainability. This should include sub-basin level abstraction registers and management controls, and identification of environmental flow requirements and protection measures. The EU WFD Common Implementation Strategy (CIS) has only more recently recognized these elements as important ancillary activities.<sup>154 155</sup>

It is now recognized that the flow regime in all rivers plays the primary role in the structure and functioning of aquatic ecosystems and is somewhat more significant than the ‘ancillary element’ referred to in the WFD. Since abstractions for economic uses of water generally have a significant impact on flow regime and environmental flows, it may be the case that water resources management is considered inextricably linked to the measures of section 1.5.1, and therefore ‘water resources management’ should be considered as an essential part of the core RBMP. Achievement of ‘Good Status’ of any waterbody is unlikely unless the flow regime is managed so as to be reasonably close to the original natural flow regime.

However, sustainability of water resources is a major policy area for the European Commission, and a key management topic within most river basins.<sup>156</sup> Sustainable water resources management requires more than a narrow focus on ecosystem water needs. It also demands resource-efficiency policies and tools and an assessment and planning of interactions with other resources, especially food and energy security. Measures to enhance water resource efficiency invariably have impacts — positive and negative — on other sectors, especially agriculture and hydropower for example.<sup>157</sup>

### 9.1.4 A Flood Risk Management Plan

Catastrophic floods endanger lives and result in heavy economic losses. Flood alleviation and protection measures are costly, and cannot be implemented across an entire basin. Other than ecosystem-based adaptation measures (the preferred norm), identification of priority areas for flood-protection and cost-benefit appraisal is required to ensure that flood protection measures are directed on a risk-based approach.

These concepts have been addressed at EU level in the Directive 2007/60/EC<sup>158</sup> and the EU Flood Risk Management Programme generally<sup>159</sup>, identifying flood risk areas and developing, at the scale of the

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<sup>152</sup> European Commission, Water Framework Directive – Article 13(5)

<sup>153</sup> European Commission, Water Framework Directive – Article 4(7).

<sup>154</sup> European Commission - Guidance document 31 - Ecological flows in the implementation of the Water Framework Directive, Technical Report 2015-086, 2015

<sup>155</sup> European Commission - Guidance document 34 - On the application of water balances for supporting the implementation of the WFD, Technical Report 2015-090, 2015

<sup>156</sup> European Environment Agency, Climate change and water adaptation issues, EEA Technical Report No 2/2007, 2007

<sup>157</sup> European Environment Agency, Towards efficient use of water resources in Europe, EEA Report No 1/2012, 2012

<sup>158</sup> European Commission - Directive 2007/60/EC - on the assessment and management of flood risks – “the Floods Directive”

<sup>159</sup> [https://ec.europa.eu/environment/water/flood\\_risk/flood\\_risk.htm](https://ec.europa.eu/environment/water/flood_risk/flood_risk.htm)

RBD or river basin as appropriate, Flood Risk Management Plans (FRMPs) enshrining the concepts of prevention, protection and preparedness. Several FRMPs may be required within the RBD depending on local flood risks.

It is an explicit requirement of the FD that the measures and impacts of any proposed protection works take full account of the environmental objectives of the WFD as set out in the RBMP (FD, Article 7, Article 9). Where environmental objectives are not met, then the over-arching requirement of ‘Good Status’ of impacted waterbodies may not be achieved. If the environmental impacts of proposed flood works have not been properly addressed and mitigated, then the impacted waterbodies (quite often ‘heavily modified’) will further fail the test of WFD Article 4(7).

### 9.1.5 A Drought Risk Management Plan

In the face of ever-increasing demands for water and declining resources due to climate change, water scarcity and drought is an increasingly frequent and widespread phenomenon in the European Union. The long-term imbalance resulting from water demand exceeding available water resources has potentially catastrophic consequences.

EU water policy with respect to water scarcity is designed to prevent and to mitigate water scarcity and drought situations, with the priority to move towards water-efficient and water-saving economies.<sup>160 161</sup> It is particularly emphasized that a stronger focus on quantity issues is required in national policies of WFD implementation.<sup>162</sup>

In the absence of a specific Directive or framework for water scarcity management, best international practice<sup>163</sup> strongly suggests that formal Drought Risk Management Plans should be prepared at many levels, possibly at river basin level, but especially at sub-basin or municipal level where drought impacts may be severe for either aquatic ecosystems or municipal or agricultural water supplies.

### 9.1.6 A Coastal Zone Management Plan

Under WFD guidance the RBMPs must explicitly take account of ‘coastal’ waterbodies, assessing the pressures, state, impact and environmental objectives in common with other waterbody categories. However, coastal regions have significant management issues extending beyond the narrow focus of section 1.5.1. For example, coastal erosion, infrastructure development, tourism and increasing coastal flooding due to climate change are significant technical issues that are unlikely to be adequately covered within the core focus of the WFD RBMP.

The ICZM Protocol (signed in 2008 and entered into force in 2011 to date) and is a huge milestone in the field of coastal zone management. Albania has been contracting part to the Convention for the Protection of this Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) since 1990 and accepted the 1995 amendments in 2001.

Albania adheres in the Barcelona Convention for the protection of the marine environment and the coastal region of the Mediterranean” has ratified in 2000, by law no. 8 690, date 16/11/2000 “On adherence of the Republic of Albania for the “Protection of the Marine Environment and the Coastal Region of the Mediterranean”, and the 6 accompanying Protocols”. Also, another Protocol of the Barcelona Convention is accepted, in 2010, as approved by law no. 10 234, date 18.2.2010 on “adherence of the Republic of Albania in the Protocol on “integrated management of the Mediterranean coastal area” of the Barcelona Convention on ‘Protection of the Marine Environment and Coastal Region of the Mediterranean”.

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<sup>160</sup> European Commission - Addressing the challenge of water scarcity and droughts – COM(2007)414,

<sup>161</sup> European Commission – The Blueprint to Safeguard Europe’s Water Resources – COM(2012)673

<sup>162</sup> European Commission - Report on the Review of the European Water Scarcity and Droughts Policy - COM(2012)672

<sup>163</sup> Global Water Partnership - Guidelines for preparation of the Drought Management Plans - Development and implementation in the context of the EU Water Framework Directive, 2015.

In this context the National Territorial Council of Albania, in 2014 approved the initiative of designing the Integrated Cross-Sectorial Plan for the Albanian coastal belt, which aims to determine the most appropriate way of developing the region through rational use of territory and its resources and assets, having a high focus on taking care about the ecosystems. The main objectives of this plan are:

- Sustainable development
- Protection of environmental capacities and landscape values, preserving the characters of coastal belt localities
- Increasing the natural protected areas
- Transforming the seashore into a unique destination
- Extending the length of the tourist season, to all-year diversified tourism development
- Equal distribution of investments and equal social distribution in the whole territory.

## 9.2 Water Resources Management in Ishem Basin

### 9.2.1 Competent Authority and Coordination Measures

The competent authority to develop and implement the water resources strategy is the AMBU. The Register of Abstractions is held centrally by the AMBU in Tirana, and is publicly accessible via the National Water Resources Cadaster.

In exercising this function, it is necessary to carry out detailed consultation and coordination activities with other major users of water and their respective regulators, most notably the agriculture and hydropower sectors.

**The River Basin Council (RBC)** is the body responsible for decision-making, for water resources, at the respective basin level. Ishem river basin forms part of the Ishem RBCs, with 15 members. RBCs issues authorizations and permits when the activity befalls within the boundaries of a single basin.

**AMBU**, as the leading institution in water resources management at the national level coordinates and controls the work of local water resources management bodies, designs and implements water basin management plans. With the aim of ensuring rational conservation, development and distribution of water resources; protection of water resources from pollution; misuse and damage that affects their quality and quantity. AMBU accepts and reviews applications for issuing a permit/authorization for water resources use, process that is currently proceeding online in [https://e-albania.al/eAlbaniaServices/UseService.aspx?service\\_code=13279](https://e-albania.al/eAlbaniaServices/UseService.aspx?service_code=13279) .

In regional level, Ishem river basin is managed by Tirana WBAO. The main competences of WBAOs, are the compilation of the draft plan for water resources for the respective basin and submission for approval to the water basin council; monitoring the implementation of the decisions of the NWC and water basin council. WBAOs serve as the technical secretariat of each relevant water basin council.

### 9.2.2 The Water Resources Strategy

According to Albanian legislation and the WFD, for water resources management on the national level, is designed and implemented the National Strategy for Integrated Water Resources Management (NSIWRM) for the period 2018-2027. The national strategy defines five key objectives.

In the first chapter of the strategy, with the aim of achieving a rigorous water resources assessment with respect to WFD implementation, based on the document "Guidance document for the application of water balance to support the implementation of WFD", as the official guide on water balance defined by the European Commission, specifies the water balance (1.2.1) for water resources at the national level and also the water balance for the average annual inflows and only for the summer months, for the six water basins.

In order to carry out the appropriate strategic interventions, we must have well-defined specific pressures for each water basin. Once the pressures are determined, specific weights should be given

to each pressure, that will enable us to judge correctly which of these pressures have the greatest impact and therefore intervention to minimize or keep them under control will be classified as a priority.

Strategic interventions related to the issues identified for Ishem river basin are:

- *Monitoring water courses in the river basin from their source, over their entire length, and in respect of all their uses.*
- *Information on the water balance in river basin that must be reflected on NWRC.*
- *Declaration and determination of protected areas in order to maintain optimum conditions for the catchment of surface water and groundwater within the river basin.*
- *Zoning and specifying the limits on the use of watersheds/ water resources in certain river basin zones which have suffered degradation as a result of over-use by population.*
- *Increase regional self-sufficiency.*
- *recovery of groundwater levels and restoration of their quality after over-use.*
- *Determination of limits on the use of or access to potential water pollutants deriving from industry, urban areas, mining operations, agricultural farms and aquaculture.*
- *Construction and/or upgrade of urban waste water treatment.*
- *Water pollution control, stream corridor restoration and recovery of rural and urban drainage capacity.*
- *Hydro-morphological measures such as improvements to river continuity.*
- *Control and manage floods effectively and scientifically. Increase regional drought and flood preparedness.*
- *Strict controls and specifying spatial conditions on licensing of activities aimed at extracting materials from river beds and continuous monitoring on the existent subjects.*
- *stabilization of river beds which have been subject to extraction of aggregate, changes in sediment load, changes in their banks, use of the land for dumping refuse and other uses affecting the natural environmental conditions.*
- *Restriction on the recreational use waters, with the aim on avoiding potential damage to natural resources.*
- *Incorporate future variability, uncertainties and risk in the decision-making process.*
- *Promote regional coordination and collaboration among local governments and agencies, public and private organizations.*

### 9.2.3 Water Resource Operations or New Schemes Impacting on Waterbody Status

Table 9-1 summarizes those waterbodies whose status may be potentially affected by water resource schemes, and which may therefore be at risk of failing the environmental objectives as set out in Section 8. Mitigation measures or justification of failure to maintain or achieve good status will have to be provided in the PoMs (Chapter 13).

**Table 9-1 – Waterbodies Potentially Impacted by Water Resources Operations**

WATERBODY NAME	SUB-BASIN	WATERBODY EU CODE	CURRENT FORM	CURRENT STATUS	POTENTIAL IMPACT
Terkuza	ISH1	351443	HMWB	Bad	Flow regime impacted by Bovilla Reservoir

### 9.3 Flood Risk Management in Ishem River Basin

#### 9.3.1 Competent Authority and Coordination Measures

The National Water Council (NWC) is the main inter-institutional body responsible for drafting policies and plans for integrated water resource management.

AMBU in cooperation with the Ministry responsible for Civil Emergencies, drafts bylaws for plans and rules for flood risk management, in accordance with the legislation in force on Civil Emergencies and the National Plan of Civil Emergencies. For each river basin, AMBU:

- prepares a preliminary flood risk assessment based on available information, such as data and studies on long-term developments, and in particular the impacts of climate change in the event of floods;
- prepares flood hazard maps and flood risk maps, at the most appropriate level, for the announced flood risk areas;
- Prepares Flood Risk Management Plans (FRMPs) coordinated at the water basin level based on flood hazard maps and flood risk maps.

These plans focus on prevention, protection, readiness, including flood forecasting and early warning systems, which presents for the coordination to the bodies responsible for civil emergencies. AMBU contributes, in collaboration with the Ministry of Interior, to prevent civil emergencies. This includes the coordinated implementation of policies for river basin management and flood risk management in compliance with the legislation in force for civil emergencies and the National Management Plan for Civil Emergency.

MARD prepares and implements the investments for the protection of agriculture land and drainage pumping stations based on the FRM-plans.

The municipalities are responsible to protect urban areas from flood risk, also based on the FRM-plan.

The Agency for civil emergencies prepares and implements the national plan for civil emergencies which shall be coordinated with the flood risk management plans. More in Annex XIII.

#### 9.3.2 Summary of Historic Floods

According to the EU FD the analysis of the preliminary flood risk assessment includes maps of the river basin districts and sub-basins, the description of historic floods and past events as well as their negative impacts on human life, economy, environment and cultural heritage. It further includes a description of the expected future events and their potential effects. Table 9-2 and Table 3-9<sup>164</sup> summarize the dates about the time when they have happened, in which municipality, number of people injured, damaged houses, damages calculated in ALL, damaged lands, damage to livestock and damage in infrastructure.

In compliance with the directive, information on past flooding events is included for the identification of the areas where there is a potential risk of floods or floods are likely to occur for Ishem river basin.

**Table 9-2 – General Data for flood damages occurred on 1946-2018 in Tirana Municipality**

Date	Municipality	Life losses	Houses destroyed / or damaged	People affected	Losses (in ALL)	Number of injured	Crops damaged (ha)	Animal Losses	Roads damaged (km)
1946/10/23	Dajt, Kamez, Tirane	9	35					243	205
1962/11/16	Tirane				95000				

<sup>164</sup> ProNews Project maps prepared for Ishem river basin

1976/10/31	Kamez								
1976/06/06	Tirane				500000		362		
1979/11/16	Tirane		4						
1985/11/19	Tirane		200	800					
1998/10/01	Tirane								
2001/05/07	Tirane			584					
2002/12/18	Tirane								
2002/09/27	Tirane		150		1800000 00				
2003/11/03	Paskuqan								
2004/01/28	Paskuqan		16	24					
2005/12/17	Tirane								
2008/12/03	Tirane				394500				
2008/06/13	Tirane		1						
2009/01/07	Kamez								
2012/04/15	Tirane								
2012/05/27	Tirane								
2009/01/07	Kamez		1		1067220				
2012/04/15	Tirane								
2012/05/27	Tirane								
2013/10/15	Paskuqan, Tirane, Kamëz		799						
2013/03/14	Kamez								
2015/11/22	Paskuqan		24						
2016/01/06	Tirane								
2016/01/07	Tirane								
2018/02/03	Berxulle								

**Table 9-3 – General Data for flood damages occurred on 1961-2016 in Durres Municipality**

Date	Municip.	Life losses	Houses destroyed / or damaged	People affected	Losses (in ALL)	Number of interests points:	Crops damaged (ha)	Animal Losses	Roads damaged (km)
1961/11/15	Koder Thumane				30000		5		
1962/11/16	Ishem				2503700				
1970/12	Koder Thumane						400		
1973/11/8	Koder Thumane						430		
1976/10/31	Bubq, Fushe Kruje; Ishem						500		
1976/11/2	Koder Thumane, Ishem						410		
1976/9/1	Koder; Thumane								
1978/3/22	Fushe Kruje; Ishem						420		
1979/11/16	Koder; Thumane; Ishem		3				4260		
1995/9/21	Bubq, Fushe Kruje, Koder Thumane				7700000		500		
2000/11/8	Fushe Kruje		147	1200					
2005/12/1	Bubq								
2005/3/17	Bubq								
2005/3/5	Koder Thumane						30		
2006/3/24	Bubq		30				300		
2010/1/31	Bubq		1						

2010/11/11	Bubq, Fushe Kruje		256				600		
2013/10/16	Bubq								
2015/11/23	Fushe Kruje		10						
2016/1/6	Fushe Kruje								
2016/1/8	Ishem								

The most risked areas, from river floods, lie mainly in the western lowlands of the country. These areas, which are mainly areas with agricultural development, are very important in the economic development of Albania. Demographic movements after the 1990s have increased population density, and expanding urban constructions in these areas, increasing the risk of flood damage. In Ishem, the river floods, have a duration from hourly up to more than two days, dependent on the type of event. In the lower parts, the floods come out of the riverbanks, causing a lot of economic damage, and threatening life to the population living in the areas of the flood plain mainly in Fushe Kruje. Some of the most risked areas are located in the villages Murqine, Mallkuc, Bilaj, and Gramez. The first river flood protections, as a wide range of investments, in Albania, began after the historic floods of 1962-1963. These investments, in flood protection, have continued for a period of 15 years, and after the 1980s these investments focused mainly on maintaining flood protection infrastructure. For a period of 40-50 years, there are no significant investments in flood protection infrastructure, there are mainly local maintenance or correctional investments, without analyzing the whole scheme of the flood protection system.

### 9.3.3 The Flood Risk Management Strategy

The EU FD is transposed into Albanian policy as part of the policy “The Content, Development and Implementation of National Water Strategies, of River Basin District Management Plans and of Flood Risk Management Plans”.

Floods are natural phenomena that cannot be avoided. While there are some human activities and climate change that contribute to increasing the probability of their negative effects. Floods pose a constant threat to human life, population displacement, the environment and economic development.

The modern approach of the directive is to cooperate with all relevant actors to “live with the floods”, to protect, if possible, to adapt uses and constructions to flood risks in respective areas, and especially to prepare for being flooded, in a holistic approach with all potentially affected people, organisations, administrations and businesses.

AMBU, with the support of the project "Program for Improvement of the National Early Warning System and Flood Prevention in Albania" - PRONEWS, supported by the European Union, has:

- Drafted the Report for the preliminary flood risk assessment for the Ishem, Erzen, river basins;
- Identified 3 areas where there is a potential risk of floods or floods are likely to occur for Ishem river basin;
- Has compiled and disposes hazard flood maps for 1 territory that includes the 2 identified areas where there is a potential risk of flooding or is likely to occur flooding for the Ishem basin.

Currently, there is no flood management plan for Ishem Water Basin and hazard flood maps are not prepared for all areas where there is a potential risk of flooding or is likely to occur flooding, similarly for the flood risk maps.

### 9.3.4 Flood Management Operations or New Schemes Impacting on Waterbody Status

Table 9-4 summarizes those waterbodies whose status may be potentially affected by flood risk management operations and which may therefore be at risk of failing the environmental objectives as set out in Section 3. Mitigation measures or justification of failure to maintain or achieve good status will have to be provided in the PoMs (Chapter 13). Table below shows water bodies that have a high potential for flooding, referring to hazard maps, with a probability of flooding once every 50 years. Water depth on average can range from 3-6 m.<sup>165</sup>

**Table 9-4 – Waterbodies Potentially Impacted by Flood Management Operations**

WATERBODY NAME	SUB-BASIN	WATERBODY EU CODE	CURRENT FORM	CURRENT STATUS	POTENTIAL IMPACT
Ishem	ISH0	TW351411	Natural	Moderate	Very high
Ishem	ISH0	RW351413	Natural	Poor	Very high
Zeze	ISH0	RW351421	Natural	Poor	Very high
Ishem	ISH0	RW35143	Natural	Poor	Very high
Tirana	ISH1	RW35145	Natural	Poor	Very high

## 9.4 Drought Risk Management in Ishem Basin

### 9.4.1 Competent Authority and Coordination Measures

The risks posed by water scarcity (droughts) are met with an efficient management of water resources and investments that serve all interests by applying national acts and by-laws which transpose with EU directives. According to the European Commission, droughts should be treated in a manner similar to flood risk management. Although there are no EU directives, there are clear guidelines based on the WFD for the preparation of Drought Management Plans (GWPCEE, 2015).

As we prepare for droughts and scarce amounts of water, it is important to understand that they are two different phenomena. Droughts have natural origin while water scarcity (or water depletion) is defined as a situation where water resources are insufficient to meet long-term water use requirements. Planning to cope with droughts and to manage small amounts of water is a complex combination of monitoring hydro-meteorological trends with technical management of water resources and mitigation of socio-economic impacts.

Regarding Drought Risk Management, there is no DCM on the establishment and functioning of a competent body, responsible for dealing with drought risk management.

MARD performs certain responsibilities through the exchange of information between municipalities and drainage boards. In addition, the Strategy for Irrigation and Drainage in Albania covers partially the drought management at country level.

### 9.4.2 Summary of Historic Droughts

Precipitation regime in Albania is Mediterranean and the most important factors that influence atmospheric precipitation are geographic location and topography. The smaller amount of precipitation receives the Southeast part of the country, where the annual amounts reach up to 600 mm, following by the Myzeqeja field, which receives about 1000 mm per year. The amount of precipitation falling down in Albanian territory is on the average 1480 mm/year. The biggest amount

<sup>165</sup> The material generated by the ProNews project: Development of flood hazard maps in accordance with EU Floods Directive subsequent IPA Floods Guidelines

of precipitation is recorded during the cold months (October-March) about 75 % of the amount. The richest month on precipitation over all the territory is November, while the driest are July-August. Albania is considered a water-abundant country. Its renewable water resources amount to 41.7 billion m<sup>3</sup> in a year out of which about 65% are generated within Albania and the remaining from upstream neighbor countries. Most of the rivers have highly irregular seasonal flow patterns. Nearly all carry less than 10% (and sometime zero) of their winter averages during the summer season. Lakes cover about 4% of the country's territory. There are 3 large lakes and 247 smaller lakes. 630 reservoirs total 5.60 billion m<sup>3</sup> in a year of storage capacity have been built, mostly along the rivers for flood protection, irrigation and production of hydropower.

3 types of droughts are considered in Albania:

- meteorological droughts – defined on the basis of rainfall deficiency;
- hydrological droughts – where accumulated shortfalls in river flows or groundwater replenishment are of primary importance;
- agricultural droughts where the availability of soil water through the growing season is the critical factor.

The most important drought type in the economic sector is the hydrological drought. This because water resources play a key role in the economy. About 97% of the total electricity production is generated from hydropower plants mostly on the 3 rivers. Agricultural sector as well is influenced because about 50% of the cropland (400 000 ha) is irrigated producing about 80% of agriculture output.

### **9.4.3 The Drought Risk Management Strategy**

The development of Water Basin Management Plans provides a good opportunity to address issues related to drought and water scarcity. Specifically, the WFD's requirement to achieve the quantitative groundwater status involves balancing between groundwater depletion and replenishment. Regarding the requirement for achieving good ecological status for surface waters, it is necessary to determine the minimum water (ecological) flow for each river, which supports the achievement of area-specific objectives related to aquatic biodiversity. Measures to achieve these objectives should be included in the Water Basin Management Plans.

Regarding to drought management, since among other things, it directly affects the water supply for irrigation, the drought should be treated as a clear climatic concept which is characterized by temporary water shortages for an extended period of time related to the normal supply (one season, one year, or several years). Regarding to the typology's role (meteorological, agricultural or hydrological drought), it determines the beginning, severity and end of a drought.

The Strategy for Irrigation, Drainage in Albania includes a description of the current situation and key challenges for irrigation, drainage, dams and reservoirs, and flood protection. Irrigation and drainage systems throughout the country are deteriorated after years as lack of maintenance and necessary repairs. Emerging changes needed in cropping patterns and water application methods, as well as climate change, require modernization of structures to permit better water use efficiency and more intensive and reliable management and financing procedures. Also, the Drought Management Plans should be designed and implemented in accordance with international standards, including the engagement mechanism through the communication between relevant institutions and stakeholders and their involvement into the plan.

### **9.4.4 Drought Management Operations or New Schemes Impacting on Waterbody Status**

The increasing heat and declining rainfall will result in a reduction of water resources that will have direct negative impacts on populations in the ecosystems. There must be an infrastructure and information provision for the climate change increasing in order to cope with climate change (GWP, 2009). Water resources are expected to decrease by 14% (EVN / Starkraft, 2009) by 2050 and

approximately 6% by 2027). It is estimated that during the summer, the remaining flow in the Ishem river basins will reach most of the current Q<sub>95</sub> flow.

The comparison between water extraction and water availability shows that the Ishem river basin is projected to have severe water shortages in the summer of 2050, even in the most optimistic scenario (CESR, 2011).

Table 9-5 summarizes those waterbodies whose status may be potentially affected by drought risk management operations, and which may therefore be at risk of failing the environmental objectives as set out in Section 4. Mitigation measures or justification of failure to maintain or achieve good status will have to be provided in the Programme of Measures (Chapter 12).

**Table 9-5 – Waterbodies Potentially Impacted by Drought Management Operations**

WATERBODY NAME	SUB-BASIN	WATERBODY EU CODE	CURRENT FORM	CURRENT STATUS	POTENTIAL IMPACT
				Reference	

## 9.5 Coastal Zone Management Plan

### 9.5.1 Competent Authority and Coordination Measures

In Albania coastal zone management plans are not yet fully developed. The National Coast Agency extends its activity throughout the territory of the coastal area of the Republic of Albania and in areas, territories, facilities and activities that are located or developed, in whole or in part or have an impact on the coastal area. It is responsible for the protection and sustainable development of the coastal area by monitoring and controlling the existing potential of the entire coastal zone, ensuring performance in coastal areas, managing integrated coastline and for their implementation. Creating and updating the National Inventory of the Coastal Zone; contributes to informing, consulting and accessing the public during the design and implementation of policies and strategies related to integrated coastal zone management; participates in the drafting of national policies and strategies for integrated coastal management and coordination of work for their implementation; proposes changes and improves the legal and sub-legal framework for integrated coastal zone management; controls the implementation of criteria and conditions by entities that exercise tourism activities, following applicable legal provisions; exercises control and inspects in the premises and in the documentation of the subjects that exercise tourist activities.

### 9.5.2 The Coastal Management Strategy

In the field of coastal zone management there are two operational framework documents:

- National Strategy for the Development of Sustainable Tourism 2019-2033;
- Integrated Cross-Cutting Plan for the Coastal Belt 2030 (PINS).

The National Strategy for the Development of Sustainable Tourism aims at developing destinations, areas, products and diversifying the tourist offer, as well as increasing the added value of tourism potentials for the economic and social development of the country, through action plans for each region.

The integrated cross-sectoral plan will be the creation of the development of the coastal region, which will promote sustainable economic development, social integrity and protection of natural resources for the next 15 years.

In Albania, the lack of spatial plans and non-implementation of the legal basis is considered to be the biggest obstacle to sustainable development on the coast. The lack of an Integrated Cross-Cutting Plan for the coast has also caused fragmentation of planning, where territorial competencies and jurisdictions are separated. This has hampered the drafting of regional plans, which would potentially intersect if an Integrated Cross-cutting Coastal Plan would precede them. Moreover, all local and

regional plans (few), as well as the developments so far, have been implemented without agreeing with a clear regional vision, much less national.

### 9.5.3 Coastal Management Operations or New Schemes Impacting on Waterbody Status

Table 9-6 summarizes those waterbodies whose status may be potentially affected by coastal management operations, and which may therefore be at risk of failing the environmental objectives as set out in Section 4. Mitigation measures or justification of failure to maintain or achieve good status will have to be provided in the Programme of Measures (Chapter 12).

Durrës Municipality is endangered by floods of the Ishem River, the river basin from Dreven to in the estuary; endangered by floods of the Erzen River, the basin from Pjezga to the estuary. Likewise, endangered by marine floods area from the estuary of Ishem river to Cape Rodoni and from Cape Rodoni to Porto Romano; endangered by marine erosion Cape Rodon in the southern part and the Tail of the Pall in the area south; there are slides along with Cape Rodon and from Shkallnuri to Seferaj.

**Table 9-6 – Waterbodies Potentially Impacted by Coastal Management Operations**

WATERBODY NAME	SUB-BASIN	WATERBODY EU CODE	CURRENT FORM	CURRENT STATUS	POTENTIAL IMPACT
Ishem	ISHO	351411	Transitional	3	Salinity level
Cape Rodoni	ISHO	CW351402	Natural		Flood from the coast

## 9.6 Strategic Environmental Assessment

### 9.6.1 Competent Authority and Coordination Measures

Strategic Environmental Assessment (SEA) is one of the key instruments for integrating environmental issues and principles of sustainable development in strategic planning and decision making. Since the PoMs is a key output of RBMPs, and these measures may themselves have major regional or cross-sectoral environmental implications, it is likely that in most cases the RBMP need be subjected to a SEA review. In Albania, Law 91/2013 on SEA and all related by-laws constitute the minimum requirement for the SEA assignment. The law is broadly aligned with Directive 2001/42/EC.<sup>166</sup> In Albania, Law 91/2013 serves to provide environmental protection and sustainable development through the incorporation of environmental issues in the drafting or reviewing plans or programs with potential negative consequences to the environment, which may include the River Basin Management Plan for example. The decision whether or not an SEA should proceed is under the competence of the Ministry of Tourism and Environment.

SEA procedure for both national and local-level plans and programmes is conducted at the national level, and includes the following stages:

- Notification of the Ministry of Environment by the proposing authority;
- Consultation with stakeholders on the issues that shall be addressed in the SEA report (scoping);
- Drafting of and public consultations on the preliminary SEA report;
- Drafting of the final SEA report;
- Review of the final SEA report and issuance of the Minister’s declaration (i.e. official position of the Ministry);
- Decision of the proposing authority for adoption of the plan or programme;

<sup>166</sup> European Commission - Directive 2001/42/EC - On the assessment of the effects of certain plans and programmes on the environment, ‘the strategic environmental assessment Directive’

- Monitoring of effects of the plan or programme on the environment, and reporting.

In case the ministry finds that the proposing authority has not implemented the requirements of the SEA law, then it communicates to the proposing authority the non-consideration for the approval of the declaration, giving the relevant reasons. The ministry also sends a copy of the response to the approval authority. If the plan or program is not approved within 2 years from the date of approval of the declaration, then the SEA Minister's Declaration becomes invalid and the SEA procedure starts from the beginning. The competent authority for the final approval of the RBMP ensures that before making a decision on their approval or not, the requirements of the SEA law have been implemented and the proposer has received the Declaration of the Minister for SEA.

### 9.6.2 Main Elements of the Strategic Environmental Assessment

The SEA can be understood as “a systematic and anticipatory process, undertaken to analyze the environmental effects of proposed plans, programmes and other strategic actions and to integrate the findings into decision-making”.

The Albanian law on SEA defines four main elements (Table 9-7):

- Preparation of reports on strategic assessment.
- Ensuring public participation and public debate.
- Taking into account the results of the strategic assessment and public participation in the decision-making stage.
- Providing information on made decisions.

**Table 9-7 – Main Elements of the SEA Process**

STAGE	OBJECTIVES	COMPLETION STATUS
Screening stage by Competent Authority	Decision on whether an SEA of the RBMP is required and under what criteria.	<i>Law no. 91/2013</i>
Scoping and statutory consultation	Scope and level of detail to be considered in the environmental assessment, and list of key stakeholders and coordination measures	<i>Completed by 01.09.2022</i>
Environmental assessment report and consultation	Assessment of significant impacts on the environment arising from the implementation of the RBMP Programme of Measures and consideration of reasonable alternatives. The draft SEA report must accompany the draft RBMP.	<i>Completed by 01.10.2022</i>
SEA Declaration by the competent authority	Statement of how environmental considerations and consultations have been integrated into the final RBMP, with issue of a final SEA Declaration.	<i>Issued on 24.10.2022</i>

The SEA process assists authority responsible for the RBMPs, as well as decision-makers, to take into account:

- Key environmental trends, potentials and constraints that may affect or may be affected by the RBMP
- Environmental objectives and indicators that are relevant to the RBMP
- Likely significant environmental effects of proposed options and the implementation of the RBMP
- Measures to avoid, reduce or mitigate adverse effects and to enhance positive effects

- Views and information from relevant authorities, the public and – as and when relevant – potentially affected neighbor countries.

A strategic environmental assessment to be carried out for RBMPs comprising:

- a. preparation of an environmental report
- b. carrying out of consultations
- c. taking into account of (i) and (ii) in decision making
- d. information on the decision.

### **9.6.3 Main Conclusions of the Strategic Environmental Assessment**

The SEA Report has to summarize all findings and conclusions achieved during the entire SEA process and serve as a basis for consultations with relevant authorities and other stakeholders.

The Strategic Environmental Assessment is not a decision-making tool. It provides information about the likely impacts on the environment and human health caused by the decision.

Nevertheless, the conclusions of the SEA process must be taken into account in the decision (and later during the implementation of the RBMP).

# 10 Waterbody Pressures, Status and Impacts Assessment

## 10.1 Overview

Central to the objectives of the RBMP is a structured assessment of all pressures likely to be operating on waterbodies in the river basin(s), the resultant change in status and consequent impacts on aquatic ecosystems. Pressures (predominantly anthropogenic or 'artificial influences', but also climate change) may create a change in status (the central indicator of the 'health' of the waterbody), which may then result in negative impacts. These may be adverse changes in water quality, quantity, ecosystem morphology or all combined.

The deficient status (risk of failure) for each waterbody creates a gap relative to the environmental objectives (EOs) set out in Chapter 3. Where 'good status' is achieved, environmental policies and the regulatory system should maintain that status (Chapter 12). Where 'good status' is not achieved a remedial action plan should either maintain or improve each waterbody where it is at risk of failing the specified EOs, set out under the PoMs (Chapter 13).

The WFD requires the systematic identification of significant pressures from anthropogenic influences such as point sources of pollution, diffuse sources of pollution, modifications of flow regimes through abstractions or regulation and morphological alterations, as well as any other pressures<sup>167</sup>, WFD Article (5). 'Significant' means that the pressure contributes to an impact that may result in failing to meet the WFD environmental objective of not having at least 'good status', WFD Article 4(1). In some cases, moderate pressures from several marginal drivers may in combination become significant.

The key stages of the general approach as laid down in the WFD are:

- Identify driving forces (influences)
- Identify the significant pressures
- Determine the consequent status
- Assess the impacts
- Evaluate the risk of failing to meet the objectives.
- Propose mitigation and/or protection measures.

## 10.2 Examples of Pressures and Impacts

The pressures and impacts occur either at point scale or diffuse scale.<sup>168</sup> Diffuse pressures e.g. nitrate pollution from agriculture e.g. over-abstraction of groundwater - may require general environmental policies or management strategies that apply over a wide area (e.g. a sub-basin, group of waterbodies or an aquifer). Conversely, point pressures such as wastewater discharges or hydropower outflows may require specific actions for individual waterbodies, although the correctly determined and enforced higher level policies should in theory prevent the need for later remedial specific measures in many cases. To varying degrees all different types of the pressures and impacts are present in the Ishem basin. (For various examples refer to Technical Annex IV).

## 10.3 Standardised Pressures Assessment Using WISE Reporting Procedures

### 10.3.1 Standard Enumeration Lists of Pressures and Indicators from WISE

In order that pressures reporting in the RBMP is correctly aligned with WISE reporting obligations, Table 10-1 and Table 10-2 set out the principal key types of pressures, together with two variants of

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<sup>167</sup> European Commission – CIS Guidance Document 3 - Analysis of Pressures and Impacts, EC 2003

<sup>168</sup> European Commission – CIS Guidance 2 – Analysis of Pressures and Impacts

‘pressure indicator’, derived from WISE 2016 guidance and reproduced in full in Technical Annex IV.  
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Pressure ‘types’ are the principal forms of anthropogenic influence that may impact on waterbody status: e.g. untreated urban wastewater, hydrological alteration due to hydropower, abstraction for irrigation.

Pressure ‘indicators’ give the quantitative strength of the pressure that has to be reduced in order to meet environmental objectives e.g. BOD5 load in the receiving watercourse e.g. flow or time reduction required of HPP running time.

The pressure enumeration list codes (Table 10-1, Table 10-2) are shown as part of the Pressures – Status summary (Technical Annex IV) and should also form part of the attribute list of the Waterbody feature class of the Cadastre.

### 10.3.2 Identification and Quantification of Pressures and Indicators

The pressures assessment and resultant status are central to understanding and quantifying the gaps between environmental objectives and the current state of waterbodies in the river basin. The assessment is necessarily a mixture of analytical and descriptive criteria depending on the level of data available.

Assessment of the waterbody status is already challenging while comparing against provisional standards on the basis of a single analytical sample. Assessment of pressures<sup>171</sup> is even more complex, because pressures are typically more abstract and harder to quantify and/or different pressures combine in complex ways to influence a waterbody’s status. Quantification of pressures, though feasible, requires significant amounts of good quality data, much of which is not collected in Albania at this time.

It is noted that many of the ‘pressure indicators’ require a volume quantity to be reported, either as part of a pollutant load calculation, or as part of an environmental flow impact. Due to the complete collapse of the national hydrometric network and absence of recent useable hydrological data, and a substantial lack of monitored effluent volume data generally by institutions and industries, it is not often possible to set meaningful pressure indicators at this time.

In order to improve environmental policy making and to identify ‘environmental hotspots’ that may require stricter regulation (through Permit conditions and enforcement) some degree of quantitative indexing of pressure is essential. Table 10-1 and Table 10-2 provide two sets of indicators for pressure, both of which are broadly compliant with the WISE 2016 reporting schema.

‘General indicators’ are high level ‘quantity related’ pressures, such as numbers of outfalls, number of hydropower or agricultural abstraction points, lengths of waterbodies affected, number of installations without Permits etc. These should be easily definable even in the currently reduced functional state of the Cadastre, based on desk studies or rapid field inspections.

‘Precise indicators’ in compliance with WISE 2016 will require greatly improved sectoral measurement and reporting than is currently available through the NWRC, especially regarding effluent parameter measurement and river flow volumes. These tables have been partially completed where data are available and are located in Technical Annex IV.

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<sup>169</sup> The approach adopted in the new template for RBMPs in Albania is to closely align with WISE reporting requirements in terms of feature classes and attributes. This focuses data collection only on what is needed for WISE and EIONET reporting, and orientates the NWRC data structures to be broadly aligned with WFD outputs.

<sup>170</sup> Water Information System for Europe – WISE GIS Guidance – on the reporting of spatial data to WISE, v 6.0.6, 2016.

<sup>171</sup> In numerous cases in the river basins of Albania, there are an insufficient number of monitoring points to cover all delineated waterbodies. Consequently, the pressures and status of the non-monitored waterbodies has to be assumed.

**Table 10-1 – Standard Pressure Types and Indicators, Types 1 to 3**

Sectoral Pressure	Code <sup>172</sup>	Type A General Indicator <sup>173</sup>	Type B Precise Indicator <sup>174</sup>
<b>1 Point Pollution Pressures</b>			
Urban Wastewater	1.1	No. Of Outfalls Failing Objectives	Bod/N/P Load Reduction (T/Year)
Urban Storm Overflows	1.2	No. Of Overflows Failing Objectives	Storm Water Volume Reduction
Industry - led Plants	1.3	No. Of Sites Failing Objectives	Bod/Nh <sub>4</sub> /Ps Load Reduction (T/Year)
Industry – Non led	1.4	No. Of Sites Failing Objectives	Bod/Nh <sub>4</sub> /Ps Load Reduction (T/Year)
Contaminated Sites	1.5	No. Of Sites Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Landfill Waste Disposal	1.6	No. Of Sites Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Mine Dewatering	1.7	No. Of Sites Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Aquaculture Fish Farms	1.8	No. Of Sites Failing Objectives	Bod/Nh <sub>4</sub> /Po <sub>4</sub> Load Reduction (T/Year)
Other Not Specified	1.9		
<b>2 Diffuse Pollution Pressures</b>			
Urban Runoff	2.1	Km Of Waterbody Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Agriculture Runoff	2.2	Km Of Waterbody Failing Objectives	N/P Load Reduction (T/Year)
Forestry Runoff	2.3	Km Of Waterbody Failing Objectives	N/P Load Reduction (T/Year)
Highway/Transport	2.4	Km Of Waterbody Failing Objectives	Pm/No <sub>2</sub> /Rbsp Load Reduction (T/Year)
Abandoned Sites	2.5	No. Of Sites Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Urban Diffuse Waste	2.6	No. Of Sites Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Atmospheric Deposits	2.7	Catchment Area Failing Objectives	Pm/No <sub>2</sub> Load Reduction (T/Year)
Mining Contamination	2.8	No. Of Sites Failing Objectives	Ps/Rbsp Load Reduction (T/Year)
Aquaculture	2.9	No. Of Sites Failing Objectives	Bod/Nh <sub>4</sub> /Po <sub>4</sub> Load Reduction (T/Year)
Other Not Specified	2.10		
<b>3 Flow Abstraction/Diversion Pressures</b>			
Agriculture	3.1	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)
Public Water Supply	3.2	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)
Industry	3.3	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)
Energy Cooling Water	3.4	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)
Hydropower	3.5	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)
Fish-Farm	3.6	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)
Other	3.7	No. Of Abstraction Points	Volume To Be Reduced (Mm <sup>3</sup> /Year)

<sup>172</sup> Classification based on WISE 2016 GIS Reporting Schema element – SW Significant Pressure Types; GW Significant Pressure Types

<sup>173</sup> General Indicators should be interpreted as number/length of installations/sites/objects assumed to be creating detrimental impact. Either a) Permits do not exist or are not complied with b) Permits are insufficient in terms of ELVs and/or EQSs.

<sup>174</sup> Precise Indicators should be interpreted as the quantity reduction required to achieve the environmental objective(s), usually tonnes/year, Mm<sup>3</sup>/year, hours/year.

**Table 10-2 – Standard Pressure Types and Indicators, Types 4 to 8**

Sectoral Pressure	Code <sup>175</sup>	Type A General Indicator	Type B Precise Indicator
<b>4 Morphological Pressures</b>			
Flood Defences	4.1.1	Km Of Waterbody Failing Objectives	Km Of Structures Failing Objectives
Agriculture	4.1.2	Km Of Waterbody Failing Objectives	Km Of Structures Failing Objectives
Navigation	4.1.3	Km Of Waterbody Failing Objectives	Km Of Structures Failing Objectives
Other Modifications	4.1.4	Km Of Waterbody Failing Objectives	Km Of Structures Failing Objectives
Hydropower Structures	4.2.1	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Flood Structures	4.2.2	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Municipal Structures	4.2.3	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Irrigation Structures	4.2.4	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Recreation Structures	4.2.5	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Industry Structures	4.2.6	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Navigation Structures	4.2.7	Km Of Waterbody Failing Objectives	Structures Failing Objectives
Other Structures	4.2.8	Km Of Waterbody Failing Objectives	Structures Failing Objectives
<b>4 Hydromorphological Pressures</b>			
Agriculture	4.3.1	Km Of Waterbody Failing Objectives	En15843 Flow Modification Index
Transport	4.3.2	Km Of Waterbody Failing Objectives	En15843 Flow Modification Index
Hydropower	4.3.3	Km Of Waterbody Failing Objectives	En15843 Flow Modification Index
Municipal Water	4.3.4	Km Of Waterbody Failing Objectives	En15843 Flow Modification Index
Aquaculture	4.3.5	Km Of Waterbody Failing Objectives	En15843 Flow Modification Index
Other Activities	4.3.6	Km Of Waterbody Failing Objectives	En15843 Flow Modification Index
Habitat Loss	4.4	Km Of Waterbody Failing Objectives	Km <sup>2</sup> Of Habitat Loss
Other Modifications	4.5		
<b>5 Aquaculture &amp; Introduced Pressures</b>			
Introduced Species	5.1	Km Of Waterbody Failing Objectives	No. Of Introduced Species
Exploitation Of Species	5.2	Km Of Waterbody Failing Objectives	No. Of Logged Sites
Solid Waste Tipping	5.3	Km Of Waterbody Failing Objectives	No. Of Logged Sites
<b>6 Groundwater Pressures</b>			
Groundwater Recharge	6.1	No. Of Gwbs Impacted By Recharge	Volume Of Recharge To Recover
Groundwater Volume	6.2	No. Of Abstraction Points	Volume Of Abstraction To Recover
<b>7-8 Miscellaneous &amp; Chemical Pressures</b>			
Other Pressure	7	Km Of Waterbody Failing Objectives	As Required
Unknown Ps	8	Km Of Waterbody Failing Objectives	Ps Load Reduction (T/Year)
Unknown Rbsp	8	Km Of Waterbody Failing Objectives	Rbsp Load Reduction (T/Year)

### 10.3.3 Standard Enumeration List of Impact Types

Table 10-3 reproduces Annex 1b of the WISE 2016 reporting requirements, with the relevance to surface water and groundwater.<sup>176</sup> Identifying the pressure(s) applying to waterbodies, it should

<sup>175</sup> Classification based on WISE 2016 GIS Reporting Schema element – SW Significant Pressure Types; GW Significant Pressure Types

<sup>176</sup> WISE 2016 GIS Reporting Schema element: <SW Significant Impact Types>, <GW Significant Impact Types>

generally be possible to infer the most relevant type of impact. Several impacts may arise from a single pressure. For example, a hydropower installation may disrupt downstream water temperatures, habitat morphology and flow regime.

**Table 10-3 – Standard Impact Types**

Impact Type	Relevant SW	Relevant GW
Nutrient pollution	Y	Y
Organic pollution	Y	Y
Chemical pollution	Y	Y
Saline pollution/intrusion	Y	Y
Acidification	Y	N
Elevated temperatures	Y	N
Altered habitats due to hydrological changes	Y	N
Altered habitats due to morphological changes (includes connectivity)	Y	N
Litter (an impact under the MSFD)	Y	N
Microbiological pollution	Y	Y
Diminution of quality of associated surface waters for chemical / quantitative reasons	N	Y
Damage to groundwater dependent terrestrial ecosystems for chemical / quantitative reasons	N	Y
Alterations in flow directions resulting in saltwater intrusion	N	Y
Abstraction exceeds available GW resource (lowering water table)	N	Y
Other Significant Impacts	Y	Y

## 10.4 Surface Waterbody Pressures and Status Assessment Overview

### 10.4.1 Pressures Assessment at Sub-basin Level

For general policy purposes and regulatory focus (i.e. Permits) a useful summary of pressures following the list of Table 10-1 and Table 10-2 is presented in tables in Technical Annex IV (general and precise indicators). Where data are not available within the NWRC, indicators are not reported. Improvements of data collection relevant to EOs are a key measure in most PoMs.

The matrix approach of these tables, (where the reported values are a direct reflection of the degree of potential pressure(s)) helps the Competent Authority to take the risk-based approach i.e. to identify the priority areas for investigation or tighter regulation. ‘Precise indicators’ in compliance with WISE 2016 will require greatly improved sectoral measurement and reporting than is currently available through the NWRC, especially regarding effluent parameter measurement and river flow volumes.

Abstraction and hydropower pressures are derived from the AMBU “Register of Abstractions” presented in Technical Annex III. The Register is not fully up to date or accurately coordinated in many cases. Where known, abstractions include for major irrigation offtakes, although the operational status of many irrigation abstractions is not currently recorded by AMBU.

Wastewater discharges are also incomplete; industrial effluent points largely derive from the Permit register maintained by the competent authority, the NEA. However, the predominant impact on river water quality is likely to be from urban municipal wastewater, and currently no register exists of specific municipal outfalls with precise coordinates. The general level of urban wastewater pollution therefore has to be inferred simply from the number of recorded wastewater outfalls (Indicators 1.1, 1.2, 1.3 of Table 10-1).

Physical pressures are taken to include significant changes to river morphology due to river gravel extraction points or channel modifications for agriculture, flood protection or realignment purposes.

Chemical pressures are taken to include pollution hotspots (solid waste dumps and chemical residues) and mining activities. All HMWBs infer some degree of physical pressure on the riverine ecosystems, and therefore the HMWBs are also shown in Map 10-2.

#### 10.4.2 Status Determination Methodology at Waterbody Level

Table 10-4 to Table 10-9 summarize the status determination for all surface waterbodies in the Ishem basin (Annex XIII). The general procedure has been set out under section 3.3. In 2021, a once-only biological survey of all water bodies was performed and a preliminary ecological status assessment was made.

The preliminary method to assess the biological data, is based on the ASPT (Average Score Per Taxon) index. This index was published in 1982 by Armitage et al, and is used later in many countries. The index is based on the ecological indicative value of macro invertebrate families. For the assessment of the Ishem river water bodies, an adaptation in calculating this index is made: instead of using only the presence/absence of families, also the abundance (number of individuals) is used. To avoid overweighting high abundances, the abundances are log-transformed. The method is explained in more detail in the report on the biological sampling of rivers in 2021 (see Technical Annex V). It is suggested to use this methodology next years for assessing the ecological status of rivers, based on macro invertebrates. For the hydro-morphological status assessment a British methodology was used (see Technical Annex VI)<sup>177</sup>.

As already emphasised in the Chapters 3 and 8: there is a huge lack in systematic, up-to-date, routine monitoring data, required for WFD compliant assessments of the status of surface waterbodies. Consequently, in the first generation RBMPs for Albania (2024-2029) the majority of waterbody status assessments are necessarily made based on 'best available data and information' (see Technical Annexes).

Since data quality is central to the status methodology, it is also necessary to report on the 'confidence level' (CL) of the status assessment.<sup>178</sup> A low confidence and precision in the data potentially leads to a risk of misclassification, hence the CL gives an indication of the reliability of the status value. The WISE 2016 guidance advises on the following classification to indicate the confidence on the ecological status or potential assigned:

'0' = no information; '1' = low confidence; '2' = medium confidence; '3' = high confidence.

The criteria are as follows:

Low = no monitoring data, expert judgement only; Medium = some supporting quality element (QE) data and limited data on one BQE; High = good data on 1+ BQE and supporting most relevant QEs.

The enumeration list for 'risk' categories used is the following:

- **'Not at Risk'** (data or professional judgement supports the waterbody is very unlikely to be at risk); Status can only be 1 or 2.
- **'Possibly at Risk'** (data or professional judgement suggests that the WB is borderline i.e. allocate status 2 or 3.
- **'At Risk'** (on basis of either PCHEM data or very significant pressure, we are certain the WB is not at Good or even Moderate status. Status must therefore be 4 or 5.
- **'Unknown'** should be used where we have zero data but where significant pressures seem likely. Status could be 2 or 3. For it to be 4 or 5 we would have to have data.

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<sup>178</sup> WISE GIS Guidance 2016 – Schema: SWB; schema element <SW Ecological Confidence>

### 10.4.3 Exemption Types for Heavily Modified Waterbodies

The overall WFD objective for HMWBs/AWBs is good ecological potential, rather than ecological status. Additional information is required on the designation and reporting of AWB and HMWBs in order to justify certain derogations of environmental objectives as set out under WFD Article 4(2) to 4(7) so as to permit the continuation of these specified uses (which provide valuable social and economic benefits) but at the same time encourage mitigation measures to improve water quality.<sup>179</sup>

## 10.5 Surface Water Pressures and Status Main Summary

### 10.5.1 Overview

Table 10-4 to Table 10-9 present one of the central outputs of the RBMP for the Ishem river basin, namely a final register of the delineated waterbodies, the probable pressures, an estimation of the waterbody status, and an estimation of the waterbodies at risk of failing the environmental objectives, presented under Annex XIII to this RBMP.

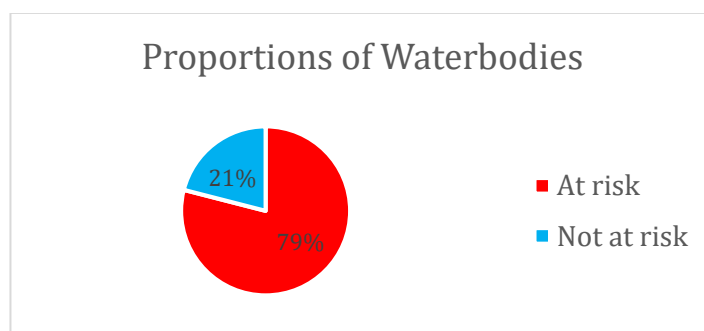
In arriving at the status determination, numerous activities converge. Namely, general drivers outlined in Chapter 4, characterisation and delineation (Chapters 5, 6, 7), monitoring and data outputs (Chapter 8), and potential impacts from associated strategies (Chapter 9).

Table 10-9 includes artificial (AWB) and heavily modified waterbodies (HMWBs), as the objective setting process for HMWBs and AWBs should be in line with the same general principles as applied for natural water bodies (delineation, pressures and status elements). The main different is that AWBs/HMWBs are assessed relative to the reference condition of 'maximum ecological potential' (MEP) (see sections 3.3.6 & 10.5).

Confusion frequently arises regarding how reservoirs should be classed. The WFD GIS guidance suggests that reservoirs formed by damming rivers should be reported as heavily modified RIVER waterbodies (but at the same time the typology differentiation and applicable quality elements (QE) should be undertaken in accordance with the descriptors for whichever natural surface water category the AWB or HMWB most closely resembles i.e. LAKES). This is not a logical approach, and it is acceptable in the WISE reporting schema to classify reservoirs under the LAKE category providing the reporting schema element <Reservoir> is completed. This is the approach adopted in the Albania classification.

In the Ishem basin, the proportions of waterbodies allocated to varying levels of status are shown in Figure 10-1. 79% of the 23 river waterbodies by number are identified as at risk of failing environmental objectives (status less than Good) in the 'Rivers, HMWB and Transitional' category. However, this proportion increases to 85% if the waterbody length is the unit of measurement, with only 15% of waterbody total length being in Good Status or above. The total length of River and Transitional waterbodies in the Ishem basin is 190.4 km.

**Figure 10-1 – The proportions of waterbodies allocated to varying levels of status**

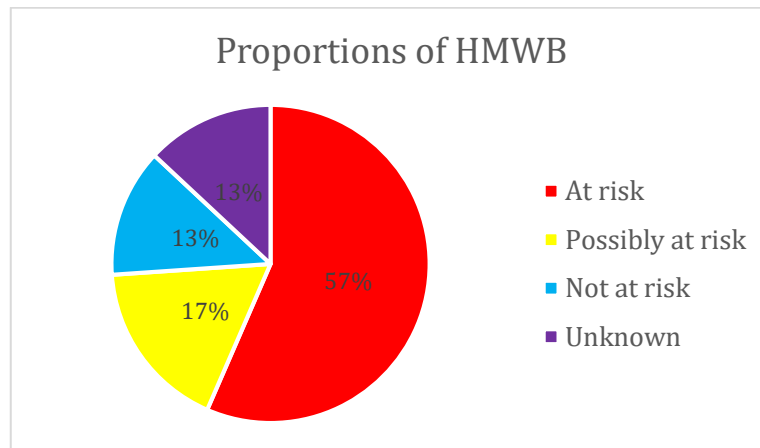


<sup>179</sup> European Commission – CIS Guidance Document 20 – Exemptions to the Environmental Objectives

Waterbody status by length should be the preferred unit of measurement, as this reflects more accurately the overall ecological impact arising from pressures.

In the Ishem basin, the proportions of waterbodies allocated to varying levels of status are shown in Figure 10-2. 13 surface waterbodies are identified as at risk of failing environmental objectives (status less than good) in the 'rivers, HMWB, transitional' category, 4 surface waterbodies are identified as "possibly at risk", 3 waterbodies as "Not at Risk" and 3 surface waterbodies as "Unknown" due to the lack of data. The high levels of Poor and Bad status waterbodies reflect the high level of municipal wastewater pressure and the uncontrolled morphological impacts of gravel abstractions.

**Figure 10-2 – The proportions of HMWB allocated to varying levels of status**



Related to 'lakes' category there are almost no data in terms of activities impacting the water quality and no data related to water quality monitoring; Lakes are not currently routinely monitored by NEA.

Limited data related to Bovilla waterbody are gathered through the project site visits. Lack of data related to this category does not allow the proper risk assessment, therefore the overall status for Bovilla waterbody is identified as "Possibly at Risk" and for the other lake waterbodies it is identified as "Unknown".

For coastal waterbodies interpretation cannot be done as the NEA does not take water samples representative for the 1 nautical mile (1.8 km) wide zone. The overall status for the Coastal Ishem waterbody is classified as "Unknown".

### 10.5.2 Surface waterbodies most likely 'at risk'

This section expands the underlying assumptions behind the determination of pressures and possible status of individual waterbodies considered to be 'at risk of not achieving environmental objectives', which will therefore require additional monitoring, application of general policies (Chapter 12) or more targeted measures (Chapter 13) in order for these waterbodies to achieve 'good status'. It will be evident that the overall status of most waterbodies is derived from extremely limited data on individual 'quality elements' (QEs), most usually the physico-chemistry. Consequently, the confidence level (CL) has a high degree of uncertainty.

The methodological assumption is that a waterbody should only be classed as 'good status' (class 2) or 'high status' (class 1) if a) there is no evidence of any significant pressure on the waterbody itself or from upstream b) the quality element data confirms the measured status of the waterbody. Consequently, of the 23 river waterbodies in the basin, five have been allocated to 'moderate status' (class 3), as there is insufficient data to support the assessment but it would appear that there may be significant pressure(s) impacting on their unknown status.

For these specific waterbodies (**351411, 351423, 351425, 35146, 351482**), the assumed pressures will have to be investigated more closely, and further operational monitoring (WFD Annex V, 1.3.2) will be required in order to confirm the status of these waterbodies.

For other waterbodies, where either the observed condition and/or the measured status is more certain, classifications of either 'bad status' (class 5) or 'poor status' (class 4) have been assumed (see Map 10-3).

River waterbody **351495** – the upper reaches of the Tirana River – it is assumed that the widespread mining of alluvial gravels along the entire length of the waterbody is adversely impacting on the aquatic ecosystem in terms of river habitat morphology (significant pressure 4.1.4).

River waterbody 351491 – the middle reaches of the Tirana River – this part of the Tirana is heavily modified due to historical canalisation. The waterbody through the city is heavily impacted by untreated wastewater creating excessive levels of BOD<sub>5</sub> and solid waste tipping (significant pressure 1.1 and 1.2).

River waterbody **351487** – the upper reaches of the Lana River on the eastern city limits – although in natural form, the waterbody through the city is heavily impacted by untreated wastewater creating excessive levels of BOD<sub>5</sub> and solid waste tipping (significant pressure 1.1 and 1.2).

River waterbody **351485** – downstream of **351487**, the waterbody is likewise heavily contaminated by untreated urban wastewater. This part of the Lana is also heavily modified due to canalisation; hence its ecological objective will be 'good ecological potential' (significant pressure 1.1 and 1.2).

River waterbody **351483** – as for the upstream waterbodies of the Lana, **351483** is likewise heavily contaminated by untreated urban wastewater indicated by measured extreme levels of BOD<sub>5</sub> (significant pressure 1.1 and 1.2).

River waterbody **351481** – as for the upstream waterbodies of the Lana, **351481** is likewise heavily contaminated by untreated urban wastewater indicated by measured extreme levels of BOD<sub>5</sub> (significant pressure 1.1 and 1.2).

River waterbody **35147** – **35147** is the waterbody combining the Tirana and Lana rivers in the city centre. Although natural in form, untreated urban wastewater is creating excessive levels of BOD<sub>5</sub> in the receiving waters (significant pressure 1.1 and 1.2).

River waterbody **35145** – the waterbody of the Ishem river combining the Lana and Tirana rivers upstream from the locations of Berxullë to Rinas (airport environs), but upstream of the confluence of the Terkuza Stream – as a result of upstream contributions of untreated urban wastewater and also significant industrial emissions this waterbody is determined as being in 'poor status'. There is some evidence that BOD<sub>5</sub> levels, although still excessively high, are somewhat reduced probably due to flow dilution effects (significant pressure 1.1 and 1.2 and 1.4).

River waterbody **351443** – the middle reaches of the Terkuza immediately downstream of the Bovilla Reservoir – at the time of commissioning of Bovilla (1999/2000, principally for municipal water supply), there is no evidence that any provision was made for compensatory flows to the downstream river. Consequently, the environmental flow regime of this river possibly as far as Rinas is completely compromised. The physical change to the waterbody in terms of damming of the river also means that it is a HMWB in form. The change in flow regime is assumed to have placed this waterbody in 'poor status' (significant pressures 3.2 and 4.2.3). It is likely that to restore the correct flow regime, a quota of water will have to be released from Bovilla Reservoir.

River waterbody **351441** – the lower reaches of the Terkuza in the Rinas environs. A combination of insufficient flow regime together with high levels of reported BOD<sub>5</sub> due to untreated urban wastewater and various other pressures place this waterbody in 'bad status'.

River waterbody **35143** – the main river of the Ishem receiving combined flows from the Tirana, Lana and Terkuza rivers – As indicated by Map 8-2 (sample point S26), BOD<sub>5</sub> at **35143** is typically in the order of 44 mg/l, and NH<sub>4</sub> levels at 20 mg/l, extreme levels for a major river by any standard. The 'poor status' of this waterbody is therefore based on the condition of the physical-chemical values, derived principally from the direct discharges to upstream waterbodies. It is likely that since 35143 is a

‘combining’ reach, upstream wastewater treatment may bring the waterbody into improved status without direct measures to the waterbody itself (significant pressure 1.1 and 1.2 and 1.4).

River waterbody **351422** – small tributaries of the Zezë Stream draining the Fushë-Krujë area – this area is dominated by limestone mining and cement works, in addition to urban wastewater. (Significant pressure 1.4)

River waterbody **351413** – the final reach of the Ishem river upstream of the transitional waterbody of 351411 – the waterbody passes through the irrigated farmlands of the Bilaj and Gramëz areas, which are also important sources of groundwater. It is assumed that the most significant local pressures are that of diffuse pollution from agricultural practices and possibly direct abstraction of groundwater and surface water for irrigation. However, Map 8-2 of the 2019 reconnaissance survey also indicates extremely high levels of BOD<sub>5</sub> and NH<sub>4</sub> (34 mg/l and 19 mg/l respectively), both indicators of untreated municipal wastewater; hence the ‘poor’ status of this waterbody is being influenced by the high levels of urban wastewater in upstream waterbodies. There is some evidence of natural dilution due to flow, as BOD<sub>5</sub> levels are lower than those upstream. Significant pressures include 2.2 and 4.2.4.

### 10.5.3 Implications for the Surface Water Monitoring Programme

In order to assess the magnitude of the pressures, Member States should monitor for those quality elements which are indicative of the pressures to which the body or bodies are subject. In order to assess the impact of these pressures, Member States should monitor as relevant:

- parameters indicative of the biological quality element, or elements, most sensitive to the pressures to which the water bodies are subject
- all priority substances discharged, and other pollutants discharged in significant quantities
- parameters indicative of the hydro-morphological quality element most sensitive to the pressure identified.

Table 10-4 to Table 10-9 under Annex XIII identify the assumed key reasons for failure to achieve environmental objectives water quality pressures, water quantity pressures (including abstraction and flow regime), and morphological pressures (including canalisation, gravel mining and physical obstructions). In many cases, due to the lack of widespread environmental monitoring, the reasons for failure may be based initially on expert judgement or desktop investigations.

This lack of certainty in the status assessment is reflected in the confidence level (CL). Confidence levels of 0 or 1 indicate no data available for the waterbody assessed. Following the requirements of WFD Annex V, 1.3.2 or 1.3.3, it may be necessary during the RBMP implementation period (2024-2029) to conduct additional short-term monitoring (operational monitoring or investigative monitoring) in order to more correctly determine the precise values of various quality elements to confirm the pressure and status evaluation.

The ensuing surface water monitoring programme is elaborated in Technical Annex IX. This programme merely extends on already existing monitoring capacities, albeit presuming various additional provisions to be in place:

- General physico-chemical quality elements:
  - More locations to be monitored by NEA, for at least a three year’s duration.
  - A few existing NEA monitoring sites to be monitored more frequently.
- Inclusion of systematic monitoring of the following hydrobiological quality elements:
  - Category Rivers: benthic invertebrate fauna.
  - Category Lakes: phytoplankton.
- Inclusion of systematic monitoring the following morphological quality elements:
  - river depth and width variation, structure and substrate of the river bed.

It is not necessary to individually monitor each and every waterbody potentially failing objectives, and this would be prohibitively expensive. The enhanced monitoring can be strategically planned such that

it is likely to be sufficiently indicative of groups of waterbodies, assuming that these grouped waterbodies are subjected to the same broadly similar pressure(s) in the contributing areas.

Strictly speaking, provision of increased monitoring is not regarded as a KTM (see 12.1). Increased monitoring is intended to further inform the establishment of a programme of measures for the achievement of the environmental objectives and specific measures necessary to remedy the effects of accidental pollution, rather than a measure in itself.

In this first initialisation of the new RBMP framework however, due to the weaknesses of the monitoring programmes and widespread lack of environmental data generally, it is considered relevant to record specific and targeted monitoring enhancements as part of the PoM. In this context the relevant KTM covering enhanced monitoring falls under KTM 14 – “Enhancements to Knowledge Base Reducing Uncertainty” (refer also to Technical Annex IX).

Table 10-4 – Pressures and Status Analysis – Rivers

IDENTIFICATION			PRESSURE ANALYSIS <sup>180</sup>								STATUS AND OVERALL STATUS or POTENTIAL					RISK ASSESSMENT		
WATERBODY NAME	WATERBODY EU CODE	FORM	POINT PRESSURE 1	POINT PRESSURE 2	DIFFUSE PRESSURE 1	DIFFUSE PRESSURE 2	ABSTRACTION PRESSURE 1	ABSTRACTION PRESSURE 2	MORPHOLOGY PRESSURE	HYDROMORPH PRESSURE	BQES EQR <sup>181</sup>	P-CHEM <sup>182</sup>	H-MORPH <sup>183</sup>	ANNEX X PSs <sup>184</sup>	ANNEX VIII RBSP	OVERALL STATUS	RISK LEVEL <sup>185</sup>	CL <sup>186</sup>
Ishem	351413	Natural	1.3	1.4	-	2.2	3.1	-	4.2.4; 4.1.4	4.5; 5.3	5	4	2	-	-	4	At risk	2
Zeze	351421	Natural	1.3	-	2.2	2.6	-	-	4.1.2	4.3.2; 4.5	4	2	2	-	-	2	Not at Risk	1
Zeze	351422	Natural	1.3	1.4	2.2	2.6; 2.8	-	-	4.1.2; 4.1.4	4.5; 5.3	4	1	2	-	-	4	At Risk	1
Zeze	351423	Natural	1.1; 1.3	1.4	2.2	2.6	-	-	-	4.5	5	3	3	-	-	3	Possibly	1
Zeze	351425	Natural	-	-	2.2	2.6	3.1	-	4.1.4; 4.2.4	4.5	3	1	1	-	-	3	Possibly	1
Zeze	351427	Natural	-	-	2.2	-	3.1	-	4.2.4	-	1	1	1	-	-	1	Not at Risk	1
Ishem	35143	Natural	1.1; 1.3	1.4	2.2	2.6; 2.8	-	-	4.1.2	-	5	4	1	-	-	4	At Risk	1
Terkuza	351441	Natural	1.3	1.4	2.2	2.6; 2.8	3.1	-	4.2.4; 4.1.4	4.3.4; 4.3.2; 4.5; 5.3	4	5	2	-	-	5	At Risk	1
Terkuza	351443	HMWB	1.3	-	2.2	2.8	-	-	4.2.3; 4.1.4	4.3.4; 4.5; 5.3	4	2	4	-	-	4	At Risk	1
	351444	Natural	-	-	2.2	-	-	-	-	-	-	-	1	-	-	2	Unknown	0
	351445	Natural	1.1	-	2.2	-	-	-	-	4.5	3	-	1	-	-	2	Unknown	0
Tirana	35145	Natural	1.1; 1.3	1.4	2.2	2.6	-	-	4.1.2	4.3.6; 4.5	5	4	1	-	-	4	At Risk	2
	35146	Natural	1.1; 1.3	1.4; 1.6	2.2	2.6	-	-	-	-	5	-	1	-	-	3	Possibly	1
Tirana	35147	Natural	1.1; 1.3; 1.5	-	2.2	2.6	-	-	4.1.2; 4.2.4	4.5; 5.3	4	5	2	-	-	5	At Risk	2
Lana	351481	Natural	1.1; 1.3; 1.5	1.2	2.2	-	-	-	4.1.5; 4.2.4	4.3.1; 5.3	5	5	3	-	-	5	At Risk	2
	351482	Natural	1.1; 1.3	1.4	2.2	2.6	-	-	-	5.3	5	-	2	-	-	3	Possibly	1
Lana	351483	Natural	1.1; 1.3; 1.5	-	2.2	2.6	-	-	4.1.5	5.3	5	5	3	-	-	5	At Risk	2
Lana	351485	HMWB	1.1; 1.3; 1.5	-	-	-	-	-	4.1.4	5.3	-	5	4	-	-	5	At Risk	1
Lana	351487	Natural	1.1; 1.3	-	-	-	-	-	-	4.5	5	5	3	-	-	5	At Risk	1
Tirana	351491	HMWB	1.1; 1.3	1.4	2.2	-	-	-	4.1.4	4.5; 5.3	5	5	3	-	-	5	At Risk	2
Tirana	351493	HMWB	1.1; 1.3	-	2.2	2.6; 2.8	-	-	4.1.4	4.5; 5.3	2	2	3	-	-	2	Not at Risk	2
Tirana	351495	Natural	-	-	2.2	2.8	-	-	4.1.4;	4.5; 5.3	2	4	2	-	-	4	At Risk	2

180 Pressure Types align with WISE GIS Reporting Guidance 2016 – Annex 1a

181 Comment on BQE method

182 Comment on P-CHEM data – P-CHEM status assessment based principally on spot sampling of July 2019, utilising BOD5 and/or NH4 values as indicator values.

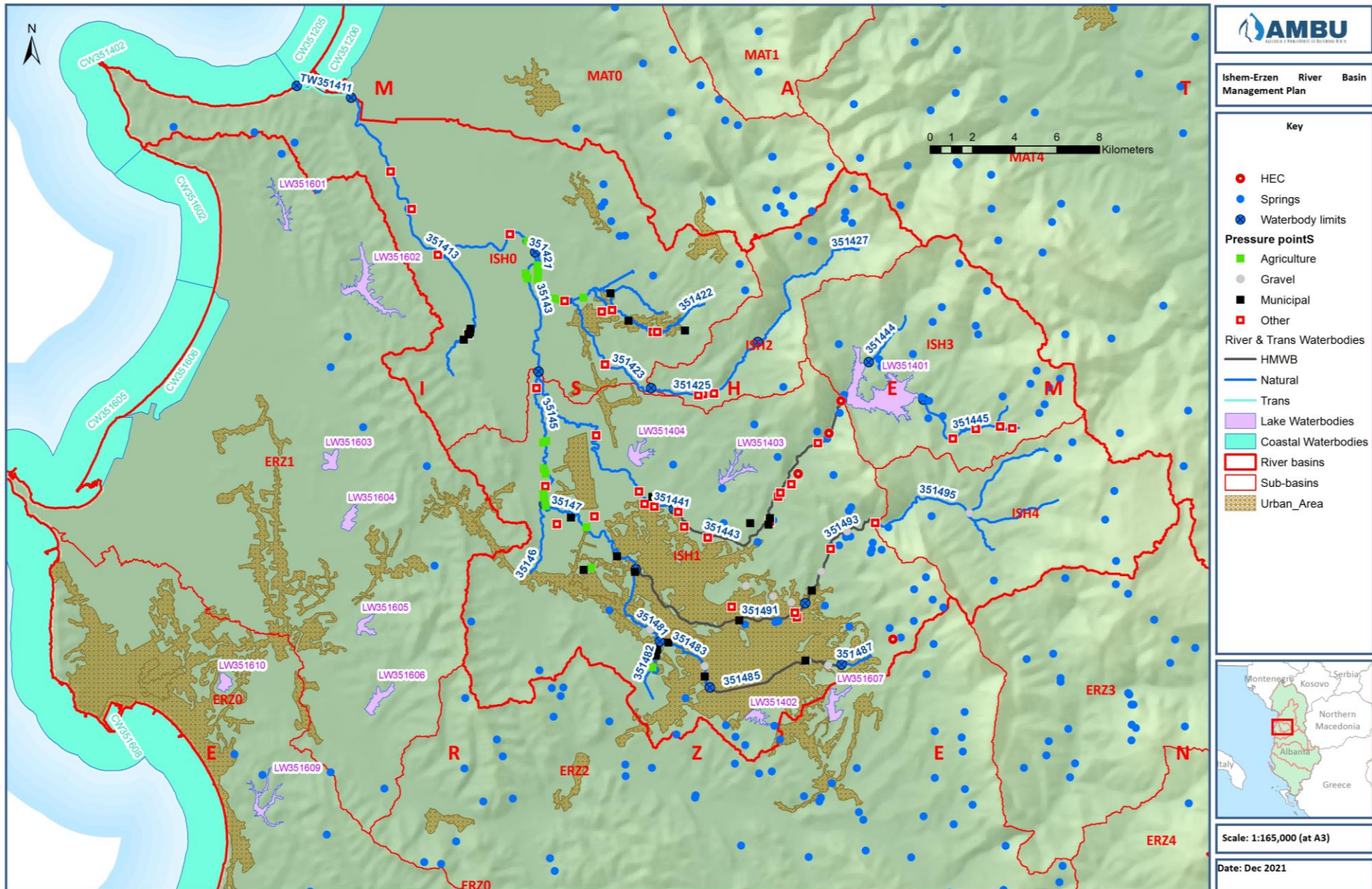
183 Comment on H-MORPH methodology – MORPHOLOGY indicates significant obstruction of watercourses or changes in river morphology due to physical or mining alterations; HYDROMORPH indicates significant change in flow regime due to municipal, irrigation or hydropower abstractions;

184 Priority Substances if monitored

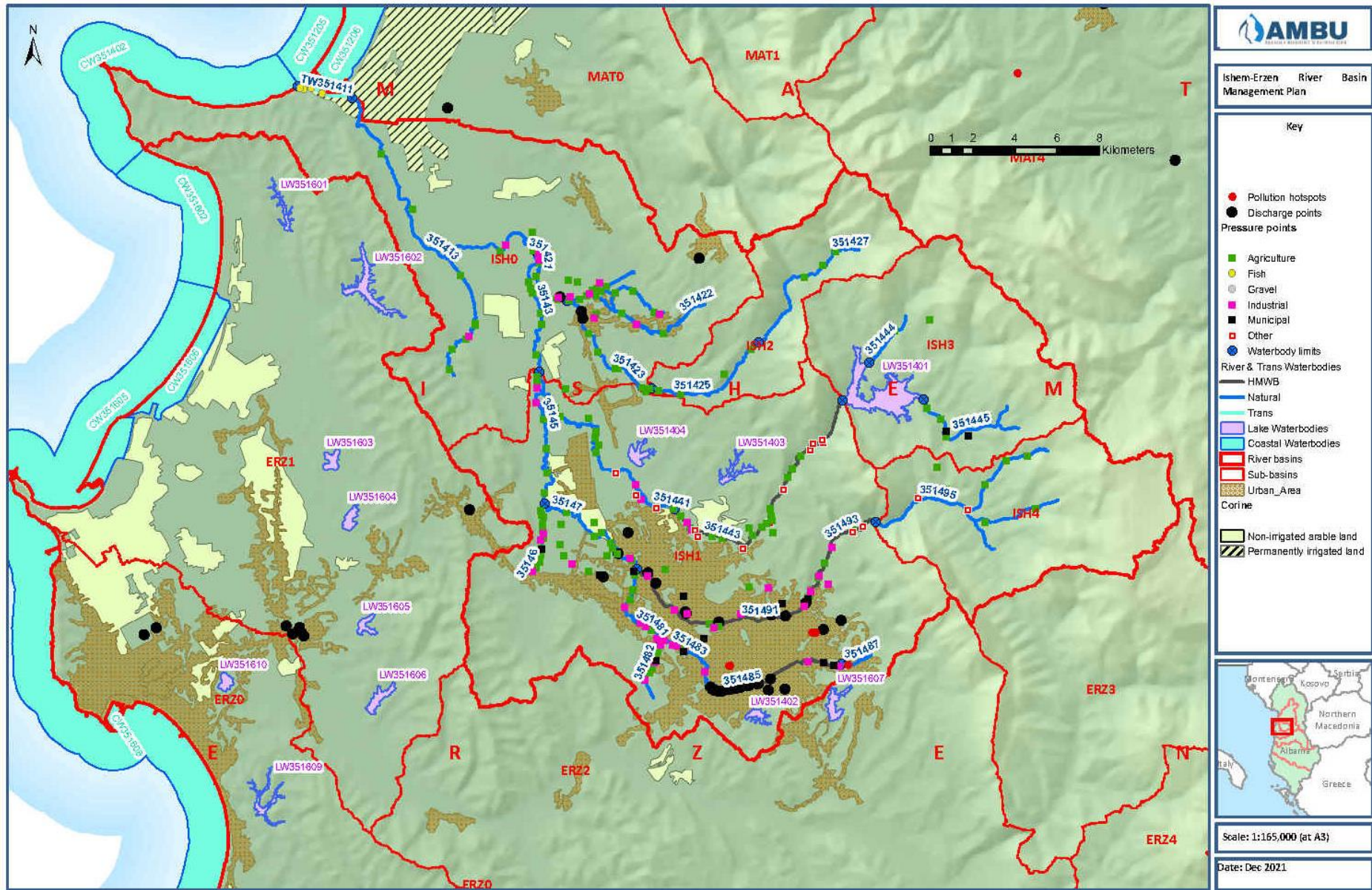
185 Enumeration List for Risk = 'Not at Risk'; 'At Risk'; 'Possibly at Risk'; 'Unknown';

186 Enumeration List for Confidence Level = '0' = no information; '1' = low confidence; '2' = medium confidence; '3' = high confidence. Low = no monitoring data, expert judgement only; Medium = some supporting quality element (QE) data and limited data on one BQE; High = good data on 1+ BQE and supporting most relevant QEs.

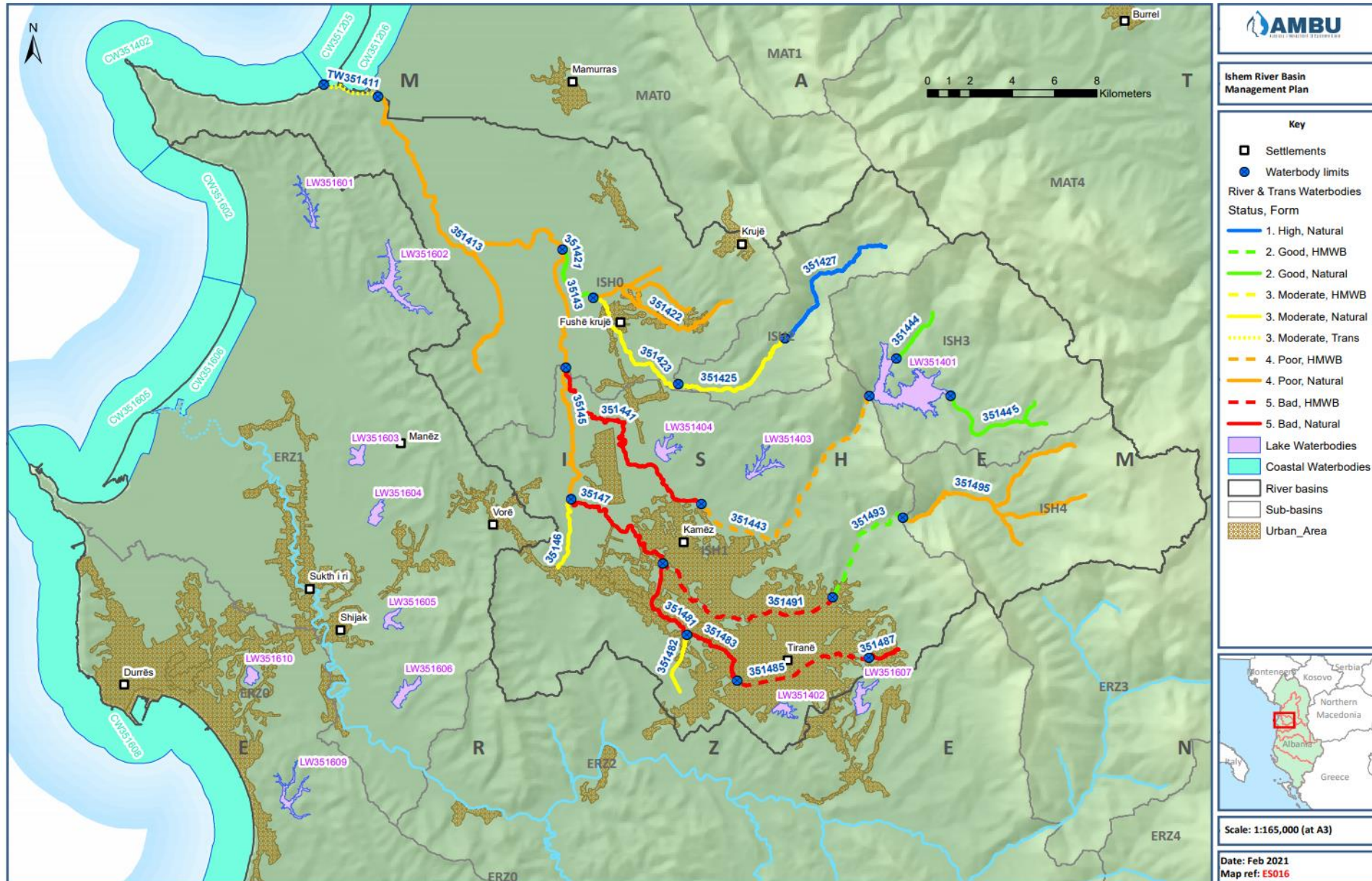
Map 10-1 – Overview of Abstraction, Hydropower and Morphological Pressures



Map 10-2 – Overview of Wastewater Discharge and Diffuse Pollution Pressures



Map 10-3 – Final Status Determination for Surface Waterbodies



## 10.6 Groundwater Body Pressures and Status Assessment Overview

### 10.6.1 Pressures Assessment at Groundwater body Level

The WFD objectives for groundwaters are: (i) to prevent or limit the input of pollutants and prevent the deterioration of status; (ii) protect, enhance and restore all groundwater bodies; and (iii) reverse any significant and upward trend in pollutant concentrations.

WFD/GWD procedures distinguish in time between status assessment which considers the current condition from risk assessment which considers what might happen during the next plan period, i.e. that a water is at risk of not meeting its environmental objectives by the end of that plan period.

Table 10-6 summarizes the principal identified pressures on each groundwater body within the constraints of available data. Because there is no compiled inventory of pollution hazards at their origin, this assessment uses the GIS database compiled by AMBU of the locations of discharges into surface water bodies. These locations were overlaid onto the groundwater bodies and indicate (i) down-slope locations from where one or more point pollution of groundwater might be occurring, even though no specific comment can be made, and (ii) the upstream limits of where each quantum of pollution entering the river could be leaking into groundwater (depending on the local hydraulic gradient). On the analysis of pressures relating to groundwater bodies also utilised the overlay of project GIS coverages (springs, dug wells, pollution hotspots, discharge points, population and settlements) and the Corrine<sup>187</sup> land-use spatial database, and are tabulated in the Groundwater Technical Annex VII.

Quantification of abstraction and groundwater discharge pressures is limited by data gaps and the nature of spring discharges, which may exceed 1 m<sup>3</sup>/s. Springs are natural discharges, widely captured for human use, and differ from pumped abstractions which are induced by human action and reduce natural discharges. The GIS analysis of spring discharges may incorrectly assign some spring to groundwater bodies in because the point of collection is located just beyond the boundary of the geological unit<sup>188</sup>. Many, and probably the vast majority of major, springs are inventoried in GIS. Abstractions of groundwater are obtained from five sources: (i) dug wells located in GIS, although mostly of low discharge; (ii) high capacity public abstraction wells are largely documented; (iii) private domestic drilled wells are largely undocumented but can be expected where no dug well or spring is recorded and the area is not served by piped public supply; (iv) private industrial wells are largely undocumented and may be of major significance; and (v) drilled irrigation wells which are largely undocumented and are likely to be significant.

The WFD presents groundwater status in terms of just two criteria, chemical and quantitative, specified as being either good or poor, with an overall status which is defined as the lower of the two determinations (i.e. if either is poor, the overall status is poor). The determination of overall status comprises four quantitative and five chemical tests (see Chapter 3). The GWD also requires that there are no significant upward trends that could lead to a change in status in the foreseeable future.

Broad distinctions can be drawn between the pressures acting on the different aquifer types in the Ishem Basin. The alluvial groundwater bodies (Type 1) are densely populated (hosting 90% of the population), the focus for industrial and commercial development, intensively abstracted, and threatened by a variety of potential pollution sources. Recent decades have witnessed profound changes in land-use from arable farming to housing and industrial development. This is displacing the risks of pollution by fertiliser nitrate and pesticides with nitrate from human waste and industrial chemicals; and at the same time the displacement of irrigation abstraction by intensification of

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<sup>187</sup> The Corrine database includes information on urban & industrial land, irrigated and non-irrigated land, pastures, forest, grassland, wetlands, and inland and marine waters.

<sup>188</sup> This commonly occurs at the contact between high-permeability (and also topographically high) and low-permeability flysch deposits which cannot transmit large quantities of water and force the groundwater to discharge at the surface as a spring.

municipal and industrial abstraction. This has led to overall increases in quantitative and chemical pressures.

The carbonate massifs (Type 4) in the middle and upper catchment are generally subject to little human interference with the exceptions of some fanning, quarrying and in particular the capture of large springs for municipal supply. The latter relies on capturing natural discharge and therefore does not endanger the resource itself but does reduce baseflow to streams and wetlands.

The sandstone and conglomerate aquifers (Type 5) that border the alluvial basin, although lower yielding is otherwise similar to the Type 1 aquifers. They host 7% of the population and are pumped for domestic and industrial supply, and subject to pollution pressures from human waste and industrial chemicals.

### 10.6.2 Derivation of Threshold Values

Threshold Values (TV) are quality standards set by States for pollutants causing a risk of not meeting environmental objectives of the WFD and as required by Article 3.1 of the GWD. TV's supplement the default groundwater quality standards (nitrate and pesticides) in Annex I of the GWD where those are not adequate for satisfying environmental objectives, and should consider at least the pollutants and indicators listed in Annex II Part B, which are:

- arsenic, cadmium, lead, mercury, ammonium, chloride, sulphate, nitrite and phosphate;
- trichloroethene (TCE) and tetrachloroethene (PCE);
- (the member selected) indicator of saline (or 'other') intrusion.

Threshold Values also define the starting points for trend reversal as per GWD Article 5. The derivation of Threshold Values for the Ishem Basin are detailed in the Groundwater Annex. The proposed Threshold Values Table 10-5; however, it should be recognised that the applicability of some of the TV's for heavy metals (As, Cd, Hg & Pb), pesticides and chlorinated solvents (TCE and PCE) is severely limited by the availability of data on their occurrence in the IEM basins, and therefore the Analysis of Pressures has been used to supplement the process. The Ishem assessment indicates the foreseeable need for a reversal, or at least reduction in the trend of nitrate which can be defined at 75% of the GWQ standard, i.e. 37.5 mg/L.

The TVs proposed in Table 10-55 are for implementation at RBD level, consideration should be given to assigning more stringent values at groundwater body level for bodies such as Selita e Malit (GW35140409) which probably contain near pristine quality water and are exploited for water bottling.

**Table 10-5 – Proposed Threshold Values**

Parameter	Units	GW Quality Standard	Threshold Values (TV)	Notes
Nitrate	mg/L	50	37.5	
Pesticides	µg/L	0.1	0.075	
		0.5 (total)	0.375	
Arsenic	µg/L	10	7.5	
Cadmium	µg/L	5	3.75	
Lead	µg/L	5	3.75	
Mercury	µg/L	1	0.75	
Ammonium	mg/L	0.50	0.375	
Chloride	mg/L	250	188	
Sulphate	mg/L	250	188	

Nitrite	mg/L	0.50	0.375	
Phosphate	mg/L	?	?	
Trichloroethene	µg/L	10	7.5	
Tetrachloroethene	µg/L	10	7.5	
Salinity as EC	µS/cm	2500	1875	

### 10.6.3 Status Determination Methodology at Waterbody Level

In accordance with the GWD status assessment is required for groundwater bodies identified as being at risk and in relation to the receptor and each of the pollutants which contribute to the GWB being so characterised (GWD, Annex III). Groundwater bodies not at risk are automatically classified as being of good status. Groundwater status is assessed based on the monitoring network, as described in Chapter 8, and does not exclude the presence of localised pollution incidents not reflected in the monitoring network.

Due to gaps in quantity and quality surveillance monitoring and the simplified delineation of the waterbodies as of 2020, interim analysis is presented for all groundwater bodies in the RBMP 2024-2029 in order to establish a broad overview. With increased surveillance monitoring in future, more distinction can be drawn between waterbodies 'at risk' and 'not at risk'. Increased and improved surveillance monitoring is a matter for the Programme of Measures.

Because data quality is central to the status methodology, it is also necessary to report on the 'confidence level' (CL) of the status assessment.<sup>189</sup> Low confidence and precision in the data potentially leads to a risk of misclassification, hence the CL gives an indication of the reliability of the status value. WISE 2016 guidance advises on the following classification to indicate the confidence on the ecological status or potential assigned:

'0' = no information; '1' = low confidence; '2' = medium confidence; '3' = high confidence.

The criteria are as follows:

Low = no monitoring data, expert judgement only; Medium = some supporting quality element (QE) data and limited data on one BQE; High = good data on 1+ BQE and supporting most relevant QEs.

## 10.7 Groundwater Pressures and Status Main Summary

### 10.7.1 Overview

Table 10-6 summarizes the principal identified pressures on the Ishem groundwater bodies. Map 10-4 shows the principal pollution and abstraction pressures. Map 10-5 summarises the final status determination of groundwater bodies in the Ishem basin.

Groundwater body **35140103** (Thumane) - There are no recorded exceedances of water quality standards however, there is significant uncertainty regarding parameters that have not been tested for. There is also much uncertainty about the trends of groundwater levels which are unlikely to fail the water balance test but the measurements at Bilaj-416, if representative, suggest that the GWB is being affected by pumping-induced intrusion of poor-quality water from polluted rivers but this is not reflected in the monitoring and therefore does not affect the chemical or quantitative status. It does, however, place the GWB at risk of failing environmental objectives during the next plan period. It is

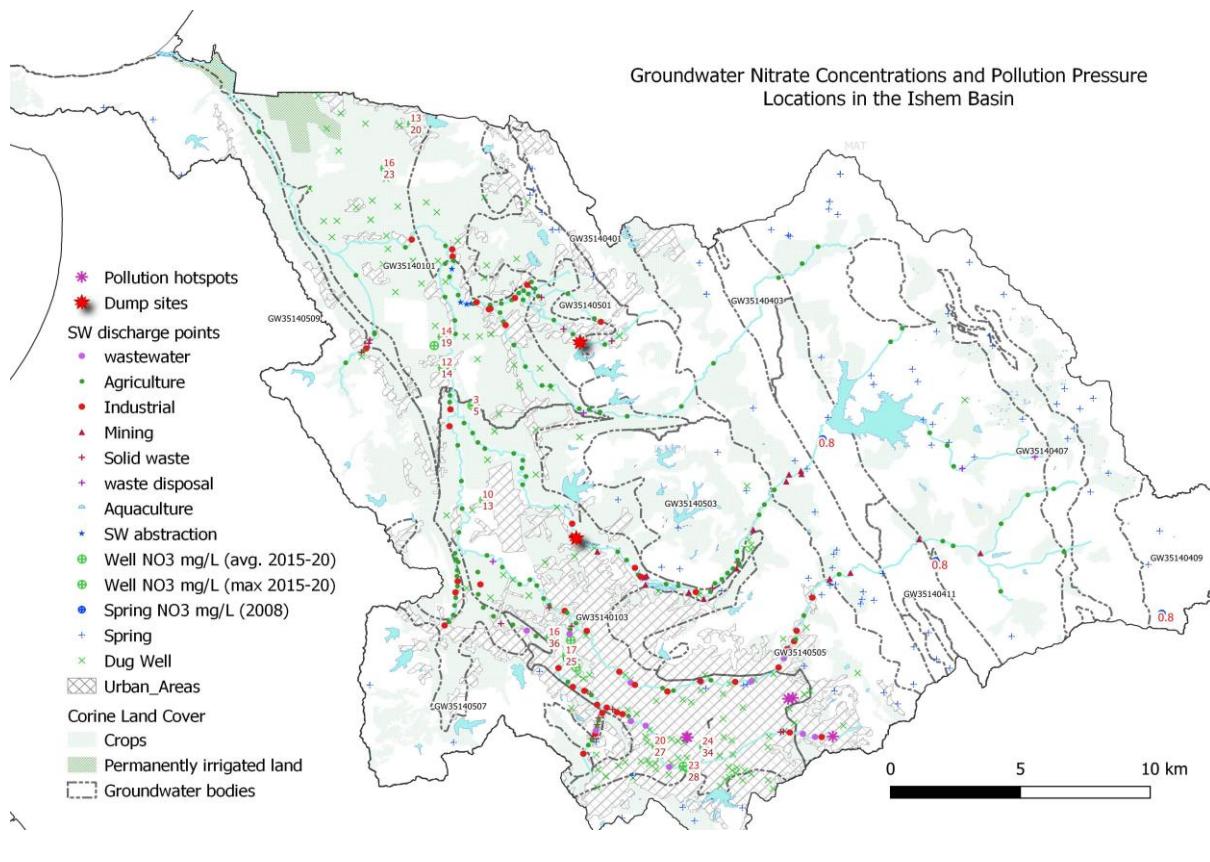
<sup>189</sup> WISE GIS Guidance 2016 – Schema: SWB; schema element <SW Ecological Confidence>

recognised that there are noteworthy pressures from agricultural nitrate and pesticides<sup>190</sup> and multiple point sources such as petrol filling stations.

Groundwater body **35140103** (Tirana) - No exceedances of water quality standards have been recorded, but there is a high level of uncertainty regarding parameters that have not been tested for and are recognised as active pressures. Groundwater levels lie below river levels for much of the year over a large part of the GWB and indicate that the GWB is being affected by pumping-induced intrusion by polluted river water but this is not reflected in the monitoring data and therefore does not affect the chemical or quantitative status. It does, however, contribute to the risk of failing environmental objectives during the next plan period. Nitrate concentrations are well above natural background (approaching 30 mg/L) and three of ten monitoring wells display upward trends. Based on current trends, the GWB is at risk of failing environmental objectives with regard to the threshold value (37.5 mg/L). Further, the nature of industries and commercial activities suggest that many hazardous chemicals that are not currently tested for are being stored or used above aquifer and therefore contributes significant uncertainty to the status assessment. Actual or potential pollution hotspots in this GWB are recorded in AMBU's database, located in Figure 10-3, are listed below together with the known or likely hazards:

- PH\_2 Dump site (multiple hazards)
- PH-3 Albanian Film Studio (cyanide)
- PH\_21 Institute for Public Health (unknown)
- PH\_25 Workshop for regeneration of used transformer oils (oils, PCB's, solvents)
- PH\_26 Transformer repair workshop (oils, PCB's, solvents)
- PH\_6 Auto & Tractor Factory, with a dump site 250m to SSW (oils, solvents)

**Figure 10-3 – Groundwater Nitrate Concentrations and Pollution Pressure Locations in the Ishem Basin**



<sup>190</sup> Although no pesticide analyses in the Ishem Basin have been identified, significant groundwater pollution by lindane (hexachlorocyclohexane or HCH) from a factory near Durres has been reported by Marini et al. (Marine poll. Bull.; 2012, 64(3):472-8) and more extensively from groundwater in the Buna Basin by Barbieri et al. (Env. Earth Sci.; 2015, 74, 6325–6338. It follows that the risk of Lindane contamination in the Ishem is significant.

All of these overlies a drinking water aquifer and therefore pose significant risk to groundwater and to the unknown number of private wells. Also, CEMSA (2012) identify a hotspot at the Sh. A Dajti metallurgical enterprise near the Great Market at Medrese where large drums of cyanide were reported.

AMBU's inventory of discharge points to surface water indicate many potential point direct sources of groundwater pollution and also highlight the risks of polluted river water being drawn into the aquifer. The 42 agricultural discharges which suggest the possible occurrence of nitrates and pesticides.

Although not present in the AMBU database, there are many industrial and commercial point pressures that threaten groundwater, notably petrol filling stations and other petroleum stores, engineering workshops using fuels and chlorinated solvents, dry-cleaners and food processing facilities. International experience suggests a significant proportion of such facilities may pollute soil and shallow groundwater. A special concern applies to Tirana International Airport; although there is no direct evidence for or against, globally airfields are very commonly associated with groundwater pollution from jet fuel and chlorinated solvents.

Groundwater body Reporting **Group A: Dajti Massif (35140403/05/11)** - the three GWB's comprise the central section of the Dajti Massif which continues north and south of the Ishem Basin, are separated by streams that receive baseflow from the massif. Based on the absence of pumped abstractions and the combination of water quality monitoring and negligible pollution pressure, both the quantitative and chemical status are assessed to be GOOD. In the absence testing for pesticides, this determination is assigned only a medium degree of confidence, and the water bodies are judged to be Not At Risk.

Groundwater body **35140407 (Mali i Dajit)** - Based on the absence of pumped abstractions and the combination of water quality monitoring and negligible pollution pressure, both the quantitative and chemical status are assessed to be GOOD. In absence testing for pesticides, this determination is assigned only a medium degree of confidence, and the water body are judged to be not at risk.

Groundwater body **35140409 (Selitë e Malit)** - Based on the absence of any pumped abstractions and the combination of water quality monitoring and no significant pollution pressure, both the quantitative and chemical status are assessed to be GOOD. Due to the absence testing pesticides, this determination is assigned only a medium degree of confidence, and the water bodies are judged to be not at risk. However, the bare karst surface renders the aquifer extremely vulnerability should human activities take place.

Groundwater body Reporting **Group B: Brar- Kruje (35140501/03/05)** - The sandstones and conglomerates of the Rogozhina Formation are considered to hold naturally good quality groundwater; there are few historical analyses but no routine monitoring of groundwater level or quality. Historical reports indicate that early wells encountered artesian water levels but the current situation is uncertain with some indications of declining levels. The expanding nature of human activities points to increasing pollution pressures from household sanitation and commercial activities as well as quantitative pressure from the large, but unknown, number of private wells. Therefore, these groundwater bodies are presumed, but with low confidence, to be of Good Status but also to be At Risk of failing EOs.

Significant parts of these water bodies have recently and rapidly been urbanised and introducing significant pressure on their quantitative status from the reduction in recharge due to conversion of natural vegetated and sloping surfaces to hard surfaces such as buildings, concrete and tarmac, and accompanied by surface drainage.

Groundwater body Reporting **Group C: Bubq- Kashar (35140507/09)** - The Rogozhina sandstones and conglomerates are considered to hold good quality groundwater; however, except for a few historical measurements, there is no monitoring of groundwater level or quality. Water levels in drilled wells were initially artesian but are understood to have declined. Increasing human activities points to increasing pollution pressures from household sanitation and commercial activities as well as quantitative pressure from the large, but unknown, of private wells. As in Group B, urbanisation is introducing significant quantitative pressure from the reduction in recharge due to conversion of

natural surfaces to hard surfaces. Therefore, these groundwater bodies are presumed, but with low confidence, to be of Good Status but also to be At Risk of failing EOs.

### 10.7.2 Implications for the Groundwater Monitoring Network

Groundwater monitoring in the Ishem Basin requires significant upgrades in several areas which should be considered in terms of geologically and geographically distinct regions, notably the alluvial, limestone and sandstone-conglomerate aquifers. These aquifer types exhibit fundamentally differences in vulnerability. The alluvial and sandstone units offer some intrinsic protection through the development of a soil zone and because flow occurs either entirely or significantly through intergranular flow. By contrast, the karst limestone aquifers are generally lacking a good soil cover and dominated by fissure flow, although this varies from modest soil cover on the Dajti Massif to virtually none on Mali mi Gropa. Despite their apparently good status and low-levels of pressure, they are highly vulnerable to pollution; contaminants will easily reach the water table and can migrate quickly once there. Improvements are required in the following areas:

- *Spatial coverage between GWBs.* Only two water bodies (GW35140101/03) contain wells that are routinely monitored (by AGS), and all measurements are made at active pumping stations. In two karstic water bodies, occasional measurements of water quality, and to a lesser extent discharge, are made at major springs. The wells that are monitoring (in GW35140101/03) are long-screened production wells that cannot be used to differentiate vertical variations in water level or water quality.
- *Chemical parameters measured.* Presently these are largely limited to major ions. Heavy metals and synthetic organics chemicals, as required by the WFD and GWD, are basically not measured due to the lack of analytical capability.
- *Alluvial Aquifers.* With the exception of large springs in karst terrain, monitoring of (non-pumping) groundwater levels is essential to understand the quantitative status of the groundwater bodies. Most wells in the current network are production wells that are generally not equipped for monitoring and even where possible, the levels are confounded by pumping.
- *Karstic Aquifers.* In the limestone massifs, where groundwater discharge occurs predominantly through springs, monitoring of flow and water quality at large springs, which drain large volumes of aquifer, is the most practical means of monitoring their status.
- *Sandstone-Conglomerate Aquifers.* The absence of any monitoring in the low-permeability sandstone aquifers, which are pumped by wells, means their status is highly uncertain.
- *Groundwater Level Monitoring.* Significant time-series data are only available at three wells each in in the Thumane and Tirana groundwater bodies, and are not sufficient to understand the impact of complex human activities there.
- *Monitoring Wells.* In the alluvial (porous) and sandstone (porous-fractured) aquifers, the use of dedicated monitoring wells (piezometers) should be standard in order to ensure reliable measurements of water quality and water level. These should be installed as piezometer nests, comprising two small-diameter, short-screened wells, one screened neared the water table and the other near the base of the main producing zone.
- *Temporal Frequency.* The scheduled frequency (quarterly) for chemical monitoring, though not always realised in practice appears adequate to identify trends in groundwater quality; however, the same frequency is not adequate to unravel long-term trends and seasonal fluctuations in groundwater levels. To achieve good temporal monitoring of water levels, important sites should be equipped with automatic data loggers and telemetry, as is becoming de facto standard practice in monitoring.
- *Abstractions.* Monitoring of abstractions at municipal, industrial and irrigation wells and springs, if conducted, is not available to the concerned water resource agencies (AMBU and AGS). Water use and status information should be freely shared in real-time, or virtually real-

time, between resource agencies and utilities. Refer to Technical Annex VII for Table 10 11 – Summary of General Pressures Assessment at Groundwater Body– Ishem and Table 10 12– Status Assessment – Category GROUNDWATER.

**Table 10-6 – 10-6 Pressures and Status Assessment Summary – Category GROUNDWATER**

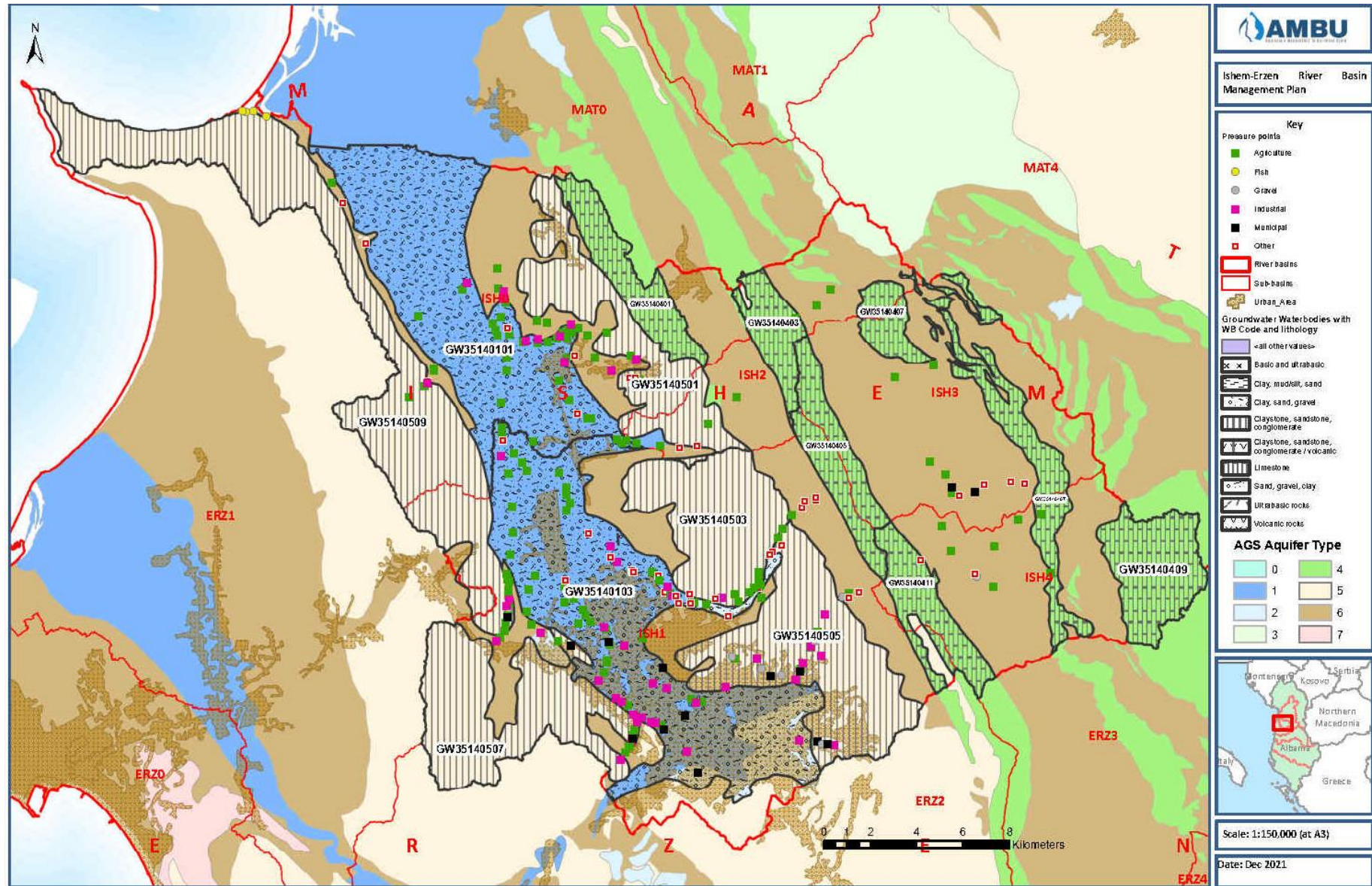
IDENTIFICATION			PRESSURE ANALYSIS <sup>191</sup>						STATUS AND OVERALL STATUS					RISK ASSESSMENT	
REPORTING GROUP	GROUNDWATER BODY NAME(S)	WATERBODY EU CODE(S)	POINT PRESSURE 1	POINT PRESSURE 2	DIFFUSE PRESSURE 1	DIFFUSE PRESSURE 2	ABSTRACTION / FLOW PRESSURE	GROUND WATER PRESSURE	QUANT <sup>192</sup>	CHEM <sup>193</sup>	ANNE XX PSs	ANN EX VIII RBSP	OVERALL STATUS	RISK LEVEL	CL
-	Thumane	GW35140101	1.1	1.3/1.4	2.2/2.6		3.1/3.2/3.3	6.2	G (2)	G (2)			Good	At risk	1
-	Tirana	GW35140103	1.1/1.2	1.3/1.4/1.5/1.6/1.9	2.2/2.6	2.8	3.1/3.2/3.3	6.2	G (1)	G (1)			Good	At risk	1
-	Makaresh	GW35140401		1.3/1.4	2.2		3.1/3.3		G (1)	G (2)			Good	Not at risk	2
<b>A</b>	Kroi i Madh	GW35140403													
	Bovilla	GW35140405			2.2		3.1/3.3		G (3)	G (2)			Good	Not at risk	2
	Dajt	GW35140411													
-	Mali i Dajtit	GW35140407							G (2)	G (2)			Good	Not at risk	2
	Selita e Malit	GW35140409							G (2)	G (2)			Good	Not at risk	3
<b>B</b>	Fushe-Kruje	GW35140501													
	Qinam	GW35140503	1.1/1.2	1.3/1.4	2.2	2.6	3.1/3.3	6.2	G (1)	G (1)			Good	At risk	1
	Brar	GW35140505													
<b>C</b>	Kashar	GW35140507	1.1/1.2	1.3/1.4	2.2		3.1/3.3	6.2							
	Bubq	GW35140509			2.2	2.6			G (1)	G (1)			Good	At risk	1

<sup>191</sup> Pressure Types align with WISE GIS Reporting Guidance 2016 – Annex 1a.

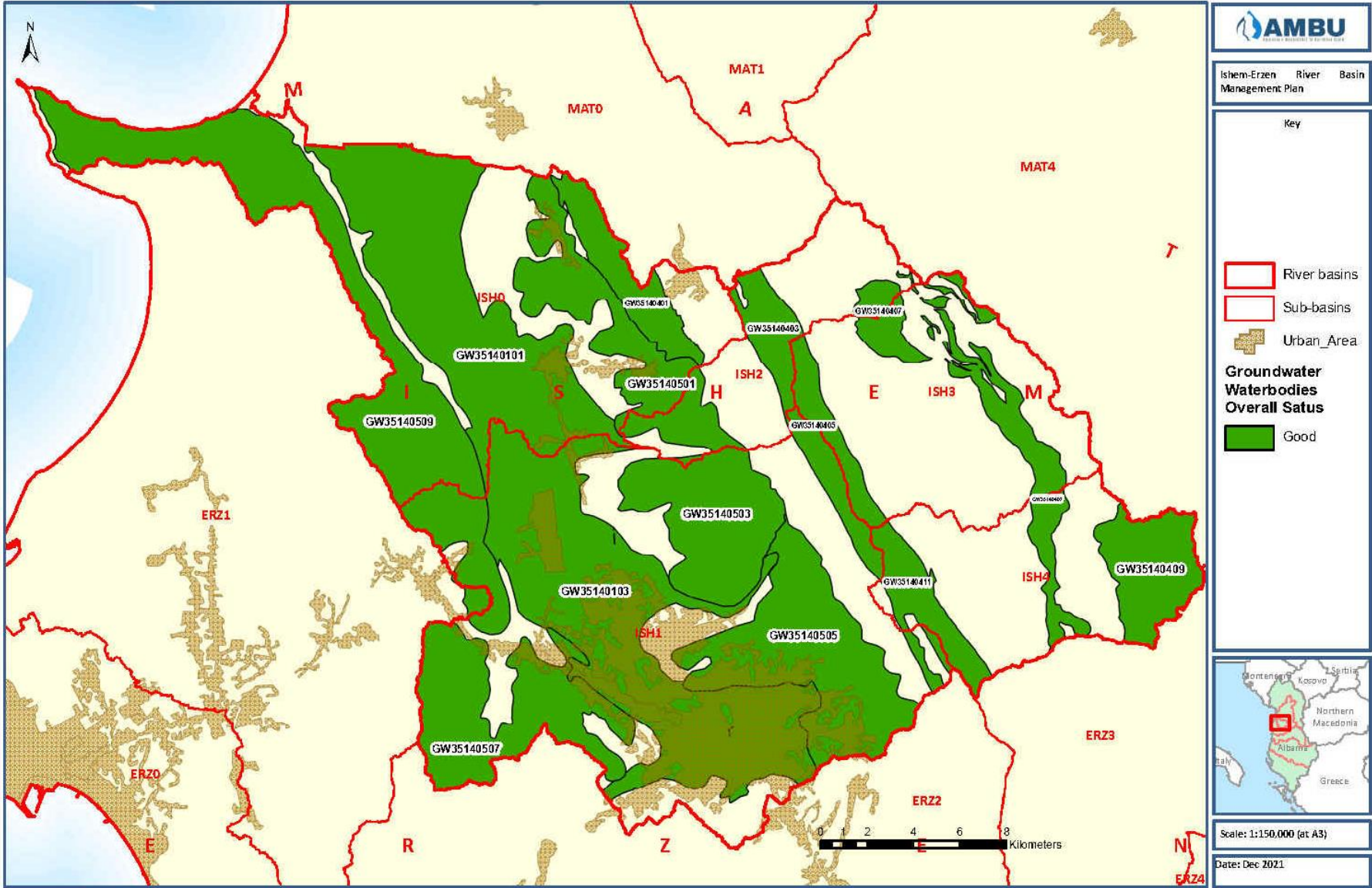
<sup>192</sup> Indicates quantitative status of the waterbody as determined by the AGS coefficient of exploitation. Abstraction must be less than (Recharge – Environmental Flow).

<sup>193</sup> Indicates basic physical-chemical status of the waterbody as determined principally by level of nitrates and/or Electrical Conductivity

Map 10-4 – Overview of Groundwater Abstraction and Pollution Pressures



Map 10-5 - Final Status Determination for all Groundwater Bodies



# 11 Summary of the Economic Analysis

## 11.1 The economic analysis according to WFD-Article 5, Annex III

The economic analysis, based on requirements of Article 5 of the WFD shall contain enough information in sufficient detail (taking account of the costs associated with collection of the relevant data) in order to:

(a) make the relevant calculations necessary for taking into account under Article 9 the principle of recovery of the costs of water services, taking account of long-term forecasts of supply and demand for water in the river basin district and, where necessary:

- estimates of the volume, prices and costs associated with water services, and
- estimates of relevant investment including forecasts of such investments;

(b) make judgements about the most cost-effective combinations of measures in respect of water uses to be included in the PoMs under Article 11 based on estimates of the potential costs of such measures.

Regarding Albania and as part of the overall requirements to prepare RBMPs, AMBU must prepare an economic analysis of water use and productivity in the basin, in particular to establish whether water is being used efficiently and its true environmental cost fully recovered from the users.

This chapter presents a summary of the economic analysis of the Ishem RB. While not all required information is available at this stage in Albania (and was not available during the first implementation cycles also for many Member States), an economic analysis report has been prepared for the Ishem RB and can be found in the Annex X.

## 11.2 The Ishem basin: a short overview

The Ishem has a catchment area of 721 km<sup>2</sup> and flows into the Adriatic Sea near the town of Ishem. It is separated by low hills from the Erzeni river basin district. It covers the main parts of the capital of Tirana, including the two tributaries of the Tirane and Lana rivers. So, this catchment in its lower parts, is densely populated and with important economic activities (and accordingly pressures).

Since the Ishem river basin is socio-economically very interlinked with Erzen RB (which at a general level holds also from a hydrological perspective), the economic analysis (as found in Annex X) for these in general in a combined way. A separation of important socio-economic data for these would be challenging (e.g. dividing relevant information/data available only for the whole Tirana municipality), and at the same time not very useful, since such a division:

- would lead to a separate consideration of the related socio-economic issues, while at a practical level these two areas face e.g. common pressures/common water uses;
- regarding the programmes of measures, separate proposals would be made that would lead to possible higher costs (e.g. separating the topic and related measures of waste water treatment and required facilities); thus, an integrated perspective to the required measures is needed.

In addition, the allocation of municipalities to the combined Ishem-Erzeni RBs shows a good congruence between the combined RBs-area (2.191 km<sup>2</sup>) and the area of the 7 municipalities falling within the boundaries of these RBs, is considered (2.213 km<sup>2</sup>). So, the analysis at this level of disaggregation can be considered reliable. Regarding specifically the Ishem RB, a disaggregation of information available at prefecture level is not possible (the Tirana and Durres provinces are part of both basins, making a division not feasible/useful due to high uncertainties).

At the same time and in order to consider the Ishem RB separately as far as possible, the following 3 municipalities are fully allocated to the Ishem (based on expert judgement):

- Kamez (100% in the Ishem);
- Kruje (mostly in the Ishem);
- Tirana (a large part of the area of the municipality is in the Erzeni, yet most of the population/economic activity is in the Ishem).

*The municipality of Vore is fully “allocated” to the Erzeni RB for the economic analysis; while approx. half of the area of the municipality is in the Ishem, a majority of the population/urban areas/economic activity is the Erzeni.*

It needs to be noted here that the analysis based on the Ishem only has to be considered with caution due to the (above mentioned) difficulty of actually “dividing” the Ishem from the Erzeni regarding socio-economics/management. The allocation of municipalities as above shows that the 3 municipalities discussed under the Ishem cover 1.492 km<sup>2</sup>, while the actual area of the Ishem RB is 721 km<sup>2</sup> (for the Erzeni, the 4 municipalities allocated there – Durres, Kavaje, Vore, Shijak – cover 721 km<sup>2</sup>, while the actual size of the Erzeni RB is 1.370 km<sup>2</sup>. Refer to Technical Annex X for Table 11-1 – Allocation of provinces and municipalities to the Ishem-Erzeni RBs – summary and Map XX: the Ishem and Erzeni River Basins and the borders of municipalities/provinces

### **11.3 Characteristics and the economic importance of water uses**

The main objective of this section is to assess how important water is for the economy and the socio-economic development of a specific river basin district. It provides the river basin’s economic profile in terms of general indicators, e.g. economic turnover, gross income, employment or number of beneficiaries for significant water uses, as far as this kind of information is available. The analysis needs to pave the way for the assessment of significant water management issues and the ensuing cost-effectiveness analysis, by initiating investigations of likely trade-offs between socio-economic development and water protection within the river basin, as well as issues of allocation of costs and benefits of water management measures to different water uses.

#### **11.3.1 General socio-economic indicators**

##### **11.3.1.1 Population and urban/rural and household structure**

It needs to be noted that the current (2020) population data are available at municipal level, and the historical ones at prefecture level. In addition, the rural-urban structure of the basins is presented, as well as the household structure.

For the Ishem-Erzeni-RBs (Table 11-1), it is obvious that these basins include some densely populated areas, covering most of the Tirana agglomeration and the whole of Durres and Kamez (urban areas in the municipalities of the basins from 6 to 56%). Although the area of the I-E RBs is just approx. 7% of Albania, approx. 42% of the inhabitants of the country live in these RBs. In the recent years (since 2017) and in contrary to a slight decline of population for the whole of Albania (of approx. 1%), the IE-RBs show a significant increase in population (of approx. 4,2%, being higher than that for the Tirana prefecture and lower for Durres).

Regarding water management, this situation implies that issues related to urban population (expansion of urban water service provision due to growth and smaller household sizes, pollution due to untreated urban sewage, flood risks) are of special importance here and will become more significant at a higher pace than for the average of Albania. Refer to Technical Annex X for Table 11-2 – Population of the Ishem-Erzeni RBs and Ishem RB 2020, urban area percentage.

**Table 11-1 – Historical Population Ishem-Erzeni RBs (2017-2020)<sup>194</sup>**

	% in the RBs	2017	2018	2019	2020
<b>Albania</b>		2.876.591	2.870.324	2.862.427	2.845.955
Ishem-Erzeni RB		<b>1.147.184</b>	<b>1.173.624</b>	<b>1.185.286</b>	<b>1.196.863</b>
<b>Prefecture Tiranë</b>	100%	862.361	883.996	895.160	906.166
<b>Prefecture Durrës</b>	100%	284.823	289.628	290.126	290.697

### 11.3.1.2 Work force and employment

In order to better understand the socio-economic situation of the population in a basin, it is important to see issues linked to the working situation, both from the perspective working and employment population/unemployment changes, but also what the importance of the different sectors is for employment.

For the Ishem-Erzeni RBs it can be seen that the working age and employment population is strongly increasing in the last years (by 10 and 15% respectively), while the working age population remains almost constant and the employment population increases at a slower rate (of 6%) for the whole of Albania. Unemployment in the I-E RBs is higher than for the whole country, with similar rate of decrease.

While the tendencies of change are not significant in the last years (2017-2019), the high importance of the service sector (62,7% working here, as compared to 43% for the whole of Albania) is evident. For industry, the difference is lower but still significant (28,5% compared to 29% for Albania), indicating the high importance of industry. Finally for agriculture, it is clear that this sector is much less significant as compared to the whole of Albania (8,8% compared to 36%).

### 11.3.2 Characteristics and economic importance of specific water uses<sup>195</sup>

Regarding the GDP, the Ishem-Erzeni RBs are of very high importance for Albania: while only 7,3% of Albania's size, these basins contribute approx. half of the national GDP. This importance is constantly becoming more and more significant in the last years (2015-2019), since the GDP-growth in Ishem-Erzeni RBs is even higher than for the whole of Albania (25% vs. 18%). The per capita GDP is higher than the one for the whole of Albania, and growing at similar (yet slightly lower) rates. Refer to Technical Annex X for Table 11 11 – Gross Domestic Product in current prices, Ishem-Erzeni RBs, 2015-2019; Table 11 12 – Growth rate of GDP, Ishem-Erzeni RBs, 2015-2019; Table 11 13 – Gross Domestic Product per Capita, Ishem-Erzeni RBs, 2015-2019.

In Ishem-Erzeni RBs and regarding the structure of the sectors and their contribution to GVA, the corresponding tables of the full economic analysis (Annex X) confirm the high and increasing economic importance of the basins (growth rate 2014-2019 of 136% as compared to 120% for Albania). Beyond that, it can be seen that agriculture, forestry and fishing have a much lower GVA in Ishem-Erzeni RBs as compared to the whole of Albania, while other sectors are “above average” (e.g. Wholesale/retail trade/transportation, real estate activities, professional, scientific and technical activities).

#### 11.3.2.1 Agriculture (including livestock) and irrigated agriculture

Agriculture is important from a water management point of view both regarding pollution aspects (diffuse pollution of fertilizers/nutrients, but also pesticides) but also regarding water

<sup>194</sup> INSTAT

<sup>195</sup> Limited information regarding the quantification of water use in Albania, the main source for estimating the water-related importance of the different water uses is the permit database of AMBU.

quantity. Therefore, this chapter presents the overall information regarding the structure of agriculture, but also separately the information available regarding irrigation.

For the Ishem-Erzeni RBs in 2019-2020 regarding hectares planted (arable land with field crops), the area remains stable, while for the whole of Albania a minor increase can be noted. Overall, the arable land with field crops in the Ishem-Erzeni RBs as compared to the whole of Albania (13%) is higher than its share of Albania (7,3%).

- Data regarding the average income produced through farming is not available, as well as added value per ton of crop/livestock, which would enable a shift to more “value added per qm” in the mid and long-term perspective.
- Regarding the use of key inputs (nitrates, phosphates, pesticides) as well as for farming type systems (e.g. on farm size, intensive-traditional/sustainable, organic) and cropping patterns that could give an indication of the scale of pressures regarding pollution/leakage, information is currently not available.
- Yet and in order to establish generally the importance of agriculture, the types of crops are important (since different crops have different needs regarding water and chemicals); this information is available both at country and municipal level, both as per area planted as well as per tons produced.

In more detail and for 2020, it can be seen that the basins are of marginal importance for some crops types, yet are of significance for soya (23% of national production area), vegetables (19%), white bean (16%), forage (15%), potatoes (12%) and maize-cereals-oats-wheat (11, 9, 9 and 8% respectively).

When considering the Ishem RB separately, also here the hectares planted (arable land with field crops) remain stable, while the overall arable land with field crops as compared to Albania (6%) is higher than its share of Albania (2,5%). Regarding the crop types (in 2020), the importance of the Ishem RB is similar to the one of the whole Ishem-Erzeni RBs, except is lower relative importance for cereals-wheat and barley (mainly located in the Erzeni) and it's strong importance for soya (100% of the Ishem-Erzeni RBs production).

Regarding livestock data show that Ishem-Erzeni RBs are of high importance, both regarding number of heads but also tonnes/pieces produced. While the area of the basins is 7,3% of Albania, the number of heads is significantly higher for poultry (29%), cattle (15%) and to some extent also for beehives (11%), with the production being also higher for the main products of these categories of livestock to the same degree. These high numbers of livestock in a rather small area can create significant pressures regarding organic and chemical pollution, but also put an additional strain on water quantities.

When considering the Ishem RB separately, the high importance of livestock as compared to the whole of Albania is confirmed (2,5% of the country's area, but higher importance regarding livestock (for cattle, Equidae, poultry beehives, and to a lesser degree for sheep/goats and pigs), both regarding number of heads as well as tons/pieces produced. (Referring to Annex X for the Table 11 16 – Structure of field crop plantings (per area), national level; Table 11 17 - Structure of field crop plantings (per tons of crops produced), national level; Table 11 18 – Arable land with field crops by municipalities (2019-2020) in hectares, Ishem-Erzeni RBs & Ishem RB; Table 11 19 – Arable land with field crops (detail) by municipalities, 2020, in hectares, Ishem-Erzeni RBs & Ishem RB; Table 11 20 – Livestock per number of heads by municipalities, 2020, Ishem-Erzeni RBs & Ishem)

Regarding the Ishem RB separately, the analysis for the Ishem-Erzeni RBs holds also here (while approx. 6% of the agricultural areas could and actually are irrigated, a larger percentage than the relative size of the basin (2.5%). The water volume used for irrigation amounts to 27,1 Mio m<sup>3</sup>/year, which again is 6% of the overall water used for irrigation in Albania. (Referring to Annex X for the Table 11 24 – Water used for irrigation in agriculture, Ishem-Erzeni RBs & Erzeni RB, 2020)

**Table 11-2 – Irrigation: potential and actual irrigated areas, Ishem-Erzeni RBs & Ishem RB, 2020**

Agriculture		RB	Total land area for agriculture	Potential - area that could be irrigated	Actual - area with irrigation infrastructure	Irrigated area
						ha
<b>Albania</b>			657.481	357.245	244.950	181.704
Ishem-Erzeni RB			78.110	42.681	27.435	20.991
Ishem RB			36.401	19.685	12.852	10.856
<b>Prefecture Tiranë</b>						
Municipality of Tiranë	<i>Ishem</i>		20.638	11.841	9.726	8.572
Municipality of Vorë	<i>Erzeni</i>		4.858	2.438	1.852	1.061
Municipality of Kamëz	<i>Ishem</i>		589	380	331	392
Municipality of Kavajë	<i>Erzeni</i>		11.540	6.026	3.276	3.334
<b>Prefecture Durrës</b>						
Municipality of Durrës	<i>Erzeni</i>		18.028	11.235	6.883	4.175
Municipality of Krujë	<i>Ishem</i>		15.174	7.463	2.795	1.892
Municipality of Shijak	<i>Erzeni</i>		7.284	3.298	2.572	1.565
IE % as compared to Albania			12%	12%	11%	12%
Ishem % as compared to Albania			6%	6%	5%	6%
Ishem % as compared to IE			47%	46%	47%	52%

### 11.3.2.2 Industry

For the Ishem-Erzeni RBs and based on the water use permit database<sup>196</sup> 16% of such permits for the whole of Albania have been issued for these basins (36 out of 226), with a forecasted quantity of 640.000 m<sup>3</sup>/year (with a similar percentage regarding quantities for the whole of Albania).

Considering overall the high number of industrial enterprises in Albania and especially in the Ishem RB, this number seems low; yet there is no other source in order to cross-check this information. Regarding discharge, no permit issued in the Ishem RB. Regarding information on the public water supply for industry/enterprises as well as discharge into the public sewer systems, this information is included under section 11.5 below. (Referring to Annex X for the Table 11 13 – Water consumption by permitted Industries, Ishem-Erzeni RBs, 2021)

### 11.3.2.3 Services

Regarding services it is difficult to get a better indication regarding the water-related importance of the sector, since:

- *Regarding self-supply/direct discharge, the AMBU permitting system does not have separate water permits especially linked to/regarding services. Therefore, the relevant information is included in various water use “types” that can be found in the chapter above on “industry”; at the same time, it can be expected that self-supply is rather not so significant for this water use;*
- *Regarding supply from the water/sewage utilities, this information is part of the overall supply to “enterprises” and will be dealt with in the chapter regarding water services (and their cost recovery).*

### 11.3.2.4 Hydropower

Regarding the Ishem-Erzeni RBs, it concerns only 5 hydropower plants (out of the more than 200 in Albania) with 0,65-1,02% of the electricity produced through hydropower in 2018-2020. This is significantly lower than the share of the RBs to the overall size of Albania (which is 7,3%). Therefore, hydropower can be regarded as less of a pressure (and impacts leading to risks for

<sup>196</sup> AMBU register of water users

the achievement of good ecological status of water bodies) as compared to the situation in other RBs.

3 hydropower plants are situated in the Ishem RB (as well as an additional one currently under construction). These represent approx. 2/3 of the hydropower production as compared to the Ishem-Erzeni RBs; the assessment that hydropower is not so significant as compared to the whole of Albania holds also for the Ishem RB (while the RB represents 2,5% of the size of Albania, hydropower production here is 0,44 to 0,73% as compared to the whole country).

It is interesting to note that one of the hydropower plants in the Ishem RB does not have a water use permit. (Referring to Annex X for the Table 11 27 – Installed Hydropower Capacity and Electricity Produced (2018-2020) in the Ishem-Erzeni RBs & the Ishem RB)

#### **11.3.2.5 Gravel extraction (from rivers and/or other water bodies)**

In general, gravel extraction is prohibited and has been allowed only for specific river segments (of which none are within the Ishem-Erzeni RBs), as defined in 2006 in the respective decision Nr. 1 (dated 21.6.2006) of the National Water Council. This has been based on the findings of the study on “Assessing the effects, environmental impact and hydro-dynamic issues” conducted in that given period. Due to environmental concerns, a full prohibition of gravel extraction entered into force, again through a National Water Council decision in 2010. Based on the need for construction materials to support the rapid infrastructure development in the country, a year later (2011) the National Water Council decided that gravel extraction can be permitted, however only for national road construction and only in specific river segments (of which none are in Ishem-Erzeni RBs).

For Ishem RB, there are concerns of frequent illegal gravel mining although the prohibition of gravel extraction is in force since many years. 13 permits exist for the use of “inert materials extracted from river basin, streams, lakes, with or without water” for the whole of Albania, of which 1 is situated in the Ishem-Erzeni RBs. There is no indication of the tons of gravel extracted, since the use unit (as basis for the water use fees) is “2% of the value of gravel sold”. 34 gravel extraction sites/companies in Ishem-Erzeni RBs that are not permitted. Of these, 20 are located in the Ishem RB. (Referring to Annex X for the Table 11 28 – Permitted Gravel extraction, Ishem-Erzeni RBs, 2021)

#### **11.3.2.6 Tourism**

Unfortunately, no disaggregated data are available for tourism, for Ishem-Erzeni RBs. At the national level the arrivals of foreign citizens increased from 2014 to 2019 by almost 75%, showing the high dynamics of the sector. Also, the nights spent in accommodation structures from 2018 to 2019 (2020 has been a “special” year due to COVID-19 so cannot be considered) shows a significant increase of 5,5% in just one year. This underlines the high growth rates of the sector, and the importance it needs to have also for water management in the future.

Regarding self-supply by tourism, no permit is issued for such activities in the Ishem-Erzeni RBs. Regarding water use/discharge and for the services provided by the water/sewage utilities, the tourism sectors is included as part of “enterprises”; therefore, relevant information is to be found in the chapter regards water services (even if due to the lack of disaggregation in billing etc., no specific information regarding the tourism sector can be found there). (Referring to Annex X for the Table 11 29 – Arrivals of foreigners in Albania by purpose of travel, 2014-2020 and Table 11 30 – Nights spent in accommodation structures of resident and non-resident inhabitants, Albania, 2018-2020)

#### **11.3.2.7 Flood control and drainage**

Flood control and drainage is a significant water use, both due to its impacts on environmental aspects of water bodies (river straightening/deepening, bank reinforcements, dikes etc.), but also due to the economic damages it can prevent (and of course save human lives).

Systematically, only limited economic information is available in Albania regarding the socio-economic information regarding flood protection, including historic investments for flood protection etc.). At the same time, through a specific project, information on historical data has been collected for Ishem-Erzeni RBs, as well as the possible risks of flooding assessed (regarding occurrence, specific areas, people affected etc.) based on the requirements of the FD (see chapter 9.3).

#### 11.3.2.8 Fish farming and leisure fishing

Only very limited data is available in Albania regarding the actual number and size of (inland) fish farming activities.

No permits were issued by AMBU, regarding this type of water use activity, for Ishem-Erzeni RBs. The unit here is “kilogram of fish sold”, with an overall permitted/forecasted volume of 55.500 kilograms (55,5 tons).

There are data available at country level regarding fish caught in tonnes from different parts of the water environment. Two of them are of specific interest:

- regarding inland water fishing and for 2020, 2.844 tonnes of fish have been caught in 2020, an increase of 168% as compared to 2016.
- Regarding aquaculture, 8.799 tonnes of produced fish are recorded (of course for both marine and inland waters) in 2020, an increase of 168% as compared to 2016.

So, even in the specific numbers/importance of inland aquaculture remains unclear, it can be assumed that it is much higher than the permitted 55 tonnes per year. Regarding leisure fishing, no specific information is available in order to be able to assess the importance of the water use activity (no. of persons fishing or fishing per day, amount of fish caught etc.) (Referring to Annex X for the Table 11 18 – Fish caught by categories, Albania, 2016-2020)

Overall, the main gaps are:

- for various indicators, a difficulty in disaggregation of the available data based on river basins (e.g. due to the information being available only at national level);
- a limited information base to assess the economic importance of water-related activities (e.g. in sub-industries with highest water footprints, tourism) by having information on turnover as well as the “added value” created per qm of water;
- only fragmentary information on the actual water abstracted/consumed and sewage discharge for various water uses, with very important issues here being touristic water uses, water abstractions by (irrigated) agriculture as well as in general self-supply water uses (e.g. water abstractions and sewage discharge in/from industry);
- for non-consumptive water uses (e.g. gravel extraction, fish farming) the information base is limited (e.g. no information on volumes of gravel - illegally – extracted, numbers of fish farms and their fish volumes and overall the economic importance of such activities).
- for flood protection, the economic information available needs be improved (by better information of current costs of the flood protection strategy per RB, but also information on population and economic activities/turnover protected (or planned to be protected), potential losses of properties/economic activities due to sub-optimal flood protection etc.).

### 11.4 Water Services<sup>197</sup>

The key elements investigated under this chapter are the status of water services, a summary of the tariffs applied and the extent of the recovery of the costs (financial, environmental and resource costs) of the water services. These issues are again structured according to hydrological

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<sup>197</sup> Data available through ERRU Reports.

boundaries/the River Basin approach; especially since it is not possible/useful to divide the data/information of the Tirana Water utility.

At the same time, the sub-chapters below give where possible an indication of any differences for the Ishem RB as compared to the economic analysis done for the combined Ishem-Erzeni RBs (Annex X). This is based on the full allocation of 3 municipalities/water utilities (Tirana, Kamëz, Krujë) to the Ishem RB.

There is a large gap of information regarding water abstraction through self-supply:

- While it is known that a number of households use well/springs for their drinking water supply, no estimation on relevant numbers (volumes of water, population with self-supply) can be found;
- Regarding self-supply for industry, there is some information available, nevertheless is fragmented;
- Regarding self-supply for agriculture and while there are noticeable areas irrigated (and while the public water supply is not used for irrigation), basically none of these water abstractions are registered in the AMBU-permit database;
- a significant number of households are not connected to the public sewage system, but there are no estimations regarding sewage disposal volumes;
- regarding industry, only fragmentary information regarding direct discharges; no permit issued by AMBU Ishem-Erzeni RBs.

#### **11.4.1 Drinking water production and supply service**

The drinking water supply in Albania is performed by 57 public utilities/water service companies at municipal level, which mostly correspond to the borders of the municipalities. These utilities are subject to monitoring by Agency for AKUM through performance assessment, while their tariffs are evaluated and need to be approved by the ERU.

##### **11.4.1.1 Population and Public Water Supply coverage**

6 water utilities to be considered in the Ishem-Erzeni RBs, which cover the 7 municipality areas (Durrës UK serving both the Durrës and Shijak municipalities). This shows that the size of the water service companies is much larger than the average in Albania (only 11% of utilities covering 40% of the serviced population<sup>198</sup>), due to the above-average urban setting as compared to the whole of Albania.

Regarding the Ishem RB, the 3 water service companies considered (Tirana, Kamez, Krujë covering 3 municipalities) are even larger as compared to the whole of Albania (5% of utilities covering 27% of the serviced population). This is mainly due the Tirana utility.

Regarding the changes of connection rates in the recent 3 years, there are rather small changes to be observed, both for the Ishem-Erzeni RBs and also for the whole of Albania. This indicates that the focus of currently implemented investments is rather on improving the quality of other service components (e.g. continuity of service) than on expanding coverage. In addition, for Ishem-Erzeni RBs, even if connections are increased, they possibly do not “catch up” with the demand for new connections due to increases in demand/population.

##### **11.4.1.2 Water volumes and losses regarding Public Water Supply**

Out of the water produced (60% by pumping and 40% by gravity at the level of Albania) for water supply, only 35% (at the level of Albania) is actually billed; this number is slightly lower for the Ishem-Erzeni RBs (33%). For the Ishem RB, the number is only 23%, due to the low billing

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<sup>198</sup> Note: the overall population within the jurisdictional area used by the municipalities (and also ERU as the regulator) is based on different information bases and assumptions, thus not using the INSTAT-population numbers (as are being used in the economic analysis report (Annex X.) and chapter 11.4.1.1. above), leading to a larger population to be served of 35% for Albania, 28% for the I-E RBs.

percentage of the Tirana utility. In addition, a significant amount of water is billed without metering. For the Ishem RB the situation is worse (due to the Tirana utility numbers and its relative importance). These numbers show the high percentage of water extracted from the environment which actually does not reach the consumer/is not creating income for the water supply companies. Again, the issue of lack of metering remains an important one (even if activities/investments are underway in that regard).

Regarding the development of overall water losses in the recent years (see economic analysis, Annex X) and even with investments/efforts for efficiency improvements underway, the situation is getting slightly worse, hinting at the deterioration of infrastructure being faster than the speed of implemented necessary investments (investment gap).

**Table 11-3 – Water Volumes: produced, billed, lost in the Ishem-Erzeni RBs and Ishem RB, 2020**

Water Service Companies	Volume of water produced		Volume of water billed		Water Losses in %
		<i>Out of which Metered</i>		<i>Out of which Metered</i>	
<b>Albania</b>	<b>309.887.138</b>	<i>177.452.816</i>	<b>107.097.811</b>	<i>80.799.421</i>	65%
Ishem-Erzeni RB	<b>153.940.589</b>	<i>121.419.917</i>	<b>51.153.082</b>	<i>43.682.060</i>	67%
<b>Erzeni RB</b>	<b>50.533.549</b>	<i>48.805.549</i>	<b>11.625.802</b>	<i>9.736.662</i>	77%
<b>Prefecture Tiranë</b>					
Tiranë UK (Ishem)	93.218.337	<i>62.425.665</i>	35.941.521	<i>31.337.081</i>	61%
Vorë UK (Erzeni)	1.814.000	<i>86.000</i>	614.000	<i>344.000</i>	66%
Kamëz UK (Ishem)	7.682.400	<i>7.682.400</i>	2.777.830	<i>2.014.030</i>	64%
Kavajë UK (Erzeni)	6.073.000	<i>6.073.000</i>	2.283.000	<i>1.569.500</i>	62%
<b>Prefecture Durrës</b>					
Durrës UK (Erzeni)	42.646.549	<i>42.646.549</i>	8.728.802	<i>7.823.162</i>	80%
Krujë UK (Ishem)	2.506.303	<i>2.506.303</i>	807.929	<i>594.287</i>	68%
IE % as compared to Albania	50%	<i>68%</i>	48%	<i>54%</i>	
Erzeni % as compared to Albania	16%	<i>28%</i>	11%	<i>12%</i>	
Erzeni % as compared to IE	33%	<i>40%</i>	23%	<i>22%</i>	

53 permits were issued by AMBU regarding groundwater and 5 regarding surface drinking water use/abstractions.

A “permit gap” can be seen when comparing the forecasted water quantities based on the permits to the “Water volumes produced” based on ERRU-information (as collected by the water utilities). The comparison shows that only 74% of the water volume produced is forecasted in the permits/is actually permitted at country level.

For Ishem-Erzeni RBs this ratio is 70% when compared to the forecasted quantities in the permits and 95% when compared to the actually billed quantities. In addition, 2 utilities operate without a drinking water abstraction permit (Vore, Kruje), 2 have permits of part of their abstraction points (Kavaje, Durres) and 2 of them have all their abstraction points included in the permits (Tirana, Kamez). Correspondingly for the Ishem RB, one utility has no drinking water abstraction permit (Kruje), while the other 2 have all their abstraction points included in permits (Tirana, Kamez).

#### 11.4.2 Wastewater collection and treatment service

In Albanian urban areas, wastewater is mostly collected through public sewers. Sewer systems are combined ones, hence collecting together wastewater and storm water. Due to poor maintenance of sewage canals and small dimensions of the pipes, leakage from these channels often creates risks of contamination of drinking water.

In many suburban areas and rural areas of cities there is a lack of sewerage systems and wastewater is collected in septic tanks. Every house uses its own means of wastewater

discharge, usually collecting them to septic tanks, and using private trucks for removing them away from the settlements.

Most of the wastewater in Albania is currently not treated, only a limited number of WWTP are currently in use. In the entire Ishem River basin there is no operational WWTP. All sewer pipes discharge directly into the closest water body without treatment. The WWTP of Tirana is under construction (designed for treating sewage water of 345 000 residents), but the works for its construction have been suspended. Regarding wastewater volumes discharged into the environment through the public utilities, only very limited information can be found in the AMBU-permit database.

For Ishem-Erzeni RBs the sewage connection rates vary greatly; from 100% for the Kamez utility to just 26% for the Kruje utility.

### **11.4.3 Assessing the current levels of the recovery of costs of water services**

ERRU defines the methodology for calculating the retail and wholesale tariffs of water for public consumption, wastewater disposal and treatment in accordance with government policy for the sector development and the EU WFD, the main purpose for the sector is to achieve full cost recovery. They need to ensure customers that they pay tariffs based on the necessary and reasonable costs for the services provided. The tariff policy followed includes a gradual increase of tariffs in the coming years, conditionally that the service providers achieve an improved level of service performance.

There are three distinct user groups, that is state households, institutions and enterprises (including industry). A fixed tariff is applied per connection; regarding drinking water supply/consumption (metered or estimated), a fixed tariff is applied per qm, which is lower for state institutions/connections. Tariffs for enterprises are lower or the same as for households.

Regarding wastewater disposal, the same qms are estimated/billed as the water used. Here again, lower tariffs are observed for state institutions, while the wastewater tariffs for enterprises are lower or the same as for households. There is no differentiation regarding the composition of wastewater disposed/pollution loads, something esp. of relevance for enterprises/industry. This means that state institutions contribute to a lesser extent to the costs of water supply and sewage than the other two user groups.

Regarding the tariffs for the Ishem RB, for the Kruje utility the volumetric tariffs are lower than for the Tirana, while for Kamez no tariffs exist that are approved by ERRU.

An important issue regarding the tariff setting (and potential increases needed in the future in order to increase cost recovery rates), is the one of collection rates (what % of bills issued are actually paid by the consumers).

The general collection rate is at 90% for the whole of Albania, while for the utilities in Ishem-Erzeni RBs this rate ranges between 70% (for Kavaje) and 121%.

There is a decline to be noted for the General Collection Rate (from 96% to 90%) when compared to the data series of 2020. This is despite the utilities trying to improve it with agreements between the utilities and the debt customers, according to which old debits are collected in addition to current bills. While utilities have collected in 2020 about 1.3 Mio ALL from arrears, this is approx. 300 Mio ALL less than in 2019.

#### **11.4.3.1 Water Service Financial Performance/current overall financial Cost Recovery**

The revenues of the utilities are contrasted to two summary cost categories (which largely correspond to the WFD-related definitions), that is:

- Total direct operational and maintenance (O&M) costs (including labour, energy and repair costs, services from Subcontractors, costs of material and chemicals and other costs such as costs for regulatory fees for ERRU SHUKALB, Board of Directors, the

Ministry of Environment for the quantity of the water extracted from the basins, accounting experts, costs for decommissioning, court decisions, etc.);

- Total costs; here, what is additionally included are capital costs (depreciation and other taxes/loans/credit interest costs).

What has to be noted here is that the cost recovery rates do not include subsidies provided by the state (in order to cover the financing gap for O&M expenses), which is correct since the analysis intends to show the financial viability of the services based on their own revenues. In addition, and regarding the large issue of future investments (excluding the issue of cost recovery of historical investments), these are not separately accounted for in the water utilities information.

Here, due to the complex nature of funding, its fast pace of changing, the difficulty to distinguish between investments for maintenance of the existing system vs. for improving/expanding the services and allocating investments to various financial years, having a complete overview is challenging.

The main categories of investments are state/government investments (through the central state budget/the AKUM) amounting to 4,8 Billion ALL in 2020 and investments by foreign sources (bilateral/international) amounting to 1,7 Billion ALL for the year. This is part of the financial investment planning for 2020-2023 of 24,3 Billion ALL (22,6 Billion ALL from the state budget and 1,7 Billion ALL from foreign sources). All of them need be seen as subsidies since (so far) not covered by the revenues of the water utilities.

The financial sector performance for the whole of Albania shows a negative result (of 3,3 Billion ALL), indicating the problematic overall financial situation of the sector (and the need for subsidies, which cover part of the financial O+M losses through 720 Million ALL in 2020). Regarding the cost recovery rate of total costs, this is correspondingly at a low 75% (with only 2 utilities - one of them in the I-E RBs/the Ishem RB, that is Tirana - covering their total costs.

At the level of the Ishem-Erzeni RBs and Ishem RB (Table 11-26), the total cost recovery rate is considerably higher than for the whole of Albania with 95% for the I-E and 103% for the Ishem (as compared to 75%). Here again, the Tirana utility has a very strong impact, since it covers even its total costs at 109%. Also, regarding coverage of O+M costs, the I-E RBs show an above-average rate of 124% and the Ishem of 142%, again due to the influence of Tirana (150%).

Considering the other utilities except Tirana, all have a financial loss, with total cost recovery rates being between 31 and 89% for the I-E and between 58 and 60% for the Ishem. Regarding coverage of O+M costs and beyond the Tirana utility, all utilities in the I-E RBs do not cover their O+M costs (CR ranging from 41 to 99% for the I-E and 68 to 85% for the Ishem), all being lower than the national average CR rate of 103%.

Considering the evolution of the financial performance of the water utilities in the last 3 years there is a negative trend, both regarding the whole of Albania as well as for the I-R RBs/the Ishem RB. This is due to the increase in both O+M and total costs observed for 2020, while the revenues remained basically the same (increase of less than 1 % as compared to 2019).

**Table 11-4 – Water Service Financial Performance/Cost recovery, Ishem-Erzeni RBs & Ishem RB, 20**

Water Service Companies	Revenues from the activity	Total Costs	Total Direct Operational & Maintenance	Subsidies	in '000 ALL		in %
					Financial Result 2020	Cost Recovery of Total Costs	Cost Recovery of Direct Operational & Maintenance Costs
<b>Albania</b>	<b>9.850.414</b>	<b>13.149.117</b>	<b>9.542.489</b>	<b>720.000</b>	<b>-3.298.699</b>	<b>75%</b>	<b>103%</b>
Ishem-Erzeni RB	5.877.491	6.180.050	4.758.199	78.689	-302.559	95%	124%
<b>Ishem RB</b>	<b>4.345.967</b>	<b>4.208.786</b>	<b>3.055.352</b>	<b>21.471</b>	<b>137.181</b>	<b>103%</b>	<b>142%</b>
<b>Prefecture Tiranë</b>							
Tiranë UK (Ishem)	4.063.228	3.725.658	2.705.671	0	337.570	109%	150%
Vorë UK (Erzeni)	66.996	75.339	75.019	6.686	-8.343	89%	89%
Kamëz UK (Ishem)	225.605	388.389	265.088	5.999	-162.784	58%	85%
Kavajë UK (Erzeni)	109.487	358.216	265.364	20.357	-248.729	31%	41%
<b>Prefecture Durrës</b>							
Durrës UK (Erzeni)	1.355.041	1.537.709	1.362.464	30.175	-182.668	88%	99%
Krujë UK (Ishem)	57.134	94.739	84.593	15.472	-37.605	60%	68%
IE % as compared to Albania	60%	47%	50%	11%	9%		
Ishem % as compared to Albania	44%	32%	32%	3%	-4%		
Ishem % as compared to IE	74%	68%	64%	27%	-45%		

### 11.4.3.2 Current financial cost recovery levels of public water supply and sewage collection/treatment

For the Ishem-Erzen RBs, the cost recovery rates of both sewage disposal but also wastewater treatment are significantly higher (183% and 212% respectively) than for drinking water supply (Table 11-27). Also, for the Ishem RB, cost recovery rates for sewage disposal (no treatment takes place) are at 223%.

Looking at the utility level at the Ishem-Erzen RBs, the cost recovery rates for drinking water supply in the I-E range from 29% in Kavaje to 100% in Tirana (for the Ishem, the range is from 56% for Kruje to 100% in Tirana). For sewage disposal, the range for both I-E and Ishem is from 27% in Kamez to 531% in Tirana (while in Tirana no “other costs” are allocated to the sewerage service which is remarkable and leads to this high-cost recovery rate).

Regarding wastewater treatment, no treatment takes place in the Ishem RB.

Finally, an estimation of the contribution of the different water uses (for Albanian utilities that is state institutions, enterprises and households) to the cost recovery of the water services would be advisable in order to establish their contribution to the established cost recovery. This has not been done yet, but based on the higher tariffs paid by households, it can be assumed that these customers cross-subsidize the water service use by state institutions (and depending on the specific tariffs of a utility, also of enterprises)

**Table 11-5 – Total Cost Recovery Rates for water supply-sewerage-wastewater treatment plants, Ishem-Erzeni RBs & Ishem RB, 2020**

Water Service Companies	in '000 ALL									in %		
	REVENUES	REVENUES	REVENUES	Direct COSTS	Direct COSTS	Direct COSTS	Other COSTS	Other COSTS	Other COSTS	Total Cost	Total Cost	Total Cost
	Water	Sewerage	Wastewater TP	Water	Sewerage	Wastewater TP	Water	Sewerage	Wastewater TP	Recovery Rate	Recovery Rate	Recovery Rate
										Water	Sewerage	Wastewater TP
<b>Albania</b>	<b>8.390.079</b>	<b>1.233.044</b>	<b>227.290</b>	<b>8.729.978</b>	<b>682.456</b>	<b>130.056</b>	<b>2.832.484</b>	<b>601.403</b>	<b>172.741</b>	<b>73%</b>	<b>96%</b>	<b>75%</b>
Ishem-Erzeni RB	4.927.702	722.499	227.290	4.440.489	250.224	67.485	1.237.473	144.784	39.596	87%	183%	212%
Ishem RB	3.883.529	462.439	-	2.948.300	107.052	-	1.052.803	100.632	-	97%	223%	n/a
<b>Prefecture Tiranë</b>												
Tiranë UK (Ishem)	3.641.379	421.849	0	2.626.273	79.398	0	1.019.988	0	0	100%	531%	n/a
Vorë UK (Erzeni)	59.542	7.454	0	73.387	1.632	0	320	0	0	81%	457%	n/a
Kamëz UK (Ishem)	192.623	32.982	0	239.080	26.008	0	26.626	96.675	0	72%	27%	n/a
Kavajë UK (Erzeni)	93.304	15.905	278	250.010	5.942	9.412	67.433	8.442	16.977	29%	111%	1%
<b>Prefecture Durrës</b>												
Durrës UK (Erzeni)	891.327	236.701	227.012	1.168.792	135.598	58.073	116.917	35.710	22.619	69%	138%	281%
Krujë UK (Ishem)	49.526	7.608	0	82.947	1.646	0	6.189	3.957	0	56%	136%	n/a
IE % as compared to Albania	59%	59%	100%	51%	37%	52%	44%	24%	23%			
Ishem % as compared to Albania	46%	38%	0%	34%	16%	0%	37%	17%	0%			
Ishem % as compared to IE	79%	64%	0%	66%	43%	0%	85%	70%	0%			

### 11.4.3.3 Environmental and resource costs of public water supply and sewage collection/treatment

With regards to the issue of environmental and resource costs (E&R costs), specific calculations are currently not available. This is valid for these costs categories regarding the impacts of the drinking water supply and sewage collection (and treatment) services (where some, even if limited, information is available on water volumes and - fragmentary – for wastewater disposed), but even more so for self-supply, where at an initial stage the volumes used/disposed and their location will have to be investigated, in order to establish their impact on the WFD-environmental status.

Additionally, the costs of the PoM in a specific RB could be taken as a proxy (if the measures would reach WFD-good environmental status, then the POM costs can be seen as the “lower end”-estimation of E&R costs). Yet, at this stage, the PoM focusses at “low hanging fruits” and cannot be assumed to reaching good status for all water bodies even if fully implemented. In addition, the costing of measures needs to be specified further.

An optional way for having at least a first estimation of E&R costs is that of instruments internalizing these costs, measuring mainly water abstraction and wastewater disposal charges/fees collected. The new charges and fees setting for water use is a great step ahead, the level of charges/fees is not connected to the environmental impact of the specific water use (to the specific location and impact to the good status of a specific use, e.g. the specific pollution load of a wastewater discharge into the environment).

These cost categories will be an important element of work for the future for a better understanding of the impacts of water use, leading to a better information base for sustainable water management.

Overall, the main gaps are:

- Information regarding self-provision of services (e.g. irrigated agriculture, water abstractions and discharges by industry and households);
- Even if many efforts underway to improve the situation, more reliable information regarding both (metered) volumes/population served/losses etc. but also financial information of water utility companies and it's disaggregation;
- Information on planned investments as well as plans on how to cover the additional costs (e.g. of new WWTP) in a way that ensures some “acceptable” and socially viable cost recovery, as well as a plan on how to ensure the financial viability of the water utilities in the long-run as linked to such investments increasing service quality;
- Assessments of the environmental and resource costs related to the provision of water services.

## 11.5 Baseline scenario: looking at the future

The specific role of the economic analysis in the development of a baseline scenario (BLS) is the assessment of forecasts in key economic drivers likely to influence pressures and thus water status. The focus should be on changes in general socio-economic variables (e.g. population growth), in economic growth of main sectors as well as changes in the implementation of planned investments linked to existing regulation.

It is important to note that on the supply side, projections need to also take place from a hydrological point of view. A key element here are the projected impacts of climate change on the water availability. Unfortunately, for many crucial elements regarding the water demand side, systematic information on the relevant socio-economic drivers and their effects on water management are not available in Albania (as well as in many other countries).

For the Ishem-Erzen RBs the population projections (of the medium-average scenario) show an expected increase from 2021 to 2031 of 4%, which is significantly higher than the expected decrease of population in this time frame for the whole of Albania of 4 %.

This will clearly impact the water management requirements in many ways, especially regarding water supply and sanitation. In order to better estimate these changes, a more detailed analysis of the regional changes with the basin(s), also linked to changes of per capita consumption (while the uncertainties regarding the population served and volumes actually produced need to be considered/reduced in order to do so).

The Ministry of Finance in its medium term budget program 2022-2024, indicates that after the strong recession in 2020 at the level of -4.0 percent, according to the latest estimate of INSTAT, the economy was expected to recover in 2021 and continue the positive trend in the medium term. Economic growth is projected (5.5 % 2021) to remain above 4 percent over the medium term. More specifically, economic growth is projected at 4.8, 4.5 and 3.9 percent, respectively for the years 2022, 2023 and 2024.

Beyond the information provided on investments in the cost recovery section regarding drinking water supply and sanitation (chapter 5.4.3 above), the National water sector programme 2018-2030<sup>199</sup> presents projections regarding the objectives for the water sector. The financial projections are calculated taking into consideration the specific budget items listed in the PBA Programme, per each responsible institution, for e.g. MTI Budget line for WSS, Ministry of Environment Budget line for Monitoring, etc. As a result, the total financing needs for achieving these objectives is estimated at 388,4 Billion ALL by 2030, while the actual budget foreseen in this time period is at 237,4 Billion ALL. Thus, a financial gap of 151 Billion ALL is established.

Clearly, overall estimations (based on the existing projections) regarding future water demand (and related gap to water supply) and future water-related pressures on water resources (regarding quantity but also quality) cannot be done at this stage, since many of them are not available.

Besides specific projections needing to be established/developed in more detail/supported by particular studies, the most urgent gap is process-oriented. Here, a systematic scenario building approach is required since the information/expert knowledge is located in a number of relevant ministries (agriculture, rural development, economics, etc.) as well from other institutes and stakeholders (water suppliers, agricultural associations, research institutes and organisations, etc.). Structural and regional plans as well as local authority plans will constitute important sources of information.

While it will be difficult to obtain information on certain parameters stated in the list above, approximations/estimations would have to be developed for each parameter/ policy projection in cooperation with the ministry/ administrative body that is responsible for/ capable of providing the required information/ projections/expert judgements. The aim should be that overall, regionalized estimations on future water demand and expected pressures on water resources (quantity/quality) in the RBs will be developed in the future.

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<sup>199</sup> Draft National Sector Programme, prepared by AMBU in cooperation with relevant stakeholders. It follows the logic of the SDGs UN Agenda 2030 for water. Not yet adopted, yet was widely consulted with all relevant stakeholders, at national and local level, including mutual dedicated meeting with line ministries

## 12 Environmental Policies at River Basin Level

### 12.1 Environmental Policies for Waterbodies – Ishem

This Chapter summarizes the broad policy and strategic approach within the 2024-2029 RBMP envisaged by AMBU to meet the EOs as defined in Chapter 3. These policy or strategic broad measures will apply to both surface water and groundwater as appropriate.

A distinction is to be drawn between general environmental policy objectives and the more targeted PoMs (Chapter 13). For waterbodies known to be failing environmental objectives, targeted measures are required for those waterbodies, requiring quantification of the relevant pressures and measures. However, it is a fundamental requirement of the WFD Preamble (26) that where good water status exists it should be maintained, and consequently this broad objective logically falls outside the PoMs.

The purpose of this Chapter therefore is to set out in broad terms the policy and/or strategic approach that will be implemented by AMBU across the river basin. The broad intention of these policies is to ensure that generally all waterbodies that are in good status remain at that status (i.e. no deterioration). Consequently, these strategic objectives apply potentially to all waterbodies within the river basin, and may include a wide range of technical guidance and/or legal or fiscal instruments to achieve in particular:

- Maintaining and improving the quality of the aquatic environment (WFD 19);
- The phasing out of priority hazardous substances (WFD 27);
- Coordination of long-term sustainability measures within the same ecological, hydrological and hydrogeological systems (WFD 33);
- Greater integration of qualitative and quantitative aspects of both surface water and groundwater systems (WFD 34);
- The implementation of a combined approach to pollution prevention and control incorporating both emission limit values (ELVs) and EQSs (WFD 40).

It may be the case that some of these policy instruments are directly relevant to individual waterbodies or groups of waterbodies as part of the more targeted PoMs, but in these cases the measure(s) to be applied should be quantifiable both in terms of the type of measure and the measure indicator (see Chapter 13).

#### 12.1.1 Summary of Initiatives to Support Environmental Objectives

An overview of proposed policy, general strategy, and increased regulation or enforcement practices is summarised in Table 12-1. The implementation of these policies, strategies and possible subsequent measures is likely to require the coordination and budgets of multiple competent authorities under the leadership of AMBU and in some cases may also require secondary legislation.

Table 12-1 is not intended as a matrix of ‘possible options’. The purpose is to summarize for the benefit of stakeholders where AMBU intends to actively implement changes in policy and/or strategic interventions to ensure long-term sustainability of water resources and water services.

The methodologies and sectoral implications for each policy or enforcement intervention are outlined in more detail in sections 12.1.2 to 12.1.11, as are the likely coordination requirements between competent authorities.

##### 12.1.1.1 Policy or Strategic Interventions for Adequate Surface Water Quantity Monitoring

A reliable and continuous river flow hydrometric network has not existed in the Ishem river basin for at least two decades. The last reliable published information on surface water quantities dates from the 1984 publication ‘Hydrology of Albania’. The national hydrometric network (meteorological and

hydrological) is under the competent authority of IGE (Institute of GeoSciences, - Department of Water Economy and Renewable Energy), but by common consent this authority is insufficiently managed or resourced in order to deliver a reliable national network<sup>200</sup> The majority of international standard flow measuring stations for routine surveillance of river flows has collapsed in the Ishem basin.

Without a reliable source of recent actual flows at strategic locations within the river basin, many critical aspects of a meaningful IWRM based RBMP cannot be achieved, most particularly:

- No information on water resources in the river basin, no possibility to establish even a basic water balance, and therefore no facility to determine appropriate water allocations between sectors.
- Environmental flows, essential to the preservation of aquatic ecosystems, cannot be reliably calculated.
- Pollutant loads, (an essential factor in quantifying the physical-chemical status of waterbodies and/or target values for restoration measures) cannot be calculated.
- The long-term probable decrease in river basin water resources, or at least major seasonal shifts, due to climate change, cannot be assessed with consequent critical implications for future river basin water resource management.

The latest EU report 2021 highlighted that *“align further with key water directives by adopting the newly prepared legal package; adopt the new strategy for water supply and sewerage 2021-2030; substantially increase the budgetary resources and implementation capacity of its key national agencies for Water Resource Management and for Water Supply, Sewerage and Waste Infrastructure, and of the national agencies for implementing a national water monitoring programme financed through a statutory”*.

Furthermore, there are different monitoring activities in the action plan of the National Strategy for integrated water management that are not fully implemented, due to the financial gap that is needed in order for these activities to be fully complete.

Considering all the above and also the requirements for the implementation of the National Strategy, AMBU is requesting financial help for improving the monitoring network (as well as equipment and technical assistance) through the Action Document on water, in the IPA III assistance. Besides AMBU, this assistance will benefit other institutions such as NEA, IGE, AGS, IPH, etc.

The overall objective (impact) of the action is “to maintain or improve the water bodies` quality status in Albania”.

The specific objectives (outcomes) of the action, corresponding to the two areas of support identified in the rationale (IWM and WWT) are to:

- Outcome 1: Increase Albania approximation with the EU water acquis.
- Outcome 2: Reduce the discharge of wastewater pollution in water bodies, advancing the alignment with the requirements of the UWWTD.

Within outcome 1, is expected output 1.3 “Water monitoring, reporting and enforcement are sustainably enhanced in line with the requirements of water related EU Directives”, and more specifically:

**1.3a: Laboratory capacity development**-Increased monitoring capacity in terms of number of water monitoring parameters from EU water directives which the reference laboratories are accredited for (NEA, AGS, IPH, LHCUs)

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<sup>200</sup> On the establishment of institutional and regulatory platform for governance and functioning (IRP) of the national water resources cadastre in Albania, world bank, October 2019.

1.3b: **Operational monitoring in RBs**-Increased monitoring capacity in terms of number of monitoring stations (fixed, boat-based or vehicle-based) equipped, installed and routinely operated (for surface water, groundwater, coastal water, meteo, hydrometry).

1.3c: Number of notifications and enforcement actions reported, on a yearly basis (NEA, AGS, IPH)

#### **12.1.2 Policy or Strategic Interventions for Adequate Groundwater Monitoring**

Within outcome 1 "Increase Albania approximation with the EU water acquis" of the action document on water, is expected output 1.3 "Water monitoring, reporting and enforcement are sustainably enhanced in line with the requirements of water related EU Directives", where specifically for the groundwater monitoring is requested:

- Chemical analyses, morphology, quantities, groundwater assessment in 7 RBs
- Increased monitoring capacity in terms of number of water monitoring parameters from EU water directives which the reference laboratories are accredited for (NEA, AGS, IPH, LHCUs)
- Increased monitoring capacity in terms of number of monitoring stations - 40 new groundwater monitoring stations.

#### **12.1.3 Policy or Strategic Interventions for Adequate Water Quality Monitoring**

Within outcome 1" Increase Albania approximation with the EU water acquis" of the action document on water, is expected output 1.3 "Water monitoring, reporting and enforcement are sustainably enhanced in line with the requirements of water related EU Directives", where specifically for adequate water quality monitoring is requested:

- Increased monitoring capacity in terms of number of water monitoring parameters from EU water directives which the reference laboratories are accredited for (NEA, AGS, IPH, LHCUs)
- Increased monitoring capacity in terms of number of monitoring stations (fixed, boat-based or vehicle-based) equipped, installed and routinely operated (for surface water, groundwater, coastal water, meteo, hydrometric-New Hydro-met monitoring stations (15 hydro + 15 meteo)
- Drafting of National monitoring programme.

#### **12.1.4 Policy or Strategic Interventions for Adequate Hydro biological Monitoring**

Within outcome 1" Increase Albania approximation with the EU water acquis" of the action document on water, is expected output 1.3 "Water monitoring, reporting and enforcement are sustainably enhanced in line with the requirements of water related EU Directives", where specifically for the hydro biological monitoring is requested:

Increased monitoring capacity in terms of number of water monitoring parameters from EU water directives which the reference laboratories are accredited for NEA.

Sampling and analyses, assess biological status in 7 RBs.

Increased monitoring capacity in terms of number of monitoring stations (fixed, boat-based or vehicle-based) equipped, installed and routinely operated (for adequate Hydro biological Monitoring).

#### **12.1.5 Policy or Strategic Interventions for Water Abstraction Controls**

Uncontrolled use or overexploitation of water resources are currently detrimental impacts on our water resources. This applies to surface and groundwater which are critical sources and currently supply large quantities of drinking water and for irrigation of agricultural lands, especially in the coastal areas in Ishem RB. AMBU is the responsible authority that must ensure on an annual basis, environmental needs and total water consumption from water sources, which should not be exceeded at the levels of annual renewable sources.

The problem related to water extraction control consists mainly of the operation of countless users for drinking water supply and irrigation in agriculture or industrial uses. As a result of the problem, there is an annual water balance at the water basin level which is not recognized as data are either

unavailable or missing, users do not report regularly, the user registration is incomplete and there are several illegal users.

To provide a solution to the identified problems for the control of water extraction, the National Strategy for Water Resources Management, represents the main policy and strategic tool for intervention. Its main objective is to protect the water quantity and, consequently, in the most efficient distribution among users, is required the design and implementation of RBMPs, aiming to improve water distribution infrastructure, taking protection measures and having regards to the impacts of climate change.

The routine control over the water users, at country and river basin level in terms of application procedures and issuing the permits or authorizations, are specifically provided under the DCM No.550 dated 15.07.2020.

Based on legal provisions, AMBU is responsible for the technical assessment of applications and issuing the permits for use of water resources. Current conditions need to be improved to achieve a sustainable balance between economic and environmental needs in the future.

### **12.1.6 Policy or Strategic Interventions for Water Use Efficiency**

Based on the WFD:

- Point (19) states that: The Directive seeks to preserve and improve the aquatic environment in the community. This purpose is primarily concerned with the quality of the water in question. Quantity control is an auxiliary element to ensure good water quality and therefore the necessary quantity measures must be taken to serve the objectives of ensuring the best possible quality.
- Item No. (41) States that: Concerning the amount of water, general control principles for intake and collection should be established to ensure the environmental sustainability of the affected water systems.

Having as a reference the Directive, the main problems related to the efficient use of water resources have been identified:

1. Control and recording the issuance of permits for the use of water resources
2. Global climate change (affected by floods and droughts)
3. Monitoring the quantity and quality of the water source.

As surface water inflows decrease and evaporation increases, water accumulated each year in reservoirs will also decrease, meaning less water for humans, for HPPs and agriculture, especially during the critical (dry) summer months. Groundwater will be affected by the decrease in surface water due to the decrease of precipitation, surface streams and soil moisture losses from increased evapotranspiration.

The authorities responsible for monitoring hydrometeorology must urgently improve the availability and range of data related to the efficient use of water. Preparation of an updated and valid balance of water resources at the basin level, reopening of monitoring stations (measurement of inflows and operation by national agencies), preliminary risk assessments from floods or droughts by preparing relevant management plans, which are regulated and sanctioned based on the legislation in force.

Strategy for Water Resources Management, represents the main policy and strategic tool for intervention. Its main objective is to protect the water quantity and, consequently, in the most efficient distribution among users, is required the design and implementation of RBMPs, aiming to improve water distribution infrastructure, taking protection measures and having regards to the impacts of climate change.

The routine control over the water users, at country and river basin level in terms of application procedures and issuing the permits or authorizations, are specifically provided under the DCM No.550 dated 15.07.2020.

Based on legal provisions, AMBU is responsible for the technical assessment of applications and issuing the permits for use of water resources. Current conditions need to be improved to achieve a sustainable balance between economic and environmental needs in the future.

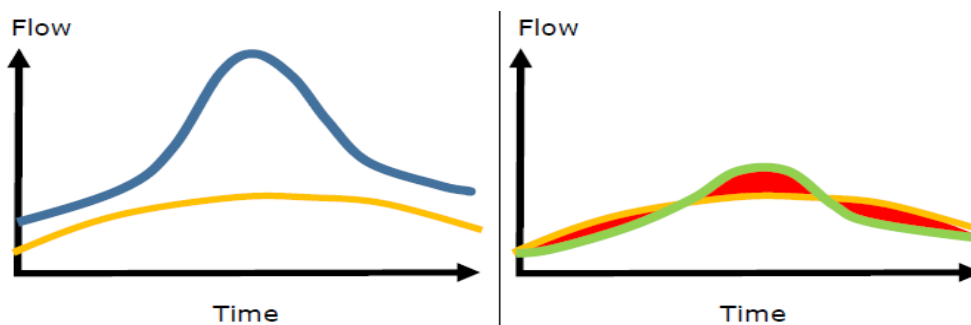
### 12.1.7 Policy or Strategic Interventions for Environmental Flow Compliance

The correct determination and maintenance of environmental flow is utterly critical to achieving good ecological status for most river systems (see section 3.3.5). Under best practice, environmental flow is not considered to be a single minimum or time-invariant flow (Figure 12-1 left), above which all abstraction may be permitted without damage to the aquatic ecosystems (as is implied by the current law on IWRM definitions under Article 4 – ‘sustainable flow = flow exceeded 355 days per year ( $Q_{97}$ )). Rather, environmental flow should mirror the entire natural flow regime of the river, varying across the seasons (Figure 12-1 right), and hence environmental flow can be both above and/or below current actual flows created by artificial influences.

The current legal definition of ‘sustainable flow’ in Albania does not equate to best practice, and in the period 2024-2029, policy work will be undertaken to review the national methodology for environmental flow. In due course Operators will have to comply with a more seasonally based and ecologically appropriate flow regime than at present, determined for individual rivers.

It will become mandatory for Operators planning to abstract, store or divert water for any purpose to plan their operations such that the downstream environmental flow regime is not excessively impacted.

**Figure 12-1 – Concept of Environmental Flow Restoration**



The hydrological regime of inflow into many rivers plays a role in the structure and functioning of aquatic ecosystems. When the natural regime changes, for example through the diversion of inflows for the construction of HPPs, or exceeded levels of water extraction for irrigation or drinking water, the changed regime is expected to have a detrimental impact, noticeable on aquatic ecosystems, reduce the ecological status of water bodies to less than "good". This concept is the main environmental objective of the WFD.

It is almost certain that the "minimum ecological contribution", described in the law no. 111/2012 amended and updated by law no. No. 6/2018, based on the inflow equivalent to 355 days of the year is insufficient for the protection of aquatic ecosystems. Many HPPs across the country continue to be approved based on these criteria, potentially allowing all inflows above this minimum limit for exploitation and diversion.

Figure 12-1 shows one of the best ecological flow management practices, where the minimum ecological flow is identified for each month of the year. To maintain the good ecological status of a water body, it must be used during the wet period of the year (in March, April) and this can reduce to less use during the dry summer months (for example August, September). Overuse of water simply destroys the ecological status of a water body.

For every intervention foreseen or planned by operators, an environmental assessment of impacts shall take place (law no. 10440, dated 7.7.2011, "on Environmental Impact Assessment"), which aims to ensure a high level of environmental protection, through the prevention, minimization and compensation of environmental damage, from projects proposed before their development approval; and ensuring an open decision-making process, in identifying, describing and assessing adverse environmental impacts, in a timely and appropriate manner; as well as the involvement of all stakeholders in it. The conditions to be met by operators (for use of surface water, for drinking water, for irrigation, for aquaculture, for purposes industrial etc.), are defined under the DCM no.550 dated 15.07.2020.

The concept of ecological input and its application in water resources use permits in Albania should be reviewed and re-evaluated, based on the opinion of experts and international best practices. Where these standard technical procedures should be applied to accurately determine the level of impact on ecological input activities related to different uses of water resources and discharges created in aquatic ecosystems after water use. These destructions will directly contradict the EOs of the WFD and therefore measures must be taken following the fulfilment of criteria of the Directive for good ecological status.

#### **12.1.8 Policy or Strategic Interventions for Increased Reporting by Operators**

The increasing demand for the use of water resources also leads to an increase in the reporting of the situation and the monitoring of water bodies by the operators themselves. Each operator planning to use water shall be awarded a respective permit or authorization, based on the provisions of the Law no. 111/2012 as amended by law no.6/2018.

Respective conditions are listed as mandatory to be met by Operators once the permit is issued by AMBU (DCM no. 550 dated 15.07.2020) including the obligations to report on the water quantity used, discharge points and quantities.

In addition, Operators are also issued an environmental permit or undergo the environmental impact assessment procedures prior to establishing a certain industrial activity, based on the provisions of the law no. 10448, dated 14.7.2011, "on Environmental Protection" law no. 10440, dated 7.7.2011, "on Environmental Impact Assessment". Operators perform self-monitoring periodically and report to NEA accordingly.

Fulfilment of obligations and periodic reporting would bring improvements and more efficient control of the water source.

#### **12.1.9 Policy or Strategic Interventions for On-site Pollution Control**

Wastewater discharges are inflows that are discharged mainly into rivers or coastal waters after their extraction and use (for drinking water, industrial, agricultural or hydropower production). In the case of drinking water and urban wastewater, without having a proper level of treatment, amounts of pollutants can be discharged into surface water bodies, creating a very large environmental impact for aquatic species and reducing the ecological status of water bodies.

Pollution from urban wastewater, industry and the agricultural sector are the biggest problems in Albania because wastewater contains high concentrations of pathogens, nitrate, phosphate, ammonium, heavy metals and hydrocarbons. The direct dumping of urban or industrial solid waste into rivers or areas near the coast is also a major problem and creates pollution.

Pollution control at the point of treatment or after use is regulated by based on the provisions of law no. 10448, dated 14.7.2011 "on Environmental Protection" which aims to protect the environment at a high level, preserve and improve it, prevent and reduce risks to life and human health, ensure and improve the quality of life, for the benefit of present and future generations, and providing conditions for the sustainable development of the country.

Apart from the above “umbrella” law, specific legal requirements are foreseen in related legislation which respond to the different aspects of water sector. For controlling the quality of bathing waters, certain standards and rules are defined, EU compliant by the regulation "Quality of drinking water" (DCM no. 379, dated 25.5.2016). In addition, in order to prevent, reduce and avoid the pollution of receiving water environments by hazardous substances, which are discharged into them through wastewater, and defining the limit values for permitted components, specific standards and rules are foreseen through the DCM no. 177, dated 31.3.2005 on the Allowed Norms of Liquid Discharges and the criteria for zoning of receiving water environments”.

Furthermore, aiming to control the quality of wastewater discharges into the environment, specific rules of their environmental treatment, as well as the obligations of wastewater dischargers are foreseen by law no. 9115, dated 24.7.2003 "on the Environmental Treatment of Wastewater”.

To have a pollution control at the source or at the place where the water is used it must be a functional register and the strengthening of all industrial discharges to provide a better indicator of the pressure of the pollutants is urgently needed where to assess individually the environmental conditions and objectives for the receiving aquatic environments and the discharges carried out in the same water body.

### **12.1.10 Policy or Strategic Interventions for Operator Self-monitoring**

Measuring and managing the amount of water is very important for the long-term use of water. Accurate rainfall measurement and discharge of water into the water basin are essential elements in managing surface and groundwater inflows, as well as assessing the impact of climate change.

The problem related to hydro morphological monitoring is that AMBU faces a lack of quantitative assessment of the water source in water basins. This lack of knowledge requires immediate intervention as it is closely related to the global climate change emergency.

Regarding the problem of monitoring the quantities of resources, it is also encountered in the users of HPPs, who do not regularly report the quantities they use, to AMBU. This means that the annual review or control of the water balance in the Water Cadastre cannot be performed.

The legislation that is currently in force is closely related to monitoring and defines exactly the appropriate ways of acting as users of the water resource but also the agencies that manage and control these water resources.

One of the institutions which in their jurisdiction deal with extensive use of water resources for reasons of drinking water supply and sewerage in the consumer sector, is the ERRU/WRA monitors the performance of water and sewerage operators to ensure that their responsibilities are met and to see the progress they make to improve services. Monitoring provides the opportunity to make an accurate assessment of the performance of each operator and set challenging objectives, taking into account current capacity. Achievements are measured by Key Performance Indicators. Each year, the operator's operational, financial and customer service performance is subject to public scrutiny when the Performance Report is published.

Operators are also issued an environmental permit or undergo the environmental impact assessment procedures prior to establishing a certain industrial activity, based on the provisions of the law no. 10448, dated 14.7.2011, "on Environmental Protection" and law no. 10440, dated 7.7.2011, "on Environmental Impact Assessment". Operators perform self-monitoring periodically and report to NEA accordingly.

Taking concrete measures in updating the status of water balance, in a standard and legally binding reporting system for the Water Cadastre, in cooperation and coordination with the institutions involved in the issue, to achieve a better status of the water body overtime of the implementation of this management plan.

#### **12.1.10.1 Policy or Strategic Interventions for Nutrient Discharge Controls**

Nutrient pollution is considered a wicked problem because of its many significant economic, social, and environmental impacts that are caused by multiple pollutants originating from a variety of sources and pathways that exist across different temporal and spatial scales. Further adding to the difficulty in managing nutrient pollution is that it is a global, rural, and urban problem.

Pollution control at the point of treatment or after use is regulated by based on the provisions of law no. 10448, dated 14.7.2011 "on Environmental Protection" which aims to protect the environment at a high level, preserve and improve it, prevent and reduce risks to life and human health, ensure and improve the quality of life, for the benefit of present and future generations, and providing conditions for the sustainable development of the country.

Apart from the above "umbrella" law, specific legal requirements are foreseen in related legislation which respond to the different aspects of water sector. For controlling the quality of bathing waters, certain standards and rules are defined, EU compliant by the regulation "Quality of drinking water" (DCM no. 379, dated 25.5.2016). In addition, in order to prevent, reduce and avoid the pollution of receiving water environments by hazardous substances, which are discharged into them through wastewater, and defining the limit values for permitted components, specific standards and rules are foreseen through the DCM no. 177, dated 31.3.2005 on the Allowed Norms of Liquid Discharges and the criteria for zoning of receiving water environments".

Furthermore, aiming to control the quality of wastewater discharges into the environment, specific rules of their environmental treatment, as well as the obligations of wastewater dischargers are foreseen by law no. 9115, dated 24.7.2003 "on the Environmental Treatment of Wastewater".

Based on the legislation and best practices of control of food dischargers, appropriate measures will be drafted to prevent and minimize pollution.

#### **12.1.11 Policy or Strategic Interventions for Structures and Continuity Restoration**

Interference and destruction of aquatic habitats through sewers and changes in flooded areas have a very large impact on aquatic species. These include direct damage to aquatic ecosystems through uncontrolled mining activity, fish barriers and the laying of fish and migration eggs, followed by the construction of barriers, dams, embankments, river sewers as a result of urbanization and zoning of natural floods from the river corridor as a result of flood protection schemes. All these activities affect the quality of aquatic ecosystems and their sustainability.

There is a neglect of the harmful effects of interventions on the morphology and continuity of rivers. Many schemes have been allowed to be constructed without conducting a thorough environmental impact assessment. Dams and barriers are built without considering fish passageways or habitat continuity. Gravel extraction is an illegal activity, as enforcement of legislation does not occur. Flood protection embankments and other activities on the shores separate the canal from the natural bed of the flooded area. The widespread distribution of small HPPs in Albania without sufficient control of impacts and inflows is damaging aquatic ecosystems.

Environmental protection and restoration of ecosystems is regulated by based on the provisions of law no. 10448, dated 14.7.2011 "on Environmental Protection" which aims to protect the environment at a high level, preserve and improve it, prevent and reduce risks to life and human health, ensure and improve the quality of life, for the benefit of present and future generations, and providing conditions for the sustainable development of the country.

Apart from the above "umbrella" law, specific legal requirements are foreseen in related legislation which respond to the different aspects of water sector. In addition, in order to prevent, reduce and avoid the pollution of receiving water environments by hazardous substances, which are discharged into them through wastewater, and defining the limit values for permitted components, specific

standards and rules are foreseen through the DCM no. 177, dated 31.3.2005 on the Allowed Norms of Liquid Discharges and the criteria for zoning of receiving water environments”.

Furthermore, aiming to control the quality of wastewater discharges into the environment, specific rules of their environmental treatment, as well as the obligations of wastewater dischargers are foreseen by law no. 9115, dated 24.7.2003 "on the Environmental Treatment of Wastewater”.

The preparation of RBMPs puts key standards, at river basin level, as to how to “save” the status of water bodies if proven to be good or high and improve in case it is reported to be moderate or lower. Immediate intervention in the fragments of water bodies that have undergone a physical modification with high environmental impact should be in the focus of taking immediate measures.

**Table 12-1 – Summary of General Policy or Strategic Measures to Support Environmental Objectives 2022-2027**

PRESSURES BY SECTOR AND SOURCE	ABSTRACTION CONTROLS	WATER USE EFFICIENCY	PRICING POLICIES	ON-SITE TREATMENT	OPERATOR MONITORING & REPORTING	NUTRIENT CONTROLS	EFLOW COMPLIANCE	HABITAT RESTORATION	STRUCTURES + CONTINUITY
<b>MUNICIPAL WATER SUPPLY SURFACE WATER</b>	Yes (26) DCM on Strategy NSIWRM  DCM no.550, dt.15.07.2020)	Yes (8) DCM on Strategy NSIWRM	Yes (9) ERRU - Tariffs DCM no.993/2020	Yes (13) DCM no.379/2016	Yes (14) DCM no 1122/2020 NWRC  DCM no 1189/2009 NMP  ERRU Benchmark / Performance Reporting	Yes (2)(3)(13) Law no.111/2012  DCM no.379/2016	Yes (7) Law no.111/2012  DCM no.550, dt 15.07.2020	Yes (6) DCM no.550, dt 15.07.2020  Law on EIA 128/2020  Law on 81/2017 on NAPA	Yes (5)(6) DCM no.550, dt 15.07.2020  Law on EIA 128/2020
<b>MUNICIPAL WATER SUPPLY GROUNDWATER</b>	Yes (26) DCM on Strategy NSIWRM  DCM no.550, dt.15.07.2020)	Yes (8) DCM on Strategy NSIWRM	Yes (9) ERRU - Tariffs DCM no.993/2020	Yes (13) DCM no.379/2016	Yes (14) DCM no 1122/2020 NWRC  DCM no 1189/2009 NMP  ERRU Benchmark / Performance Reporting	Yes (2)(3) (13) Law no.111/2012  DCM no.379/2016	Yes (7) Law no.111/2012  DCM no.550, dt 15.07.2020	Yes (21) DCM no.550, dt 15.07.2020  Law on EIA 128/2020  Law on 81/2017 on NAPA	Yes (21) DCM no.550, dt 15.07.2020  Law on EIA 128/2020

<b>MUNICIPAL WASTEWATER</b>	n/a DCM no.550, dt 15.07.2020	Yes (8) DCM no.550, dt.15.07.2020)	Yes (9) ERRU - Tariffs DCM no.993/2020	Yes (1) DCM no.177/2005 DNWC no.2/2015 Law on URWWT no 9115/2003	Yes (14) DCM no 1122/2020 NWRC DCM no 1189/2009 NMP	Yes (1) DCM no.177/2005 DNWC no.2/2015 Law on URWWT no 9115/2003	Yes (18) DCM no.550, dt.15.07.2020) Law on EIA 128/2020	Yes (19) DCM no.550, dt.15.07.2020) Law on EIA 128/2020	n/a DCM no.550, dt 15.07.2020
<b>INDUSTRIAL WATER SUPPLY SURFACE WATER</b>	Yes (26) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020)	Yes (8) DCM on Strategy NSIWRM	Yes (10) ERRU - Tariffs DCM no.993/2020	Yes (13) DCM no.379/2016	Yes (14) DCM no 1122/2020 NWRC DCM no 1189/2009 NMP	Yes (2)(3) (13) Law no.111/2012 DCM 379/2016	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020	Yes (21) DCM no.550, dt 15.07.2020 Law on EIA 128/2020 Law on 81/2017 on NAPA	Yes (21) DCM no.550, dt 15.07.2020 Law on EIA 128/2020
<b>INDUSTRIAL WATER SUPPLY GROUNDWATER</b>	Yes (26) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020)	Yes (8) DCM on Strategy NSIWRM	Yes (10) ERRU - Tariffs DCM no.993/2020	Yes (13) DCM 379/2016	Yes (14) DCM no 1122/2020 NWRC DCM no 1189/2009 NMP	Yes (2)(3)(13) Law no.111/2012 DCM no.379/2016	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020	Yes (6) DCM no.550, dt 15.07.2020 Law on EIA 128/2020 Law on 81/2017 on NAPA	Yes (5)(6) DCM no.550, dt 15.07.2020 Law on EIA 128/2020

<b>INDUSTRIAL WASTEWATER</b>	n/a DCM no.550,dt 15.07.2020	Yes (8) DCM no.550, dt.15.07.2020)	Yes (10) ERRU - Tariffs DCM no.993/2020	Yes (1) DCM no.177/2005 DNWC no.2/2015 Law on URWWT no 9115/2003	Yes (14) Law on EIA 128/2020 Law on Env. Permits 52/2020 Emissions Register (Air/Oils)	Yes (1) DCM 177/2005 DNWC no.2/2015 Law on URWWT no 9115/2003	Yes (18) DCM no.550, dt.15.07.2020) Law on EIA 128/2020	Yes (19) DCM no.550, dt.15.07.2020) Law on EIA 128/2020	n/a DCM no.550, dt 15.07.2020
<b>AGRICULTURE SURFACE WATER</b>	Yes (26) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020	Yes (8) (12) DCM on Strategy NSIWRM	Yes (11) Law no. 24/2017, on irrigation and drainage administration	Yes (16) DCM no.177/2005	Yes (14) DCM no 1122/2020 NWRC DCM no 1189/2009 NMP Law on Env. Permits 52/2020	Yes (2)(3) (18) Law on EIA no.128/2020 Law on Env. Permits 52/2020	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020	Yes (17) (22) DCM no.550, dt.15.07.2020) Law on EIA no.128/2020	Yes (5)(6) Law no.111/2012 DCM no.550, dt.15.07.2020)
<b>AGRICULTURE GROUNDWATER</b>	Yes (26) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020)	Yes (8)(12) DCM on Strategy NSIWRM	Yes (11) Law no. 24/2017, on irrigation and drainage administration	Yes (16) DCM no.177/2005	Yes (14) DCM no 1122/2020 NWRC DCM no 1189/2009 NMP Law on Env. Permits 52/2020	Yes (2)(3)(18) Law on EIA 128/2020 Law on Env. Permits 52/2020	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020	Yes (17) (22) DCM no.550, dt.15.07.2020) Law on EIA 128/2020	Yes (5)(6) Law no.111/2012 DCM no.550, dt.15.07.2020)

<b>HYDROPOWER SURFACE WATER</b>	Yes (26) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020)	Yes (8) DCM on Strategy NSIWRM	Yes (10) ERRU - Tariffs DCM no.993/2020	Yes (16) DCM no.177/2005	Yes (14) DCM no 1122/2020 NWRC Law on EIA 128/2020	n/a	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020 Law on EIA 128/2020	Yes (23) (24)(6) (17) (18) (19) DCM no.550, dt 15.07.2020 Law on EIA 128/2020 Law on 81/2017 on NAPA	Yes (6) DCM no.550, dt 15.07.2020 Law on EIA 128/2020 Law on 81/2017 on NAPA
<b>MINING OPERATIONS SURFACE WATER</b>	Yes (26) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020	Yes (8) DCM on Strategy NSIWRM	Yes (10) ERRU - Tariffs DCM no.993/2020	Yes (13) DCM no.379/2016	Yes (14) DCM no 1122/2020 NWRC DCM no 1189/2009 NMP	Yes (2)(3)(13) Law no.111/2012 DCM no. 379/2016	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020	Yes (21) DCM no.550, dt 15.07.2020 Law on EIA 128/2020 Law on 81/2017 on NAPA	Yes (21) DCM no.550, dt 15.07.2020 Law on EIA 128/2020
<b>FLOOD RISK MANAGEMENT</b>	n/a	n/a	n/a	Yes (13) DCM no.379/2016	Yes (14) DCM no. 1122/2020 NWRC	Yes (1) Law no.111/2012	n/a	Yes (4)(17)(21) (22)(24)(25) Law on Env. protection Permits 53/2020	Yes (6) DCM on Strategy NSIWRM DCM no 1015/2020
<b>DROUGHT RISK MANAGEMENT</b>	Yes (26) (24) (13) DCM on Strategy NSIWRM DCM no.550, dt.15.07.2020)	Yes (8) DCM on Strategy NSIWRM	Yes (10) Law no. 24/2017, on irrigation and drainage administration	Yes (1) (16) DCM no 177/2005	Yes (14) DCM no 1122/2020 NWRC	Yes (2)(3) Law no.111/2012 DCM 379/2016	Yes (7) Law no.111/2012 DCM no.550, dt 15.07.2020	Yes (24) (23) (25) Law on Env. protection Permits 53/2020	Yes (6) DCM on Strategy NSIWRM DCM no 1015/2020

TRANSBOUND  
ARY  
AGREEMENTS

n/a	n/a	n/a DCM Tariffs	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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# 13 The Programme of Measures for the Ishem Basins

## 13.1 Overview

The RBMP is the main tool for the water management of all surface and groundwater bodies within a specified RBD, and the PoMs for the Ishem river basin is the principal output of the RBMP Report. The programmes, regulatory improvements or enforcements, and remedial or protective actions identified for specific waterbodies, areas or economic sectors are expected to be legally binding on the appropriate competent authorities once the RBMP is formally adopted by the Council of Ministers.

In this report, the extent to which waterbodies do not meet these objectives is summarised principally in Chapter 10, based on the supportive evidence of Chapters 4 to 9. To restate, the EOs for the Ishem river basin broadly are:

- To prevent the further deterioration of the status all waterbodies from their current status or potential;
- Where waterbodies currently fail the test of 'good status' or are at risk of failure, remedial measures will be required so as to enhance and ultimately restore all waterbodies to 'good status' or 'good potential' ;
- Artificial and heavily modified waterbodies may be subject less stringent environmental objectives from 'good ecological status' to 'good ecological potential', providing the reasons and technical and/or economic justifications are specifically mentioned in the river basin management plan;
- Priority substances and priority hazardous substances discharged to the environment should be progressively phased out.

The PoMs for the Ishem basins comprise both 'Basic measures' and 'Supplementary measures', see section 13.2 and 13.3.

### 13.1.1 The Concept of 'Measures' and Key Types of Measures (KTMs)

The content and purpose of the PoM is frequently misapplied or misunderstood by regulatory agencies.

This RBMP sets out the PoMs that will be required in the period 2024-2029 to achieve the 'environmental objectives' described fully under Chapter 3, in compliance with the WFD Article 4. The PoM is not intended to address all issues relating generally to water management and use within the river basin, including for example national deficiencies in water resource monitoring capability, structural deficiencies in national inter-Agency competencies or coordination, provision of rural water supply, the need for flood protection schemes, drought risk management plans etc., although these are often incorrectly incorporated into PoMs.

These non-structural and/or structural issues are relevant only in so far as they impact on the core objective of achieving river basin environmental objectives. 'Measures' are intended solely to ensure the protection and sustainable use of water at river basin level. The WFD intention is to maintain or improve the aquatic environment, and therefore 'measures' primarily address management of quality of waterbodies, and quantity where it serves the objective of good quality.

Precisely because of this widely varying interpretation among MS, and inappropriate inclusion of 'non-environmental' objectives in many RBMPs, the WISE WFD Reporting Guidance 2016 identified a core list of KTMs to be followed in the development of PoMs. KTMs are groups of measures identified by Member States in the PoMs which target the same pressure or purpose. It is expected that most Member States will be able to report their measures in terms of predefined KTMs. The use of additional "new" KTMs should be very limited to facilitate comparability and the consolidation of

information at EU level.<sup>201</sup> Member States are expected to "bundle" their particular 'national measures' (usually more detailed than the KTMs) to report them in an aggregated way as KTMs.<sup>202</sup>

As for other chapters in this RBMP Report, the intention is to develop standard reporting templates that closely align with the EU WISE reporting requirements. As and when the National Water Resources Cadastre becomes fully functional, it will be evident that this structured and compliant approach to data collection and reporting is essential.

Measures should be strictly definable and targeted in terms of their type and extent to ensure that the identified pressures at basin, sub-basin or waterbody level are correctly managed, and that these measures will deliver measurable improvements towards achieving good status or potential in individual or groups of waterbodies.

Table 13-1 summarises the EU WISE compliant KTMs that have been broadly adopted in this RBMP Report. It should be noted that Albania introduces at this time one additional nationally specific KTM, namely "26-Control of excessive abstraction quantities through Water Permit conditions and enforcement".

This reflects the current situation in Albania that many Operators are operating abstractions without any form of Permit, and abstractions are frequently unregulated and excessive in quantity. A first step for measures will be to identify all such abstractions, quantify appropriate abstraction levels, and enforce these through an improved Permit and inspection regime.

Control of excessive abstraction quantity by the municipal, agriculture and industrial sectors (through Permit restrictions and/or pricing policies) is likely to achieve several multiplier benefits in terms of increased water resource availability to other sectors, climate change resilience, improved environmental flow compliance, and improved dilution potential for pollutant loads.

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<sup>201</sup> In exceptional circumstances, a new Key Type Measure may be introduced and reported by the MS if the list is insufficient, under WISE schema element "New Key Type Measure". In Table 13-1 KTM is an Albania specific measure.

<sup>202</sup> European Commission, WISE Reporting Guidance 2016, Chapter 10. Schema "RBMPPOM"

**Table 13-1 – EU WISE Key Types of Measures Mapped to Albania National Sectoral Water Program**

KTM	KTM DESCRIPTION	PROGRAM OF PROPOSED MEASURES BASED ON NSWP <sup>203</sup>	SOFT/HARD MEASURE
1	Construction or upgrades of wastewater treatment plants.	1. Operation of existing urban wastewater treatment plants, and compliance with WFD 2000/60 / EC standards.	Hard
		2. Construction of urban wastewater treatment plants.	Hard
		3. Construction of sewerage system with septic tanks.	Hard
		4. Implementation of projects for the closure of non-sanitary landfills for urban waste, as well as for the opening of landfills / urban waste treatment plants, or transfer stations.	Hard
2	Reduce nutrient pollution from agriculture.	1. Investments for protection from pollutants coming from agriculture, concentrated (drip) and non-concentrated (non-drip).	Hard
		2. Rehabilitation and cleaning of drainage canals and construction of new irrigation schemes.	Hard
3	Reduce pesticides pollution from agriculture.	1. Investments for protection from pollutants coming from agriculture, concentrated (drip) and non-concentrated (non-drip).	Hard
		2. Rehabilitation and cleaning of drainage canals and construction of new irrigation schemes.	Hard
4	Remediation of contaminated sites (historical pollution including sediments, groundwater, soil).	1. Rehabilitation of contaminated "hotspots".	Hard
		2. Rehabilitation of mining dams and surfaces contaminated by industrial discharges.	Hard
		3. Construction of collection points and treatment of waste and oils from vessels in all ports and necessary points by making investments to reduce the risk of natural disasters.	Hard
5	Improving longitudinal continuity (eg establishing fish passes, demolishing old dams).	<i>Improvement of irrigation systems for irrigated agricultural lands and rehabilitation and maintenance of dams following the technical conditions, according to the recommendations of ICOLD, to increase safety and reduce the potential effects caused by their damage.</i>	

<sup>203</sup> These are the measures proposed by Albanian National Sectoral Water Program. <http://ambu.gov.al/public/PROGRAMI%20KOMB%C3%8BTAR%20SEKTORIAL%20I%20UJIT%202018-2030.pdf>

KTM	KTM DESCRIPTION	PROGRAM OF PROPOSED MEASURES BASED ON NSWP 203	SOFT/HARD MEASURE
		1. Rehabilitation and cleaning of drainage canals and construction of new irrigation schemes.	Hard
		2. Rehabilitation of other dams to guarantee the water source for irrigation and increase their safety (previously assessed by the subordinate structures of MARDWA).	Hard
6	Improving hydro morphological conditions of water bodies other than longitudinal continuity (eg river restoration, improvement of riparian areas, removal of hard embankments, reconnecting rivers to floodplains, improvement of the hydro morphological condition of transitional waters, etc.).	1. Construction/reconstruction of flood protection infrastructure in the river Ishem	Hard
		2. Preservation and reduction of erosion rate to protect high-risk soils. Rehabilitation of existing infrastructure for erosion protection (embankments, river protection spurs).	Hard
7	Improvements in flow regime and/or establishment of ecological flows.	Investments for the restoration of ecosystems damaged by human intervention in river environments (natural flow diversions from HPPs or other purposes, ecosystem degradation).	Hard
8	Water efficiency, technical measures for irrigation, industry, energy and households.	1. Rehabilitation/expansion projects / new water supply systems in urban and rural areas.	Hard
		2. Construction of new water intake and irrigation schemes.	Hard
		3. Investments for industrial water treatment by the private sector.	Hard
9	Water pricing policy measures for the implementation of the recovery of the cost of water services from households.	Purchase and installation of meters for measuring the amount of water produced.	Hard
10	Water pricing policy measures for the implementation of the recovery of the cost of water services from the industry.	Installation of water meters	Hard
11	Water pricing policy measures for the implementation of the recovery of the cost of water services from agriculture.	Installation of water meters in irrigation works.	Hard
12	Advisory services for agriculture.	Reduce pollution from agrochemicals	Soft
13	Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc.).	1. Strengthening laboratory capacities for groundwater monitoring.	Hard
		Definition of Protection Zones and incorporation into planning control	Soft
14	Research, improvement of knowledge base reducing uncertainty.	Water resource assessments and investigations	Soft
15		1. Industry regulations	Soft

KTM	KTM DESCRIPTION	PROGRAM OF PROPOSED MEASURES BASED ON NSWP 2003	SOFT/HARD MEASURE
	Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or the reduction of emissions, discharges and losses of Priority Substances.	Zonal planning control for new facilities	Soft
16	Upgrades or improvements of industrial wastewater treatment plants (including farms).	1. Construction of wastewater treatment plants.	Hard
		2. Construction of sewerage system with septic tanks.	Hard
17	Measures to reduce sediment from soil erosion and surface run-off.	1. Preservation and reduction of erosion rate to protect high-risk soils. Rehabilitation of existing infrastructure for erosion protection (embankments, river brushes).	Hard
		2. Construction of mountain dams.	Hard
		3. New afforestation and increase of vegetation.	Hard
18	Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases.	Strengthening laboratory capacities for surface, ground and coastal water monitoring.	Hard
19	Measures to prevent or control the adverse impacts of recreation including angling.	Support on the application of aquaculture techniques that reduce the negative impact on the environment significantly, compared to traditional techniques.	Hard
20	Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants.		
21	Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure.	1. Operation of existing urban wastewater treatment plants, and compliance with WFD 2000/60 / EC standards.	Hard
		2. Construction of urban wastewater treatment plants.	Hard
		3. Waste collection plant at the estuary of the river Ishem.	Hard
		4. Installation of physical barriers to curb urban waste in the direction of surface water (lakes).	Hard
		5. Implementation of projects for the closure of non-sanitary landfills for urban waste, as well as for the opening of landfills / urban waste treatment plants, or transfer stations.	Hard
22	Measures to prevent or control the input of pollution from forestry.	Investments for protection from pollutants coming from agriculture, concentrated (droplet) and non-concentrated (non-droplet).	Hard
23	Natural water retention measures.	Sustainable urban drainage systems	Hard

KTM	KTM DESCRIPTION	PROGRAM OF PROPOSED MEASURES BASED ON NSW <sup>203</sup>	SOFT/HARD MEASURE
24	Adaptation to climate change.	1. Apply nature base solutions for climate change resilience	Hard
25	Measures to counteract acidification.	1. Increase efficiency in the use of chemicals and other materials for drinking water treatment.	Hard
		2. Strengthening laboratory capacities for surface water monitoring.	Hard
		3. Strengthening laboratory capacities for groundwater monitoring.	Hard
26	Control of excessive abstraction quantities through Water Permit conditions and enforcement	1. Regsitration and permitting of all abstractions	Soft
		2. Time-limited permits to include efficiency and resource availability criteria	Soft

## 13.2 Basic Measures

### 13.2.1 Overview

'Basic measures' should be interpreted as the legal minimum compliance requirements for all waterbodies in order to meet the ELVs, EQS, or other objectives set out under the principal Directives of the EU.<sup>204</sup>

This may include legislative and compliance measures to promote efficient and sustainable water use, point source and diffuse source pollution controls, controls on abstraction, and hydro-morphological controls for habitat protection and enhancement, all of which are subject to various EU Directives in some form.

### 13.2.2 Legislative Compliance

It is expected that Basic measures will implement the requirements of various EU Directives set out under WFD Article 10, as follows:

- The Management of Bathing Water Quality (2006/7/EC)
- Birds Directive (79/409/EEC)
- Drinking Water Directive (80/778/EEC) as amended by Directive (EU) (2020/2184)
- Major Accidents (Seveso) Directive (96/82/EC)
- Environmental Impact Assessment Directive (85/337/EEC)
- Sewage Sludge Directive (86/278/EEC)
- Urban Waste Water Treatment Directive (91/271/EEC)
- Plant Protection Products Directive (91/414/EEC)
- Nitrates Directive (91/676/EEC)
- Habitats Directive (92/43/EEC)
- Integrated Pollution Prevention Control Directive (96/61/EC)
- Environmental Liability, Prevention and Remedy Directive (2004/35/EC)

It is a reporting requirement under WISE 2016 that the relevant Directives implemented as part of the Basic measure(s) are listed. Several national measures may contribute to a single KTM, and conversely, a single measure may be part of several KTMs.

### 13.2.3 Operational Relevance of Basic Measures

In operational terms, basic measures will typically address the following issues:

- Measures to implement existing Community water legislation and other environmental legislation (set out in WFD Article 10 and in Part A of Annex VI – detailed above).
- Measures to implement WFD Article 9 (cost recovery), including environmental and resource costs
- Measures to promote efficient and sustainable water use
- Measures to protect drinking water quality and reduce level of treatment required
- Measures to control abstraction from surface and groundwater

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<sup>204</sup> European Commission – Directive 2000/60/EC – Annex VI

- Measures to control recharging of groundwater
- Measures to control point source discharges
- Measures to prevent or control inputs of diffuse pollutants
- Measures to address any other significant impacts on status, in particular the hydro-morphological condition
- Measures to prohibit direct discharges to groundwater
- Measures to eliminate or reduce pollution by Priority Substances
- Measures to prevent accidental pollution.

### 13.3 Supplementary Measures

Supplementary measures are defined under WFD Article 11(4) and Annex VI Part B. In addition to the Basic measures of section 13.2, other more general measures may also be appropriate, such as:

- legislative instruments
- administrative instruments (including licence trading)
- economic or fiscal instruments
- negotiated environmental agreements
- emission controls
- codes of good practice
- restoration of wetland areas
- abstraction controls
- demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought
- efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry and water-saving irrigation techniques
- construction projects
- desalination plants
- rehabilitation projects
- artificial recharge of aquifers
- educational campaigns
- research, development and demonstration projects
- other relevant measures

The Basic and Supplementary measures may frequently overlap. The principal distinction is that Basic measures must ensure compliance with various EU Directives as transposed to national legislation whereas Supplementary measures might not necessarily require transposed EU or national legislation.

### 13.4 Additional Measures

The concept of 'additional measures' as identified under WFD Article 11(5) is often misunderstood. If the environmental objectives identified under WFD Article 4 (Chapter 3 of this report) cannot be achieved for a specific waterbody within the first phase RBMP, then this is the result of failure of all Basic and/or Supplementary measures.

With proper understanding of the pressures and committed implementation of measures, such a situation is unlikely. However, there may be specific reasons that have to be investigated further, and ‘additional measures’ formulated i.e. measures not yet applied under WFD basic and/or supplementary approaches.

Under WISE 2016 reporting convention, if the implementation of an additional measure lasts longer than one river basin management planning cycle, this measure becomes in any case either a basic or supplementary measure. Therefore, the introduction of ‘additional measures’ is usually superfluous and should be considered as a last resort.

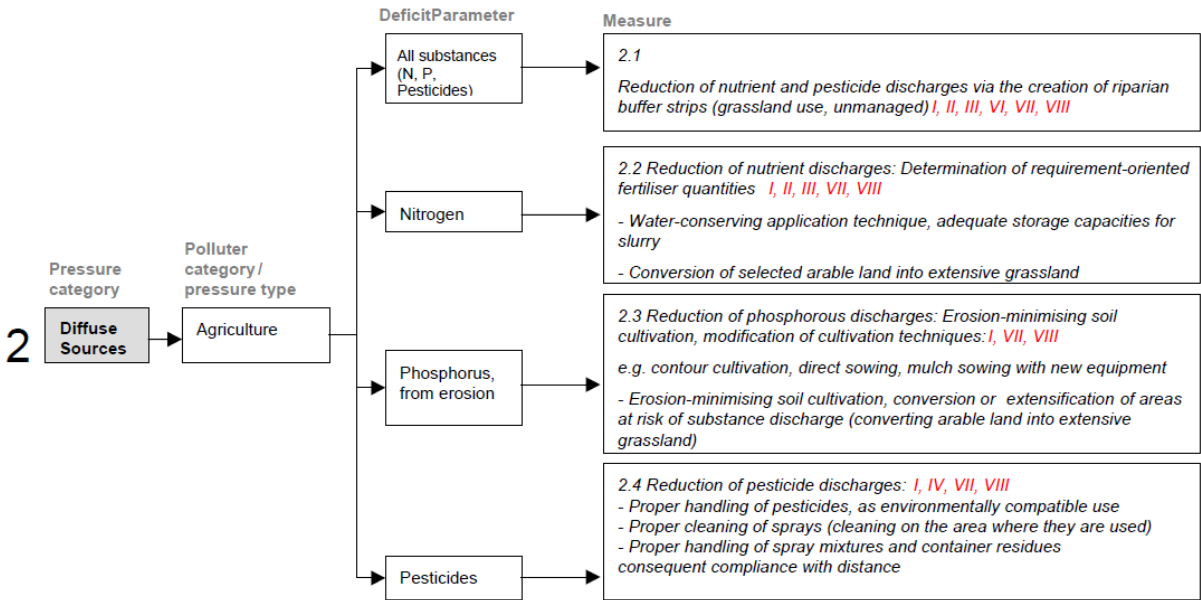
### 13.5 Systematic Approach to the Identification of Measures

The new RBMP framework approach in Albania adopts good practice in terms of following a well-defined ‘pathway process’ in reaching appropriate measures for given pressures.<sup>205</sup> Evidently, all waterbodies are to some extent unique, with specific and complex combinations of characteristics, location and pressures and therefore measures. However, as a starting point, a systematic approach to identifying suitable possible measures according to a set of basic options is recommended. A set of pressure-measure pathways for each of the five main pressure types is given in Technical Annex XI.

An example pathway for diffuse sources of pollution is given in Figure 13-1.

The example illustrates that diffuse pollution falls within the WISE reporting category Type 2 (see Table 10-1). Typically, but not exclusively, diffuse pressures originate from agriculture. Diffuse pollution may originate also from urban areas, highways and forestry. Depending on the exact pressure indicator e.g. pesticide concentrations, annual nitrate loading etc., various measure options become available. To implement the measure, either Basic measures will be required in order to comply with the relevant EU Directive(s), and/or Supplementary measures may be required.

Figure 13-1 – Example Measures Pathway for Pressure Category “Diffuse Sources”<sup>206</sup>



<sup>205</sup> Basic principles for selecting the most cost-effective combinations of measures for inclusion in the programme of measures as described in Article 11 of the Water Framework Directive – HANDBOOK. Report UBA-FB 000563, Ecologic 2004.

<sup>206</sup> Ecologic, 2004

## 13.6 Operational Implications for Waterbodies Failing Environmental Objectives

### 13.6.1 Active Management of the River Basin

Where monitoring data or other evaluations indicate that the objectives set under WFD Article 4 for the body of water are unlikely to be achieved within the RBMP period, it is a requirement that<sup>207</sup>:

- the causes of the possible failure are investigated with specific studies.
- relevant Permits and authorisations are examined and reviewed as appropriate.
- the monitoring programmes are reviewed and adjusted as appropriate.
- additional measures as may be necessary in order to achieve those objectives, including, as appropriate, the establishment of stricter ELVs or EQSs.

This process clearly requires ‘active management’ by the relevant competent authorities (CAs). The responsible authorities for monitoring need to report at least annually as to whether or not the targeted change in status are being achieved. AMBU, in coordination with others, must then take corrective action within the period of the Plan period.

## 13.7 Numeric Identification and Reporting of Measures

Reporting guidance for the PoMs is set out under WISE 2016, section 10.1.19. A critical mandatory attribute is the ‘measure code’ or the numeric identification of the individual measure.<sup>208</sup> Providing each and every river basin measure with a unique code establishes some important disciplines with respect to the PoM:

- The code-identified measure and its primary attributes can be stored and accessed from a relational database such as the National Water Resources Cadastre (NWRC).
- The measure code can be cross-referenced to all waterbodies within the river basin where that measure is to be applied, and therefore visually mapped via any Geographic Information System.
- Identification of specific unique measure codes with associated attributes (relevant pressure, implementing Agency, budget, indicators, target date etc.) encourages focus and accountability of implementing the measure.

The coding of measures in the Albania RBMPs now adopts the same overall approach to the numeric identification of all water management related objects in the river basin, as described in Technical Annex XI and Section 4.7.

### 13.7.1 The Use of Indicators to Ensure Achievement of Measures

Environmental indicators play a crucial role for effective and coherent policy making by highlighting key factors in the drivers-pressures-state-impact-response (DPSIR) model that cause environmental pressures and that policy can target.<sup>209</sup> Indicators support technical assessments by providing information on states and trends of priority issues and progress towards targets or reference values. Quantitative indicators are therefore a key management tool and represent the best estimate of the gap to achieving good status or potential and the intended progress by a certain deadline. The WISE 2016 reporting schema have mapped the expected association between pressures, pressure indicators, measures and measure indicators, and this reporting

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<sup>207</sup> European Commission Water Framework Directive 2000/60/EC – Article 11(5)

<sup>208</sup> European Commission, WISE Reporting Guidance 2016, Chapter 10. Schema “RBMPPoM”, Schema element: *MeasureCode*

<sup>209</sup> European Environment Agency - Digest of EEA indicators 2014 – Technical Report 8/2014.

model is followed in the Albania RBMP reporting procedures. A definitive list of KTMs and Indicators is provided in Table 13-2.

### 13.7.2 Reported Information on General and Specific Measures

The identification and traceability of any measure is essential, but the reporting system must work both numerically (i.e. can be entered into the NWRC with numeric attributes) and as a series of practical Tables and/or Maps within RBMP reports such that the proposed measure(s) can be easily identified and understood. Both methods of 'reporting' must ensure that whether general or specific in nature, the pressures are clearly identified, and that the measures proposed will directly influence the pressures. Further, the achievement level of the measure(s) must be monitored by the use of indicators (see 13.6.4).

However, the implementation of measures and the interrelations between types of measure and the target group (Basic or Supplementary, general or specific) makes for a potentially very complex reporting system, see Table 13-3.

The reporting Tables designed for Albania (the precise design of which is at MS discretion, subject to the EU WISE minimum requirements<sup>210</sup>) take account of important subtleties and complexities in the application of measures in a new and innovative way.

Table 13-3 summarises a generally complex set of permutations with these key points:

- Basic and Supplementary measures may apply both at general and specific scale
- Basic and Supplementary measures at general scale will typically be applied through basin-wide policies, strategies, fiscal or other instruments
- Basic and Supplementary measures at specific scale will typically be applied through determination of specific Permit conditions
- Pressure and Measure indicators are an essential element in achieving environmental objectives. However, these indicators are necessarily different, depending on whether the measure is to be applied at general or specific scale.

Guidance on general pressure and measure indicators is provided under WISE 2016 Annex 3. Typically, these require basin-wide statistics such as annual load of BOD<sub>5</sub>, annual volume of water taken by sector as % of renewable resource etc. Measure indicators are similarly basin-wide, such as population equivalent (p.e.) to be served by WWTPs etc. The definitive list of measure indicators at general level is provided by WISE 2016 Annex 8t, some 80+ individual indicators.

Specific measures (whilst falling within the framework of KTMs, should address the specific pressures encountered at the waterbody level. The most effective way to reflect the relevant pressure(s) and consequent measure(s) is to summarise the individual elements that contribute to the waterbody overall status or potential. Where an exemption is applicable under WFD Article 4(5) or 4(7), this should be reported.

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<sup>210</sup> EU WFD Common Implementation Strategy – WISE 2016 Reporting Guidance – sections 10.1.9 and 10.2.3

**Table 13-2 – Standard Enumeration List for Key Measures and Indicators**

Key Type Of Measure	Code <sup>211</sup>	General Indicator Specific Indicator
Construction/Upgrade Of Municipal WWTPs	1	Number Of WWTPs Required To Achieve EQ Population Equivalent Requiring Treatment
Reduce Nutrient Pollution From Agriculture	2	Area Of Land Covered By Control Strategy
Reduce Pesticide Pollution From Agriculture	3	Area Of Land Covered By Control Strategy
Remediation Of Contaminated Sites	4	Number Of Sites Requiring Remediation
Longitudinal Connectivity Of Rivers	5	Number Of Barriers Requiring Remediation
Hydromorphological Conditions Of Rivers	6	Length Of Waterbodies Requiring Remediation
Flow Regime And Environmental Flow	7	Length Of Waterbodies Requiring Remediation Number Of Sites Requiring Revised Permits Environmental Flow Index For Waterbody
Sectoral Water Efficiency Measures	8	Number Of Households/Operators Targeted Volume Of Real + Apparent Losses
Water Pricing Measures For Households	9	Number Of Households Targeted
Water Pricing Measures For Industry	10	Number Of Installations Targeted
Water Pricing Measures For Agriculture	11	Area Of Agricultural Land Targeted
Advisory Services For Agriculture	12	Number Of Farms Targeted
Drinking Water Protection Measures	13	Number Of Protection Zones Required
Knowledge Base Developments (Cadastral)	14	Number Of Sites Requiring Improved Data
Measures For Phasing Out Of Phs & Ps	15	Number Of Sites Requiring Revised Permits
Construction Or Upgrade Of Industrial WWTPs	16	Number Of WWTPs Required To Achieve EQ
Sediment Control Strategies	17	Area Of Land Covered By Control Strategy
Introduced Species/Diseases Control Strategy	18	Length Of Waterbodies Requiring Remediation Number Of Species Action Plans Required
Measures To Control Recreational Impacts	19	Length Of Waterbodies Requiring Remediation
Measures To Control Aquaculture Impacts	20	Length Of Waterbodies Requiring Remediation
Measures To Control Urban Diffuse Pollution	21	Length Of Waterbodies Requiring Remediation Number Of Interceptors/Buffers/Suds
Measures To Control Forestry Pollution	22	Area Of Land Covered By Control Strategy
Natural Water Retention/Buffer Measures	23	Number Of Sites Requiring Implementation
Climate Change Adaptation Measures	24	Number Of Installations Needing Adaptation
Measures To Control Acidification	25	Length Of Waterbodies Requiring Remediation
Measures To Control Excessive Abstraction	26	Number Of Permits Issued With Abstraction Limits

<sup>211</sup> Classification based on WISE 2016 GIS Reporting Schema element – Key Type Measure

## 13.8 Finalised Templates for Measures Reporting

As summarised under tables, reporting of measures in the Ishem RBMP follows a structured approach complying with the minimum requirements as suggested under WISE 2016. These tables can be applied identically to all categories of waterbody. The attributes of the measure(s) will include as a minimum:

Measure code -measure name -type of measure under Article 11 -water category (river, lake, groundwater etc.) Recipient unit (basin, sub-basin, and waterbody) relevant pressure(s) -contribution that the measure is expected to make towards achievement of the environmental objective the lead Competent Authority Operators or sectors affected by the measure summary total cost.

Further details regarding funding and implementation, especially regarding sources of funds and the costs of measures are reported mainly in Chapter XI to this report (see also Annex X).

### 13.8.1 Summary Reporting of the PoM at River Basin Level

In addition to the detailed level of 'national reporting' (as set out under Annex XIII), it is a WISE reporting requirement to provide a high-level summary of pressures and measures at the scale of the river basin. Member States should report one high level standard (MS) indicator for each of the eight main Key Pressure Types and at least one other predefined (national) indicator specifically relevant for the individual pressure or chemical substance.

The MS pressure indicator facilitates comparison between different river basins, and the recommended indicator is simply to indicate the total length (or area) of waterbodies subjected to the identified significant pressure as a % of the total length/area of waterbodies in the basin.

For example, as set out in Table 13-4, for the point pressure type of untreated urban wastewater (KTP 1), it is assessed that 56.4 % of the combined length of all (river) waterbodies are subjected to untreated urban wastewater. This MS indicator identifies the relative scale of the pressure. The national pressure indicator gives the absolute scale, in this case either:

- i) the total actual length of waterbodies affected (general indicator), 103 km in the example.
- ii) or more usefully, the BOD load (specific indicator, tonnes/year) that needs to be reduced in order to achieve the environmental objective (e.g. a BOD<sub>5</sub> level compatible with 'Good Status', typically < 4 mg/l).

The national pressure indicator is a matter of choice for the MS BUT should generally comply with the standard set of indicators as set out under Table 10-1 &

Table 10-2. The degree of flow quantity measurement in Albania (both effluents and receiving waters) is so deficient at this time that generally, volumetric based indicators (i.e. loads) cannot be reliably calculated. Consequently, in the first Plan period 2024-2029 indicators will have to rely on simplistic measures of waterbody length or number of sites.

With regard to the implementation of measures, the most generally applicable KTM for the Key Pressure Type should be identified, and the indicator that will be used to quantify progress of the measure. The most common indicator for each KTM should be identified and its 'baseline' value in 2021. For example, as set out in Table 12-6, the point pressure of urban wastewater has to be most usually addressed through the construction of WWTPs (a Basic Measure under EU WWTD, KTM 1).

It is of fundamental importance that the measure indicator is identified and quantified. In the case of urban wastewater, the most generally applicable measure indicator is the level of population equivalent (p.e.) requiring wastewater treatment in order to achieve the environmental quality standard of e.g. BOD<sub>5</sub> < 4 mg/l in the receiving waterbody.

The measure indicator should be a clear statement of the expected/actual level of progress towards the environmental objective, and should therefore always be presented in a 'reducing balance' format (i.e. the pressure remaining), and for at least the baseline + two forward RBMP Plan periods (since many measures may take 6, 12+ years to achieve objectives).

In the example of Table 13-4, it is estimated that 750,000 p.e. are currently without wastewater treatment to the required standard. Following implementation of various WWTPs, the progress of the measure is targeted at 500,000 and 250,000 by 2029 and 2035 respectively. Consequently, a pressure equivalent to 250,000 p.e. still remains by 2035, requiring further measures post-2035, but this is entirely clear from the reporting template.

A review of progress of measures implementation (by achievement of the indicators) is a fundamental component of the RBMP Plan review at the end of the six-year period.

### 13.8.2 Summary of the National PoM Reporting Templates

The key attributes of the measure reporting template exhibit 'best practice' with respect to the determination of measures generally:

- Measures should be targeted at the pressure(s) identified. Unless the measure demonstrably contributes to the reduction in pressure (and by inference an improvement in waterbody status) at either river basin or waterbody scale, it does not constitute a measure in the accepted sense of WFD Article 11.
- Measures should be realistic and achievable. Many early RBMPs, especially in pre-accession countries, set totally unrealistic and unachievable targets, ignoring limited central budgets, deficient technical competencies of staff, lack of monitoring data, or the degree of coordination needed between Competent Authorities.
- Measures must be quantifiable in terms of the progress towards the objective. Unless quantifiable targets are set, and progressively monitored, there is no way to ensure that the objectives will be achieved by the end of the RBMP period. This is achieved by the setting of standard 'indicators'.
- Basic and Supplementary measures may apply equally at general scale (river basin) or specific scale (waterbody). The essential difference between general measures and specific measures will generally be the number of waterbodies affected by the measure, and their spatial separation (disaggregated or grouped respectively).
- Measures can/should be differentiated by *a*) different Competent Authorities *b*) different pressures. Although two Competent Authorities may be working in parallel to address the same pressure, each CA will be using specific instruments, Permits, legal powers pertinent to that CA, and therefore the individual measures should be separated.
- The 'best practice' Table 13-4 (see also Annex XI) align with WISE 2016 reporting requirements that: "Measures should be targeted in terms of their type and extent to ensure that pressures are addressed and that this will deliver improvements towards achieving good status or potential in individual water bodies.

The measures should be designed based on the assessment of the actual status of the water body, supplemented with the information from the analysis of pressures and impacts affecting the water body".

Technical Annex XI gives worked examples of how the Tables can be completed for the two principal alternative sets of measures:

- Single general measure applied to multiple waterbodies
- Multiple specific measures applied to single waterbody

**Table 13-3 – Inter-relationship of Types and Targets of Measures and Coding System**

	BASIC MEASURES	SUPPLEMENTARY MEASURES	EXAMPLE INDICATORS FOR PRESSURE(S) <sup>212</sup>	EXAMPLE INDICATORS FOR MEASURE(S)
<p><b>GENERAL MEASURES</b> Applies at basin or sub-basin level or multiple waterbodies</p> <p><b>CODE SYSTEM</b> BM or SM + Basin ID + Sequence e.g. BM-3514-01</p>	<p>EU Directives as relevant, especially:</p> <ul style="list-style-type: none"> <li>• The Management of Bathing Water Quality (2006/7/EC)</li> <li>• Drinking Water Directive (EU) (2020/2184)</li> <li>• Urban Waste Water Treatment Directive (91/271/EEC)</li> <li>• Nitrates Directive (91/676/EEC)</li> <li>• Habitats Directive (92/43/EEC)</li> <li>• Integrated Pollution Prevention Control Directive (96/61/EC)</li> <li>• Plant Protection Products Directive (91/414/EEC)</li> </ul>	<ul style="list-style-type: none"> <li>• Charges/financial incentives</li> <li>• Cooperation arrangements</li> <li>• Advisory approaches</li> <li>• Statutory instruments</li> <li>• Measures do not take account of time-pressure or seasonality</li> </ul>	<ul style="list-style-type: none"> <li>• Number of wastewater outfalls without treatment</li> <li>• Annual tonnage of NPK applied</li> <li>• Number of waterbodies with morphological discontinuity</li> <li>• Annual pesticide load above EQS</li> <li>• Number of hydropower plants</li> <li>• Groundwater abstraction volume</li> </ul>	<ul style="list-style-type: none"> <li>• Population equivalent to be treated by WWTPs</li> <li>• Total number of new/retrospective Permits</li> <li>• Agricultural area subject to NPK restrictions</li> <li>• Reduction % in sectoral water abstraction or consumption</li> <li>• Basin Water Exploitation Index</li> <li>• Basin Environmental Flow Index</li> </ul>
<p><b>SPECIFIC MEASURES</b> Applies at single waterbody level OR contiguous waterbodies</p> <p><b>CODE SYSTEM</b> BM or SM + Waterbody ID + Sequence e.g. SM-GW35140409-01</p>	<p>EU Directives as relevant, especially:</p> <ul style="list-style-type: none"> <li>• The Management of Bathing Water Quality (2006/7/EC)</li> <li>• Drinking Water Directive (EU) (2020/2184)</li> <li>• Urban Waste Water Treatment Directive (91/271/EEC)</li> <li>• Nitrates Directive (91/676/EEC)</li> <li>• Habitats Directive (92/43/EEC)</li> <li>• Integrated Pollution Prevention Control Directive (96/61/EC)</li> <li>• Plant Protection Products Directive (91/414/EEC)</li> </ul>	<ul style="list-style-type: none"> <li>• Permit conditions take account of waterbody specific requirements e.g. emission limit values (ELVs), environmental flow, protected areas, groundwater dependent ecosystems, abstraction points etc.</li> <li>• Measures will take account of time-pressure or seasonality</li> </ul>	<ul style="list-style-type: none"> <li>• Status of individual elements for waterbody status <ul style="list-style-type: none"> <li>- Biological quality elements</li> <li>- Physical-chemical elements</li> <li>- Hydromorphological elements</li> <li>- Annex X Priority substances</li> <li>- Annex VIII RBSPs</li> </ul> </li> <li>• Length of depleted reach</li> <li>• % time disruption to waterbody</li> <li>• % flow disruption to waterbody</li> <li>• Groundwater observed level</li> </ul>	<ul style="list-style-type: none"> <li>• Waterbody Ecological Quality ratio</li> <li>• Waterbody Environmental Flow Index</li> <li>• Seasonal BOD load g/m<sup>3</sup></li> <li>• Seasonal RBSP load g/m<sup>3</sup></li> <li>• Operator Permit issued with seasonal constraints (time/flow)</li> <li>• Industrial installations with on-site treatment</li> </ul>

<sup>212</sup> General Indicators should be interpreted as number/length of installations/sites/objects assumed to be creating detrimental impact. Either a) Permits do not exist or are not complied with b) Permits are insufficient in terms of ELVs and/or EQSs. Related to Table 10-2

**Table 13-4 - Summary Pressures & Measures– Ishem River basin**

Basin code	WB category	Significant Pressure Types 2021	Pressure Indicator	Pressure MS Indicator Baseline 2023 <sup>213 214</sup>	Pressure National Indicator Baseline 2023 <sup>215</sup>	Applicable KTM	KTM indicator	Indicator Value Baseline 2023 <sup>216</sup>	Indicator Value Target 2029 <sup>217</sup>
3514	SW	Type 1 – Point pollution (urban wastewater)	<i>Length of waterbodies affected (km)</i>	56.38%	103 km	KTM 1	<i>Population requiring WWTP (pe)</i>	1,000,000	553,009
	GW	Type 1 – Point pollution (urban wastewater)	<i>Area of GWBs with average nitrate concentration above Threshold Value (km<sup>2</sup>)</i>	56.38%	56.38%	KTM 1	<i>Population requiring WWTP (pe)</i>	1,000,000	553,009
	GW	Type 1.5 – Contaminated industrial sites	<i>Number of sites potentially requiring remediation (N)</i>	No.	No.	KTM 4	<i>Repair sites (N)</i>	6	0
	SW/ GW	Type 1.6 – Solid waste disposal sites	<i>Number of sites potentially requiring remediation (N)</i>	No.	No.	KTM 21	<i>Number of unsanitary landfills to be closed (N)</i>	0	0

<sup>213</sup>The Member State Standard Indicator is expressed as a relative percentage to facilitate comparison between river basins. In the new PMBU Framework in Albania, this indicator is defined as the length of all water bodies subject to that Main Type of Pressure (as % of the total length of water bodies in the river basin) OR as % of the total area of underground water bodies in the case of UNs. Where

<sup>214</sup>Where it is not appropriate to express the MS indicator as a % of total body length (eg isolated point pressures), the absolute object count is alternatively used

<sup>215</sup>The national indicator is expressed as an absolute value to indicate the degree or amount of pressure specific to the river basin

<sup>216</sup>The Baseline Indicator value represents the degree of measure required at the beginning of the RBMP period in order to fully achieve the environmental objective(s) across the river basin

<sup>217</sup>The target indicator value represents the degree of measure still required to achieve the environmental objectives for the river basin, in accordance with the WISE 2016 reporting procedures

Basin code	WB category	Significant Pressure Types 2021	Pressure Indicator	Pressure MS Indicator Baseline 2023 <sup>213 214</sup>	Pressure National Indicator Baseline 2023 <sup>215</sup>	Applicable KTM	KTM indicator	Indicator Value Baseline 2023 <sup>216</sup>	Indicator Value Target 2029 <sup>217</sup>
	GW	Type 1 & 2 – Point and diffuse pollution	<i>Public Water Supply wells without defined protection zones (N)</i>	%	No.	KTM 13	<i>Number of protection zones requiring definition (N)</i>		
	SW/ GW	Type 2 – Diffuse pollution (agriculture)	<i>Length of waterbodies affected (km)</i>	16%	95.5 km	KTM 2	<i>Length of waterbodies targeted</i>	95.5 km	50 km
	GW	Type 2 – Diffuse pollution (agriculture)	<i>GW areas with average nitrate concentration above Threshold Value (km<sup>2</sup>)</i>	16%	%	KTM 2 & 3	<i>Area of groundwater bodies requiring reduction of NO3-N below Threshold Value (km<sup>2</sup>)</i>		
	SW	Type 3.1 – Abstraction or diversion due to agriculture	<i>Volume of water being over-abstracted beyond efficient use (Mm<sup>3</sup>/year)</i>	N/A	Mm <sup>3</sup>	KTM 8 & 26	<i>Reduction in water abstraction required to achieve objectives (Mm<sup>3</sup> OR %)</i>		
	SW	Type 3.2 – Abstraction or diversion due to public water supply	<i>Volume of water being over-abstracted beyond efficient use (Mm<sup>3</sup>/year)</i>		Mm <sup>3</sup>	KTM 8 & 26	<i>Reduction in water abstraction required to achieve objectives (Mm<sup>3</sup> OR %)</i>		

Basin code	WB category	Significant Pressure Types 2021	Pressure Indicator	Pressure MS Indicator Baseline 2023 <sup>213 214</sup>	Pressure National Indicator Baseline 2023 <sup>215</sup>	Applicable KTM	KTM indicator	Indicator Value Baseline 2023 <sup>216</sup>	Indicator Value Target 2029 <sup>217</sup>
	SW	Type 3.5 – Abstraction or diversion due to hydropower	<i>Volume of water being over-abstracted beyond efficient use (Mm<sup>3</sup>/year)</i>	Mm <sup>3</sup> /year	Mm <sup>3</sup> /year	KTM 8 & 26	<i>Reduction in water abstraction required to achieve objectives (Mm<sup>3</sup> OR %)</i>	XX Mm <sup>3</sup>	XXMm <sup>3</sup>
	SW	Type 4.1 – Channel morphology	<i>Length OR number of waterbodies affected by physical alteration of channel (km)</i>	No.	No.	KTM 6	<i>Length or number of waterbodies requiring remediation (km)</i>	10,895 km	
	SW	Type 4.2 – Dams & Barriers	<i>Number of structures disrupting river continuity (N)</i>	No.	No.	KTM 5	<i>Number of structures to be improved (N)</i>	53	20
	SW	Type 4.3 – Hydrological Alteration	<i>Length of waterbodies affected by disrupted flow regime (%)</i>	%	km	KTM 7 & 8	<i>Length or number of waterbodies where the environmental flow regime should re-established (km)</i>	31.881km	
	SW/ GW	Type 5.3 – Disposal of urban solid waste and point disposal	<i>Number of sites failing objectives (N)</i>	No	No	KTM 21	<i>Number of waterbodies requiring remediation (N)</i>	25	20
	GW	Type 6.1 – Groundwater recharge (runoff / infiltration)	<i>New urban development</i>	%	%	KTM 27	<i>New developments or areas required to incorporate</i>		

Basin code	WB category	Significant Pressure Types 2021	Pressure Indicator	Pressure MS Indicator Baseline 2023 <sup>213 214</sup>	Pressure National Indicator Baseline 2023 <sup>215</sup>	Applicable KTM	KTM indicator	Indicator Value Baseline 2023 <sup>216</sup>	Indicator Value Target 2029 <sup>217</sup>
			<i>preventing GW recharge (km<sup>2</sup>)</i>				<i>SUDS or recharge activities (km<sup>2</sup>)</i>		
	GW	Type 6.2 – Groundwater abstraction	<i>Area of GWBs being over-abstracted (km<sup>2</sup>)</i>	%	%	KTM 14 & 26	<i>Number of groundwater abstractions requiring Permits (N)</i>		

### **13.9 Summary of Surface Waterbodies at Risk of Environmental Failure**

Based on the characterisation and assessment of water bodies as analysed in Chapter 10, the summary of all surface waterbodies considered to be at risk of failing the specified environmental objectives is presented in Table 13-5.

Where it is expected that measures can be implemented for a specific waterbody or contiguous group of waterbodies, the relevant Directive is mentioned for Basic measures, or other instrument for Supplementary measures. Prospective measures are considered and reviewed with appropriate stakeholders during the draft RBMP consultation period (during 2022).

For reasons of technical complexity, financing or other restrictions, it may then be decided that in spite of deficient status, there is no realistic prospect of implementing sufficient measures within the RBMP period for specified waterbodies. The reasons for inability to achieve compliance should be listed in the narrative.

### **13.10 Summary of Groundwater Bodies at Risk of Environmental Failure**

Based on the characterisation and assessment of water bodies as analysed in Chapter 10, the summary of all groundwater waterbodies considered to be at risk of failing the specified environmental objectives is presented in Table 13-6.

Where it is expected that measures can be implemented for a specific waterbody or group of waterbodies, the relevant Directive is mentioned for Basic measures, or other instrument for Supplementary measures. Prospective measures are considered and reviewed with appropriate stakeholders during the draft RBMP consultation period (during 2022).

For reasons of technical complexity, financing or other restrictions, it may then be decided that in spite of deficient status, there is no realistic prospect of implementing sufficient measures within the RBMP period for specified waterbodies. The reasons for inability to achieve compliance should be listed in the narrative. The programme of measures specifically for groundwater are described in Section 13.6.

**Table 13-5 – Summary of Surface Waterbodies at Risk of Failing Environmental Objectives**

WATERBODY OR GROUP	NAME	FORM	OVERALL STATUS	FAILURE OF QUALITY?	FAILURE OF QUANTITY?	FAILURE OF MORPHOLOGY ?	ANY MEASURES PROPOSED?	BASIC INSTRUMENTS	SUPPLEMENTARY INSTRUMENTS
RW351441	Terkuza	Natural	5	No	Yes	Yes	Yes	EU 2000/60/EC Environmental Impact Assessment Directive (85/337/EEC) Habitats Directive (92/43/EEC)	Law 111/2012 Law no.10431/2011
RW351443	Terkuza	HMWB	4		Yes	Yes	yes	EU 2000/60/EC Environmental Impact Assessment Directive (85/337/EEC) Habitats Directive (92/43/EEC)	Law 111/2012 Law no.10431/2011
RW351487	Lana	Natural	5	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW351485	Lana	HMWB	5	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW351483	Lana	Natural	5	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW351481	Lana	Natural	5	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW351495	Tirana	HMWB	4	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011

RW351493	Tirana	HMWB	2	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW351491	Tirana	HMWB	5	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW35147	Tirana	Natural	5	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
RW35145	Tirana	Natural	4	yes	yes	yes	yes	91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011
LW351401	Bovilla Reservoir	HMWB	3	no	yes	yes	yes	EU 2000/60/EC	Law 111/2012 Law no.10431/2011
LW351402	Tirana City Lake	AWB	3	yes	no	yes	yes	EU 2000/60/EC	Law 111/2012 Law no.10431/2011
LW351403	Cekreze Watershed	HMWB	3	no	no	yes	yes	EU 2000/60/EC	Law 111/2012 Law no.10431/2011
LW351404	Tapiza Watershed	HMWB	3	no	no	yes	yes	EU 2000/60/EC	Law 111/2012 Law no.10431/2011

**Table 13-6 – Summary of Groundwater Bodies at Risk of Failing Environmental Objectives**

WATERBODY OR GROUP	GROUP	NAME	OVERALL STATUS	FAILURE OF QUALITY?	FAILURE OF RECHARGE?	FAILURE OF ABSTRACTION?	ANY MEASURES PROPOSED?	BASIC INSTRUMENTS	SUPPLEMENTARY INSTRUMENTS
GW35140101	-	Thumane	Good	Yes Saline intrusion	No	No	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012
GW35140103	-	Tirana	Good	Yes Urban and industrial	No	Yes	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012
GW35140501	B	Fushe-Kruje	Good	Yes Sanitation	Yes	No	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012
GW35140503		Qinam							
GW35140505		Brar							
GW35140507	C	Kashar	Good	Yes Sanitation	Yes	No	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012
GW35140509		Bubq							

Notes:

1. Overall status refers to the current condition, which is everywhere good albeit with significant uncertainty.
2. The 'failure' columns refer to the nature of the risk identified in the 2022-27 plan period.
3. Failure of recharge refers to a failure the water balance test; failure of abstraction refers to a failure to sustain current pumping operations
4. Note, the assessments of Groups B and C are assigned a confidence level of zero.

### 13.11 Measures for Surface Waterbodies at Risk

The programme of Basic and/or Supplementary measures targets specific surface waterbodies at risk of failing environmental objectives. These waterbodies require a detailed assessment of how the current status and the consequent impacts will be addressed within the duration of the Plan (2024-2029). General and specific Basic and Supplementary measures should be identified, together with the expected change in status, the responsible competent authority, target dates and costs of the measure(s).

Since all measures should be targeted at individual waterbodies or groups of waterbodies, measures are listed by waterbody order, commencing with the most upstream waterbodies.

General measures for groups of waterbodies or specific measures for individual waterbodies are presented in the Technical Annex XI.

The PoMs builds upon the results of the pressure analysis and the water status assessment (Chapter 10), and includes, as a consequence, measures of basin-wide importance oriented towards the agreed visions and management objectives for 2029.

PoMs are structured according to significant pressures (organic, chemical, nutrient and hydro-morphological changes) as well as groundwater bodies associated with the entire basin. It pursues total basin management objectives for each surface and groundwater to achieve the WFD environmental objectives by 2029. Key findings and conclusions on the identified measures and their relevance across the basin, as well as the priorities related to their implementation in the pond to a large extent, are summarized as part of the PoMs. The implementation of important measures throughout the basin is ensured through coordination with institutions that have the objective of implementing the measures.

From the analysis of pressures and the determination of the status of water bodies, water bodies have been identified which fail to meet the EOs. According to Article 4 of the WFD respectively to take appropriate measures to prevent the deterioration of the status of all surface waters and to achieve good ecological status or good ecological potential. Chapter 10 explained the source of these pollutants and the impact they have on water bodies. Listed below are the proposed measures to improve the status of these water bodies.

Measures should be targeted in terms of their type and extent to ensure that pressures are addressed and that this will deliver improvements towards achieving good status or potential in the individual water bodies. The measures should be designed based on the assessment of the actual status of the water body, supplemented with the information from the analysis of pressures and impacts affecting the water body.

Quantitative indicators for the scale and progress with the implementation of measures were proposed for each of the defined KTM. Member States could also report their indicators if the proposed ones were not appropriate for their specific national situations.

The grouping of these water bodies was based on several important factors such as proximity to each other (they are water bodies belonging to a river) and the same pressures that appear on each of them.

There are some waterbodies that are like most not achieving the environmental objectives.

Concerning the implementation of measures, the most generally applicable KTMs for the KTPs should be identified, and the indicator that will be used to quantify the progress of the measure.

Tables in the Annex XIII will be listed two concrete examples of how measures have been selected for the two cases of a grouping of water bodies. The explanation of the methodology and the path followed is explained in Technical Annex XI.

### **13.11.1 Waterbody Group 351495-351493-351491**

Waterbodies 351495 and 351491 are the upper reaches of the Tirana River –it is assumed that the widespread mining of alluvial gravels along the entire length of the waterbody is adversely impacting the aquatic ecosystem in terms of river habitat morphology (significant pressure 4.1.4) and the middle reaches of the Tirana River is heavily modified due to historical canalisation. The waterbody through the city is heavily impacted by untreated wastewater creating excessive levels of BOD5 and solid waste tipping (significant pressure 1.1 and 1.2).

The point pressure of urban wastewater (KTP 1.1) has to be most usually addressed through the construction of wastewater treatment plants (WWTPs- KTM 1) but when it is impossible to construct a WWTP there are other KTM for reducing the load from urban waste water like measures to prevent or control the entry of pollution from urban areas, transport and built infrastructure. (KTM 21).

One of the measures is to reduce the discharge points of urban wastewater, collecting in a reduced number of collectors and separating the combined systems from the rainwater, being channelled into the water supply system and not flowing in any way with the water bodies of the Tirana River.

Since these water bodies are channelled, we are adversely impacting the aquatic ecosystem in terms of river habitat morphology, it is proposed to build/allow the passage of aquatic fauna in the modified body with unnatural structure of its bed. Clean all points where urban solid waste landfills are located near or in the riverbed. Also remove urban wastewater discharge points which are not connected to the sewer system.

These measures will help to improve the current status of these water bodies and with their implementation, it is expected that in the second cycle of management plans (the year 2029) it will be reduced from a very bad to moderate status.

### **13.11.2 Waterbody Group 351487-351485-351483**

Waterbodies 351487, 351485, 351483 and 351481 are part of Lana River that is likewise heavily contaminated by untreated urban wastewater (significant pressure 1.1 and 1.2). Lana River is also heavily modified due to historical canalisation.

The point pressure of urban wastewater (Key Type Pressure number 1.1) has to be most usually addressed through the construction of wastewater treatment plants (WWTPs) (a Basic Measure under EU WWTD, KTM 1).

Currently, the structural part of the Kashar plant has been built, but the works have stopped as a result of a non-fulfilment of the contract condition. This RBMP requests from the relevant authority to complete the construction of the urban wastewater treatment plant and to start the treatment of urban wastewater coming from the urban area of Tirana.

In addition to the urban wastewater treatment plant, other measures have been proposed for these water bodies, which will result in improving their status. One of them is to reduce the discharge points of urban wastewater, collecting in a reduced number of collectors and separating the combined systems from the rainwater, being channelled into the water supply system and not flowing in any way with the water bodies of the Lana River.

Since these water bodies are channelled, we are adversely impacting the aquatic ecosystem in terms of river habitat morphology, it is proposed to build/allow the passage of aquatic fauna in the modified body with unnatural structure of its bed.

These measures will help to improve the current status of these water bodies and with their implementation, it is expected that in the second cycle of management plans (the year 2027) it will be reduced from a very bad to moderate status.

Table 13-6 is the summary of all pressures and measures (See also Annex XIII, 13-9 and Table 13-10).

### 13.11.3 Waterbody Group 351443-351441

Waterbodies 351443 and 351441 the middle and the lower reaches of the Terkuza. Consequently, the environmental flow regime of this river possibly as far as Rinas is completely compromised. The physical change to the waterbody in terms of damming of the river also means that it is a HMWB in form. The change in flow regime is assumed to have placed this waterbody in 'poor status' (significant pressures 3.2 and 4.2.3). It is likely that to restore the correct flow regime, a quota of water will have to be released from Bovilla Reservoir. A combination of insufficient flow regime together with high levels of reported BOD<sub>5</sub> due to untreated urban wastewater and various other pressures place this waterbody in 'bad status'.

The most relevant KTM associated with reducing the pressures and impacts from the hydro morphological alteration of water bodies is the improving hydro-morphological conditions of water bodies other than longitudinal continuity (KTM 6).

So, some of the measures conduct in rehabilitation of the inert extraction area. Entities are required to comply with the permit conditions for the rehabilitation of the area, closing access roads after the entity completes the permit. Establish protection against river erosion on agricultural lands. Remove concrete dams located inside the river. To monitor the conditions of the permits issued for the subjects that abstract gravel in the water body. For the flow regime should allowing a certain amount of water volume to be discharged from the Bovilla reservoir during the dry summer period, to maintain the water supply to the water body.

These measures will help to improve the current status of these water bodies and with their implementation, it is expected that in the second cycle of management plans (the year 2029) it will be reduced from a very bad to moderate status.

### 13.11.4 Waterbody 35147 and 35145

Waterbodies 35147 and 35145 are combining into from the Tirana and Lana rivers in the city centre. Although natural in form, untreated urban wastewater is creating excessive levels of BOD<sub>5</sub> in the receiving waters (significant pressure 1.1 and 1.2).

The point pressure of urban wastewater (Key Type Pressure number 1.1) has to be most usually addressed through the construction of WWTPs (a Basic Measure under EU UWWTD, KTM number 1).

Currently, construction of WWTP Kamza, p.e. 96,991 (2029) in the water body 35147. This RBMP requests from the relevant authority to complete the construction of the urban wastewater treatment plant and to start the treatment of urban wastewater coming from the urban area of Kamza city.

In addition to the urban wastewater treatment plant, other measures have been proposed for these water bodies, which will result in improving their status. One of them is to reduce the discharge points of urban wastewater, collecting in a reduced number of collectors and separating the combined systems from the rainwater, being channelled into the water supply system and not flowing in any way with the water bodies. Clean all points where there are landfills of urban solid / inert waste near or in the river bed.

These measures will help to improve the current status of these water bodies and with their implementation, it is expected that in the second cycle of management plans (the year 2029) it will be reduced from a very bad to moderate status. **Error! Reference source not found.** is the summary of all pressures and measures (See also Annex XI, Table 13-9 and Table 13-10).

## 13.12 Definitions and Reporting of Costs and Sources of Funding

### 13.12.1 Overview of Costs

PoM general table (referred to PoM Technical Appendix) summarises anticipated costs for all measures directed at surface waterbodies at risk, disaggregated as follows:

- Capital or Installation Costs generally related to the implementation of specific measures, sometimes also referred to as 'installation costs' e.g. construction of wastewater treatment facilities
- Operation and Maintenance Costs generally associated with the ongoing costs related to the installation costs above e.g.
- Administration Costs generally defined as costs borne by competent authorities, Ministries or other governance agencies responsible for administering particular measures e.g. in the form of inspection and enforcement, collection of levies or taxes etc.
- Resource costs a form of indirect cost, also referred to as 'opportunity costs' which are associated with using water (assumed a finite and scarce resource) in a specific way. Resource costs arise only if an alternative use of the water would generate a higher economic value than the current use i.e. the difference between net benefits (present v alternative use) is negative e.g. water quota historically reserved for irrigation could generate higher economic value if it was redirected to hydropower use.

### 13.12.2 Overview of Funds

For the PoM to have validity, sources of funding must be confirmed. If there is no designated budget line or funding stream to support the measure(s), the measure has little prospect of being implemented and should therefore be deferred until such time that funding is confirmed.

Since final confirmation of funds may take years to finalise, whether through international financing, the national fiscal budget or municipal funds, inevitably some of the funding sources may be anticipatory i.e. during the draft RBMP review within 2022, final confirmation of funds may have to be assumed, if not actually approved.

Potential sources of funds are disaggregated as follows:

- External Grants or Loans assumed to be sourced from non-governmental sources e.g. international funding agency, technical assistance programme
- Central or Agency budget assumed to be financed through Government central budget or devolved funding mechanism to Ministry or regulatory agency
- Municipal budget assumed to be financed through devolved funding mechanism to regional administrative authority or municipality
- State Water Charges or Levies assumed to be financed through the administration of various fiscal instruments for environmental cost recovery at state or municipal level e.g. water abstraction charges, wastewater pollution taxes
- Operator financed assumed to be financed directly from operator revenues where the operator has to finance measures according to the "polluter pays" principle (WFD Article 9).

### 13.12.3 Reporting of Costs and Funds

The flexible reporting structure of Table 13-11 recognises that multiple types of costs and/or funding mechanisms might arise in the implementation of a single measure. For example, the imposition of reduced water abstraction quotas by the regulatory authority to preserve groundwater quantity status

might require expenditure by irrigation operators to install more efficient technology, costs attributable to an advisory service to farmers, a resource cost arising from reduced yields due to an enforced limitation of water use, and administration costs borne by the inspectorate to enforce efficiency measures.

In the completion of PoMs (Technical Annex XIII), different potential costs attributable to different agencies or operators should be itemised on separate rows in a single Table.

In compliance with recommended good practice <sup>218</sup>, it is useful to identify the instrument(s) (legal or fiscal) that support the measure; in the case of Basic type measures, the most relevant EU Directive should be cited. In the case of Supplementary measures, relevant national legislation or the applicable national tax or levy could be cited.

The relationship between specific measures and the targeted waterbodies is most easily identified by reference to Table 13-18 for surface water (see also Annex XI)

### **13.13 Summary Costings for Surface Water Measures**

Tables for summarizing anticipated costs for all measures directed at surface waterbodies at risk can be found in Technical Annex XI. The sequence of costings follows the sequence of measures reported from corresponding Tables.

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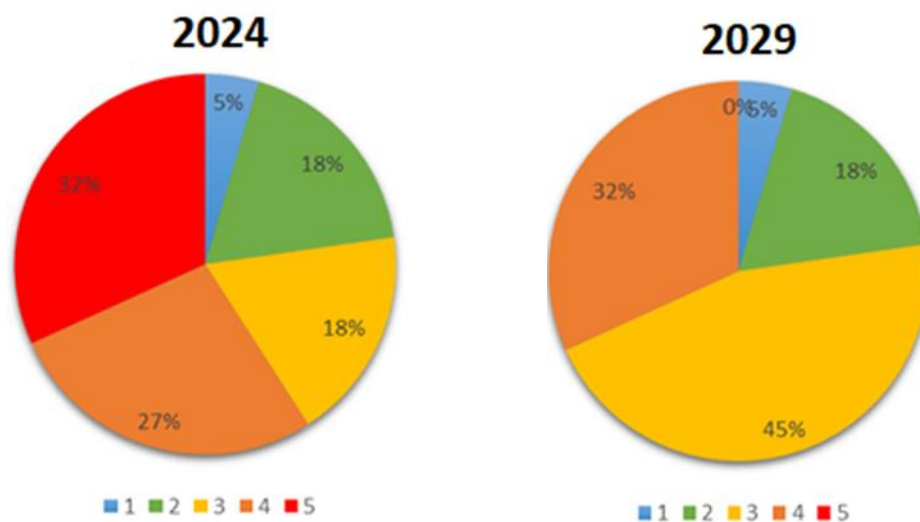
<sup>218</sup> Comparative study of pressures and measures in the major river basin management plans in the EU - Task 4 b: Costs & Benefits of WFD Implementation, ACTeon 2012.

### 13.14 Final Summary of Current and Projected Surface Waterbody Status

Figure 13-2 summarises the expected outcomes of the 2024-2029 RBMP for the status of surface waterbodies in the Ishem basin.

- It is expected that 5 waterbodies currently in 'good status' will remain in good status
- It is expected that 4 waterbodies currently in 'moderate status' remain in 'moderate status'
- It is expected that 6 waterbodies currently in 'poor status' will increase to 'moderate status'
- It is expected that 7 waterbodies currently in 'bad status' will reduce to 'poor status'

Figure 13-2 – Current and Projected Proportions of Surface Waterbody Status



### 13.15 Plan Monitoring and Evaluation Procedures

#### 13.15.1 Details of the proposed 2024-2029 surface water monitoring programme

The proposed monitoring programme extends on existing capacities, but will require more resources than having been allocated so far.

##### 13.15.1.1 Proposed water categories

The WFD distinguishes four main categories:

- Rivers. NEA routinely monitors the rivers in the Ishem River Basin, expect for Terkuza and Zezë.
- Lakes. This category also includes reservoirs. They are not yet monitored by NEA inside the Ishem River Basin, but at least Bovilla Reservoir is suggested to become included.
- Transitional waters. Suggested to be skipped during the period 2024-2029, since this requires a vessel and equipment to measure/sample also in the vertical direction (depth).
- Coastal waters. NEA takes samples at/near the coastline, sometimes in the vicinity of wastewater outlets. These samples are not suitable for a representative assessment of the quality of coastal waterbodies, which are 1.8 km wide (and several meters deep). A vessel and the necessary equipment are lacking, thus this waterbody category can be skipped.

Hence, the surface water monitoring programme is suggested for the rivers and lakes (reservoirs) inside the Ishem River Basin.

### 13.15.1.2 Proposed monitoring parameters

The acronyms P-CHEM, BQES ER, ANNEX VIII RBMP, and H-MORPH correspond to the ones used in Pressures and Status Assessment (as presented under Annex XIII to this RBMP).

### 13.15.1.3 General physical-chemical quality elements (P-CHEM)

The parameters routinely monitored by NEA cover the full range of the WFD general physical-chemical quality elements. They are to be monitored in both rivers and lakes (reservoirs).

### 13.15.1.4 Hydro biological quality elements (BQES ER)

The in-house capacity of NEA is limited to benthic invertebrate fauna. This parameter is indicative for the state of river waterbodies, but not that suitable for lakes/reservoirs. On the other hand, inter alia phytoplankton is a suitable parameter for lakes/reservoirs. Unfortunately, NEA does not employ corresponding experts. Currently they only perform monitoring for benthic invertebrate fauna in rivers and chlorophyll-an in lakes/reservoirs.

### 13.15.1.5 Other specific pollutants (ANNEX VIII RBSP)

BOD<sub>5</sub> and COD<sub>Cr</sub> can be considered as part of the 'Other specific pollutants'. They are routinely analysed by NEA and applicable to both rivers and lakes/reservoirs.

### 13.15.1.6 Hydro-morphological quality elements

#### RIVERS: FLOW

IGE<sup>219</sup> monitors river water levels at five stations (subsection 13.15.1.7); an extension of the number of hydrological posts is not expected during the period 2024-2029. However, flows of waterbodies can be approximated via modelling, as has been applied in Table 5-1 of the main RBMP.

#### RIVERS: MORPHOLOGY

The Department of Hydrogeology of AGS is capable of monitoring river depth and width variation, and the structure and substrate of the river bed.

#### LAKES

IGE does not monitor the lakes/reservoirs inside the Ishem basin.

However, the Water Supply and Sewerage Utility Tirana (Ujesjelles Kanalizime Tirane, UKT) might collect suitable data about e.g. the water levels in the Bovilla Reservoir.

### 13.15.1.7 Monitoring locations

#### RIVERS: P-CHEM and BQES ER

In principle, these quality elements are to be monitored in all delineated surface waterbodies. However, some could be excluded, for example because their status might be inferred from adjacent waterbodies (refer to the footnotes of Table 3-1 in Chapter 3).

Several waterbodies are already covered by the currently monitored NEA sites. Most delineated waterbodies were visited during the EUSIWM "Sampling Campaign Rivers, April 2021", thus providing already an orientation for the remaining sites. However, determining the appropriate sites for sampling the benthic invertebrate fauna will take further preparatory work. (Refer table 13-14 and 13-15 to Annex VI)

If available, then UKT's data for discharges the Bovilla Reservoir into the Terkuza River (waterbody code RW311443) will be very useful, also in conjunction with finetuning environmental flows.

#### RIVERS: MORPHOLOGICAL QUALITY ELEMENTS

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<sup>219</sup> The  $Q_n$  rating curves (required for calculating the flow from the water level) have not been updated since 15 or more years.

The profiles are primarily situated in areas with (intensive) gravel/sand abstractions. The Lana and Tirana Rivers are not included. Because of the links between the hydro-morphological quality elements with the hydrobiological quality elements (i.e. benthic invertebrate fauna as regards the proposed 2024-2029 monitoring programme), it is strongly suggested to:

- Add another cross-section along the Ishem River further downstream, for example in the vicinity of NEA’s Ura Salmer water quality station.
- Add cross-sections along the Lana and Tirana rivers, e.g. upstream, middle, and downstream. In this stage it is not possible already to suggest possible candidate sites.

These lake/reservoirs are not routinely monitored by NEA, but were sampled during the EUSIWM “Sampling Campaign Lakes, June and July 2021” (refer to Table 13-3 at Technical Annex VI).

Boat-based sampling is a prerequisite (samples taken from the shoreline are not representative for the lake/reservoirs). Further investigations are needed to determine whether one (vertical) site will suffice, either more sites are needed for representative monitoring & assessment of the status.

Furthermore, taking (sub) samples at different depths may be required (e.g. with a Ruttner sampler).

#### LAKES: HYDROMORPHOLOGY

It is suggested for the time being to use, if available, data for water levels, volumes, etc., that are collected by inter alia UKT, MARD, and others.

#### 13.15.1.8 Monitoring frequencies

The proposed monitoring frequencies are shown. For more details refer to Technical Annex IX).

**Table 13-7 - Proposed monitoring frequencies [once per mentioned interval]**

	RIVERS Surveillance	Operational & Baseline	LAKES Surveillance	Operational & Baseline
<b>Biological quality elements</b>				
benthic invertebrate fauna	1 year *	1 year *	-	-
chlorophyll-a	-	-	1 month	3 months
<b>Hydromorphological quality elements</b>				
hydrology	daily	daily	-	-
morphology	6 years	3 years	-	-
<b>Physico-chemical quality elements</b>				
general physico-chemical quality elements	1 month	3 months	1 month	3 months
other specific pollutants (BOD <sub>5</sub> , COD <sub>Cr</sub> )	1 month	3 months	1 month	3 months

\* Once during the (early) spring season, tentatively March – May.

**Table 13-8 – Summary of Programme of Measures by Surface Waterbody**

No.	Measure Code	Waterbody Code or RB Code	Significant Pressure	KTM	Measure Type	Measure Name	Implementing Authority	KTM Indicator	Indicator value 2024	Indicator value 2029
1	BMRW351482-01	RW35145	1.1 – Point pollution of urban wastewater	1	Basic	Completion of construction and commissioning of WWTP of Kashar p.e 350,000 <b>Water body 351482</b>	AKUM AMBU	Population equivalent number of WWTP requiring to be constructed or upgraded	800,000	450,000
		RW35146							4	3
		RW35147								
		RW351481								
		RW351482								
2	BMRW35147-01	RW35147	1.1 – Point pollution of urban wastewater	1	Basic	Construction of WWTP of Kamez, pe 96,991 (2027) <b>35147 body of water</b>	AKUM AMBU	Population equivalent number of WWTP requiring to be constructed or upgraded	800,000	703,000
		RW35145							4	3
		RW35143								3
3	SMSW3514-01	RBSW3514	1.3 - Point IED plants	16	Supplementary	Construction of plants for the treatment of industrial wastewater, requiring that every industrial installation has effluent treatment on site, in accordance with the legislation	NEA AMBU Private entity	The number of entities that do not have industrial waste water treatment plants installed	70	30
4	SMSW3514-02	RBSW3514	3 – Abstraction or flow diversion	8	Supplementary	Improvement of environmental conditions in water bodies through the rehabilitation of	AMBU NEA	Number of revised permit required to achieve objectives		

						<i>modified water segments.</i>				
<b>5</b>	SMSW3514-03	RBSW3514	1.1 – Point pollution of urban wastewater 1.2 – Point Storm overflows	21	<i>Supplementary</i>	<i>Reduction of untreated direct discharges from sewer spills by diversion to new collector systems.</i>	<i>AKUM Municipalities</i>	<i>Number of drainage systems required to achieve objectives</i>	76	30
<b>6</b>	SMSW3514-04	RW351413 RW351421 RW351422 RW351423 RW351425 RW351427 RW35143 RW351441 RW351443 RW351444 RW351445 RW35145 RW35146	4.4 – Hydro morphological alteration, physical loss of whole or part of the water body	6	<i>Supplementary</i>	<i>Rehabilitation of water bodies, control of sediments by applying the NBS approach (choices based on nature), to achieve environmental objectives.</i>	<i>AMBU MIE</i>	<i>Length (km) or area (km2) of river network that will be affected by the measures required to achieve objectives</i>		

		RW35147 RW351481 RW351483 RW351491 RW51493 RW351495								
7	SMSW3514-05	RBSW3514	2.2 – Diffuse Agricultural	12	<i>Supplementary</i>	<i>Rehabilitation and maintenance of the irrigation and drainage system of agricultural lands.</i>	<i>MARD Municipalities</i>	<i>Length of river requiring buffer zones to intercept or reduce sediment loads to rivers to achieve objectives</i>	95.5 km	50 km

<b>8</b>	SMSW3514-06	RBSW3514	2.2 - Diffuse Agricultural	2 and 3	Supplementary	Implementation of restrictions to reduce the pollution load from chemical fertilizers, pesticides in agricultural lands.	MARD Agricultural/private sector Municipalities	Compilation of the register of the total amount of nutrients and pesticides used in agricultural practices and the improvement of policies.	0	1
<b>9</b>	SMSW3514-07	RBSW3514	1.6 – Landfill/waste disposal	21	Supplementary	Removal/clean-up of illegal solid waste dump sites	AKUM MTE Municipalities	Number of illegal waste/dump sites identified to be removed	19	0
<b>10</b>	SMSW3514-08	RBSW3514	3 - Flow Abstraction/Diversion Pressures	26	Supplementary	Improving policies for the formalization and incentive of current water users	AMBU IKMT NEA AGS Municipalities	Number of abstraction points		
<b>11</b>	SMSW3514-09	RBSW3514	3 - Flow Abstraction/Diversion Pressures	7	Supplementary	A study should be done on the water bodies threatened by the changes in flows	IGEO AMBU	Number of water bodies		
<b>12</b>	SMLW351401-01	LW351401	3.2 - Abstraction or flow diversion Public water supply	7, 8, 26	Supplementary	Reduction of losses in the water supply network of the municipality of Tirana and Kamez, in order to reduce the excessive extraction of water	Tirana Water Supply and Sewerage (UKT) AMBU	Quantity of water to be recovered (Mm <sup>3</sup> /Year)	15.7 Mm <sup>3</sup> /year = 0.50 m <sup>3</sup> /s	6.307 mm <sup>3</sup>

						<i>from the Bovilla reservoir</i>				
<b>13</b>	SMRW351443-01	RW351443 RW351441	4.3.4 – Hydrological alteration	7	Supplementary	<i>Improvement in environmental flow on Terkuza River. The 'recovered' water from Bovilla will be used to provide environmental flow for the Terkuza</i>	<i>Tirana Water Supply and Sewerage (UKT) AMBU</i>	<i>Total length of waterbodies and actual flow quantity.</i>	27.1 km 0.50 m <sup>3</sup> /s	0.00 km 0.20 m <sup>3</sup> /s
<b>14</b>	SMRW351485-01	RW351485 RW351491	4.1.4 - Physical alteration of channel/bed/riparian area/shore - Other	5	Supplementary	<i>Allow the passage of aquatic fauna in the modified body with unnatural structure of its bed by modifying the current thresholds</i>	<i>AMBU /MIE/Municipalities</i>	<i>Length of remaindering of straightened river channels required for the achievement of objectives</i>	5 km	3 km
<b>15</b>	SMRW3514-10	RW351485 RW351491 RW351481 RW351482 RW351483 RW351485 RW351487	4.1.4 - Physical alteration of channel/bed/riparian area/shore - Other	5	Supplementary	<i>Replacement of the damaged protective embankment with a new embankment (where they may conform to NBS nature-based measures/measures)</i>	<i>AMBU /MIE/Municipalities</i>	<i>Length of remaindering of straightened river channels required for the achievement of objectives</i>		

<b>16</b>	SMRW3514-11	RW351495 RW351493 RW351443 RW351441	3.1 - Abstraction or flow diversion - Agriculture	7 and 12	Supplementary	Implementation of environmental best practices related to agricultural practices (new)	MARD municipalities	Irrigated area required to be covered by measures to achieve objectives		
<b>17</b>	SMLW351401	LW351401	3.2 - Abstraction or flow diversion Public water supply	13	Supplementary	Identification of drinking water protection areas (DWPAs) for Bovilla reservoir	Tirana Water Supply and Sewerage (UKT) AMBU	Mapping	1	0
<b>18</b>	SMSW3514-13	RW35143 RW351413		14	Supplementary	Rehabilitation and operation of two suspended and non-functional surface flow monitoring points.	NEA IGJEO AMBU	Sites requiring monitoring station	2	0

**Table 13-7 Summary tables of costs and funds for surface water measures**

A - Measure BMRV3514-01 Relevant Ministry, Implementing Authority or Operator	Directive or relevant Instrument	Capital or installation costs	Operatio n and mainten ance costs	Admini stratio n Expens es	Resour ce Costs	Other costs	Σ of Costs€M		Extern al grant or loan	Central or agency budget	The budget of the Municip ality	Funded by the Operator	State Water Fees or Taxes	Othe r funds	Σ of funds €M	
<i>Completion of WWTP construction and commissioning</i> Kas har <b>AKUM/MIE /Municipality of Tirana/</b>	Urban Wastewater Directive (EU 91/271/EEC) Water Framework Directive (2000/60/EC)	10,653,000,000.00 ALL						Sources of Funds								
<i>Construction of WWTP Kamez</i> <b>AKUM/MIE /Municipality of Tirana/</b>	Urban Wastewater Directive (EU 91/271/EEC) Water Framework Directive (2000/60/EC)	6,050,000,000.00 ALL														
<i>Construction of plants for the treatment of industrial wastewater, requiring that</i>	Urban Wastewater Directive (EU 91/271/EEC) Water Framework Directive (2000/60/EC)	24,200,000.00 ALL														

<i>every industrial installation has effluent treatment on site, in accordance with the legislation</i> <b>AMBU / NEA/ Private entity</b>	Integrated Pollution Prevention Control Directive (96/61/EC)													
<i>Reduction of untreated direct discharges from sewer spills by diversion to new collector systems.</i> <b>AKUM/MIE /Municipalities</b>		1,493,369,000.00 ALL												
<i>Removal/cleaning of illegal solid waste dumps</i> <b>AKUM/MIE /Municipalities</b>		166,948,551.00 ALL <sup>220</sup>												
<i>Allowing aquatic fauna to pass through the modified body with unnatural bed structure by modifying the</i>	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) Water Framework	9,000,000.00 ALL												

<sup>220</sup>Referred from FINAL REPORT - RISK MITIGATION IN DEPOSIT VENUES. June 2018- This document was prepared by the Ministry of Tourism and Environment, supported by the Program for Decentralization and Local Development, through the Swiss Development Agency, with the technical assistance of the consultant.

<i>current rapids.</i> <b>AMBU</b> <b>/MIE/Municipalities</b>	Directive (2000/60/EC)													
<i>Improvement of environmental conditions in water bodies through the rehabilitation of modified water segments.</i> <b>AMBU</b> <b>/MIE/Municipalities</b>	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) Water Framework Directive (2000/60/EC)	1,936,000,000.00 ALL												
<i>Replacement of the damaged protective embankment with a new embankment (where they may be in accordance with measures/measures based on the nature of the NBS).</i> <b>AMBU</b>	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) Water Framework Directive (2000/60/EC)	36,000,000.00 ALL												

/MIE/Municipalities																
<i>Rehabilitation and maintenance of the irrigation and drainage system of agricultural lands.</i> <b>MARD/Municipalities</b>	The EU's Common Agricultural Policy	1,210,000,000.00 ALL														

<b>B - Measure BMRV3514-02 &amp; SMRV3514-01 &amp; SMRV3514-02 &amp; SMRV3514-03 Relevant Ministry, Implementing Authority or Operator</b>	<b>Directive or relevant Instrument</b>	<b>Capital or installation costs</b>	<b>Operation and maintenance costs</b>	<b>Administration Expenses</b>	<b>Resource Costs</b>	<b>Other costs</b>	<b>Σ of Costs €M</b>	<b>Sources of Funds</b>	<b>External grant or loan</b>	<b>Central or agency budget</b>	<b>The budget of the Municipality</b>	<b>Funded by the Operator</b>	<b>State Water Fees or Taxes</b>	<b>Other funds</b>	<b>Σ of funds €M</b>
<i>Implementation of restrictions to reduce the pollution load from chemical fertilizers, pesticides in agricultural lands.</i> <b>MARD/ AMBU /Municipalities</b>	The EU's Common Agricultural Policy	121,000,000.00 ALL													

<p><i>Rehabilitation of water bodies, control of sediments applying the NBS (nature-based choices) approach, to achieve environmental objectives.</i></p> <p><b>AMBU /NEA</b></p>	<p>484,000,000.00 ALL</p>															
<p><i>Improving policies for the formalization and incentive of current water users.</i></p> <p><b>AMBU /IKMT/NEA/AGS/Municipalities</b></p>	<p>121,000,000.00 ALL</p>															
<p><i>Identification and zoning of Drinking Water Protection Areas (DWPA). This includes especially for the Bovilla reservoir and the main groundwater extraction points used by UKT (The result can only be a map with a safety zone indicated around the water bodies. These Maps should be printed as PDF and made available at AMBU website.)</i></p>	<p>484,000,000.00 ALL</p>															

AMBU /UKT(Tirana Water and Sewerage Utility)/AGS																	
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

C - Measure SMRV3514-04 Relevant Ministry, Implementing Authority or Operator	Directive or relevant Instrument	Capital or installation costs	Operatio n and mainten ance costs	Admini stratio n Expens es	Resour ce Costs	Other costs	Σ of Costs€ M		Extern al grant or loan	Central or agency budget	The budget of the Municip ality	Funded by the Operator	State Water Fees or Taxes	Othe r funds	Σ of funds €M
<i>Reduction of losses in the water supply network of the municipality of Tirana and Kamza, in order to reduce the excessive extraction of water from the reservoir of Bovilla.  Improving the environmental flow in the Terkuza River. The water 'recovered' by Bovilla will be used to ensure the environmental flow for Terkuza</i>	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) Water Framework Directive (2000/60/EC)	1,210,000,000.00 ALL						Sources of Funds							

<b>UKT (Bovilla Reservoir) / AMBU</b>														
<i>Preparation of a study on water bodies threatened by flow changes</i> <b>AMBU /IGEO</b>		60,500,000.00 ALL												
<i>Implementation of best environmental practices in relation to (new) agricultural practices</i> <b>MARD/Municipalities</b>	The EU's Common Agricultural Policy	60,500,000.00 ALL												
<i>Rehabilitation and operation of two suspended and non-functional surface flow monitoring points.</i> <b>NEA/IGEO/ AMBU</b>		4,356,000.00 ALL												
Total costs and funds		<b>24,123,873,551.00 ALL</b>												

### 13.16 Measures for Groundwater Waterbodies at Risk

The basic and/or complementary measures program targets groundwater bodies that are at risk of not achieving environmental objectives. These water bodies require a detailed assessment of how their current status and subsequent impacts will be addressed during the duration of the plan (2024-2029). The precise measures are identified together with the expected change in status, responsible competent authority, target dates, and costs of the measures. Specific measures define individual or groups of water bodies that are at risk.

The WFD/GWD includes two separate but complementary measures, where the first are those aimed at rehabilitating underground water bodies that currently do not meet the objectives, while the other measures are related to 'prevention and limitation.' The latter is related to underground water bodies. The WFD strongly emphasizes the importance of preventing significant contamination of groundwater because it is based on European and world experience that has shown that if contaminated, cleaning up groundwater is difficult, slow, and costly, while protective measures are relatively simple, quick, and inexpensive.

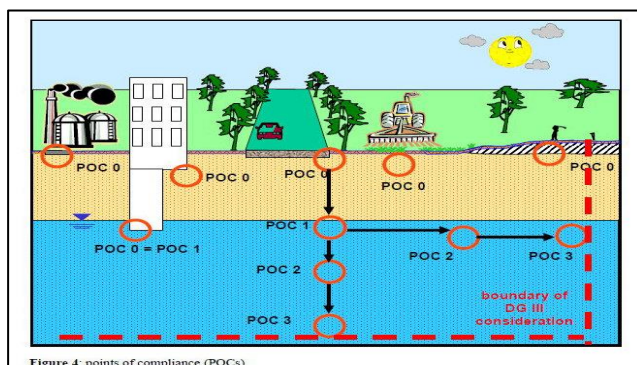
Article 11(3) of the WFD requires a 'combined approach' for the protection of groundwater, which combines the control of pollution at the source with the determination of environmental quality standards. Article 7 requires maintenance of water quality to reduce the level of drinking water treatment. Cases of localized contamination do not necessarily affect the status of all GWs, provided that they are investigated and if necessary, remedied as preventive and containment measures.

Based on the analysis of pressures in Chapter 10, a map of all measures for underground water bodies is provided in Technical Appendix VII.

#### 13.16.1 Prevent and Limit Measures for Groundwater Waterbodies

The WFD and GWD particularly emphasize the prevention and limitation of direct and indirect penetration of pollutants into groundwater throughout underground water bodies. The difference between direct and indirect seepage is explained in the diagram below, which focuses on whether the pollution source lies above or below the water table. The most detailed explanation of the prevention measures and limitations is presented in Technical Appendix VII. Prevention and mitigation measures are the first line of defense for preventing groundwater pollution and include regulatory measures such as permits and codes of conduct. For the identified pollution risks, the WFD expresses these protective objectives by defining VKE and Compliance Values (CV), which are applied to Compliance Points (CP) and are stricter than Threshold Values. The Compliance Value is the concentration (and the corresponding compliance regime), which when not exceeded in CP, prevents pollution. This differs from the Threshold Value because the latter is applied at the source (i.e., at CP-0). Pollution prevention requires taking all measures that are 'necessary and reasonable,' where 'reasonable' means technically feasible without involving disproportionate costs. The monitoring design for prevention and mitigation is described in Document 17 of CIS WFD.

Figure 13-3 - Points of Compatibility



### 13.16.2 Prevent and Limit Measures Applying to All Groundwater Waterbodies

- Upgrade Groundwater Monitoring Network and Programme

Piezometers nests should be installed and monitored across the alluvial and sandstone-conglomerate GWB's, starting with the main municipal pumping centres where levels cannot be measured and second in areas of intensive industrial or irrigation pumping. For reasons of continuity, existing monitoring at pumping stations should be continued until at least the end of the first RBMP. In addition, analytical capabilities must be upgraded in order to monitor those parameters required for WFD/GWD compatible status assessment and in line with known pressures of chemical usage.

High discharge springs, especially those measured or estimated to exceed 100 L/s, should be equipped with a measuring structure (e.g. weir or flume) and data logger recording water level and quality indicators.

The measurable outputs of this action will be the clear definition of status and trends in accord with WFD requirements.

- Groundwater Abstraction

Abstraction controls may likely be required at some point, however, there is no prospect of implementing these until the majority of private wells are registered. Registration is a precondition for monitoring and all forms of active management such as diverse permitting activities and even protection. Registration may be promoted through combinations of active information gathering and both coercive and incentive-based measures such as 'grandfathering'.

The present system of abstraction licensing should be examined and, as appropriate, upgraded too include automatic periodic review of the licensed quantities and the option to require best practice water efficiency measures and a condition of renewal.

### 13.16.3 Prevent and Limit Measures for GW35140101 and GW35140103

Multiple parallel measures are required in the Thumane and Tirane alluvial groundwater bodies:

- Upgrade Groundwater Monitoring Network and Programme

Piezometers nests (paired shallow and deep wells with short screens) should be installed and monitored across the GWB's, starting with locations close to the main municipal pumping centres where levels cannot be measured and second in areas of intensive industrial or irrigation pumping. For reasons of continuity, existing monitoring at pumping stations should be continued until at least the end of the first RBMP. In addition, analytical capabilities must be upgraded in order to monitor those parameters required for WFD/GWD compatible status assessment and in line with known pressures of chemical usage.

The measurable outputs of this action will be accurate representation of the hydraulic and chemical state and trends within the aquifers that are not confused by natural and pumping-induced vertical variation in properties.

- Collaboration of Water Utilities, Resource Agencies and Local Government

These agencies should work together in planning, monitoring and protecting groundwater, centred around the sharing of information on public digital platforms. This will provide essential data and institutional linkages for improved assessment and basin planning. Utilities are the largest abstractors and, based on international experience, likely to be largest polluters (from urban wastewater). Utilities (what do they monitor now?) and Resource Agencies should improve and coordinate monitoring activities to be in line with environmental and statutory objectives, and combine their monitoring data in an online platform. Together with local government, information should be systematically collected and compiled on the large but unknown number of industrial, commercial and irrigation wells.

The measurable outputs of this action will be indicated by a shared database containing abstraction and water quality records of all municipal wells, a specified percentage of large (to be defined) industrial wells, and registration of a specified percentage of irrigation wells.

- Pollution Hazard Mapping, Groundwater Source Protection Zones and Land-Use Zoning

The analysis of pressures has identified pollution risks associated with chemicals identified in the WFD and GWD. A set of linked activities are required. First is identification of the type and location of hazardous chemicals used or stored in the GWB summarised in a digital hazard map. Second is the definition of inner, outer and total (borehole) catchment source protection zone (SPZ) at municipal wells. Third are the imposition of restrictions on land use and chemical handling practices within inner and outer SPZ's. The measurable outputs of this action will be quantitative reduction of hazard risk expressed in relocated facilities, installed mitigation measures, and new hazards excluded.

- Reverse the Trend of Rising Nitrate Concentrations

The cause of rising nitrate is believed to a combination of domestic sanitation not connected to sewerage, poor construction and maintenance of septic tanks, leaking sewers and drains, and infiltration from polluted rivers. In all cases, the underlying cause is poor faecal waste management, and hence the underlying solution lies improving faecal waste collection and treatment and inspecting unconnected systems, as noted above with regard to surface water quality. The measurable outputs of these actions will be seen in the stabilisation or reversal of nitrate concentration trends.

- Management Model of the Ishem – Mati – Drin Alluvial Aquifer

A potentially important quantitative pressure concerns natural and pumping-induced trans-basin and inter-groundwater body flows of groundwater in the Ishem Mati and Drin basins. As noted by CEMSA (2012), the alluvium in the lower parts of the Ishem, Mati and Drin basins for a single aquifer. By necessity, river basin plans align water bodies with surface catchments; however, pumping from near the margins of one groundwater body will affect the adjacent body. The footprint of these aquifers is home to a major part of Albania's population and economic activity and are very likely to face demand for increased abstraction of groundwater. The risks of over-allocation and unintended mobilisation of contaminated groundwater require an aquifer-wide management tool to advise basin-scale and other local agencies and guide the sustainable management of groundwater in the component water bodies. To this end, a central agency should prepare or commission, and maintain, a numerical model of the Ishem-Mati-Drin alluvial aquifer so that it can plan, allocate and adjudicate demands in different basins. Noting the concerns expressed earlier regarding monitoring data, this programme should be integrated with training and capacity building and improving groundwater monitoring. Hence the programme should be implemented over multiple years in order to develop a robust model and mature capacity for groundwater management.

The measurable outputs of this action, assuming its recommendations are acted on, will be seen in coordinated allocation of abstractions between basins, and in the avoidance of severe deterioration of quantitative status.

- Investigation of River-Aquifer Interaction

The available information suggests that flows between surface and groundwater bodies may have significant quantitative and chemical impacts but are entirely unquantified. Where river water enters aquifers, it may help reduce the decline of groundwater levels and increasing the sustainable yield of the aquifers but potentially at the cost of degrading the quality of the groundwater. Field investigations should be undertaken to quantify these flows and chemical changes. The results should be fed into the Management Model described above and justifiable hydraulic parameters and attenuation rates of polluted river water.

- Specific Investigations

Notwithstanding the good overall status inferred from the monitoring, this status is contingent on undertaking investigation, and if necessary, remediation of the known hotspots of apparently local pollution identified in Chapter 10 and Figure 10-3 and listed below.

- PH\_2 Dump site
- PH3 Albanian film studio (including cyanide risk)
- PH\_21 Institute for Public Health
- PH\_25 & 26 Workshop for regenerating transformer oil and transformer repair
- Former metallurgical enterprise near the Medrese market (including cyanide risk)

Highest priority should be given to sites PH\_25 and PH\_25 are located about 750 m from UKT's abstraction well '16/97 Kavajes', and endangers public water supplies as well as any private wells in the area. There are also dug wells as close as 230 m.

- Reducing Urban Runoff and Increasing Recharge

Urbanisation is converting natural groundwater to impermeable buildings and paved areas, increasing and accelerating runoff, also reducing recharge and thereby reducing the available groundwater resource. Municipal and planning authorities should introduce procedures to require the adoption of infrastructure falling under the umbrella title of Sustainable Urban Drainage Systems (SUDS) which includes the construction of soakaways, swales and permeable pavements etc.

#### **13.16.4 Prevent and Limit Measures for Groundwater Body Group B (GW35140501, GW35140503 and GW35140505)**

Group B comprises three groundwater bodies: GW35140501 (Fushe-Kruje), GW35140503 (Qinam) and GW35140505 (Brar). The "At Risk" status of the Group of GWB's derives from the almost complete lack of information regarding the aquifers, and the evident drivers and pressures resulting from rapid urbanisation which is accompanied by unregulated groundwater abstraction, pollution risks from domestic sanitation and commercial activities, plus the reduction in recharge due to conversion of natural to hard surfaces. This is exacerbated by the general absence of information on the properties of the aquifers, the number and depths of well, the quantity of abstraction and complete absence of monitoring of groundwater levels and quality.

A programme to register private abstractions is urgently required.

To counter the combined effects of increasing abstraction and reduced recharge, municipal and urban planning authorities should introduce what is known in different countries as SUDS and/or Managed Aquifer Recharge (MAR) and comprises a range of measures to increase infiltration and attenuate the run-off hydrograph and includes rooftop-rainwater harvesting leading to soakaways, permeable pavements, retention ponds, swales, check dams and contour trenching.

In addition to the Prevent and Limit measures that apply to all groundwater bodies, two potential pollution hotspots (see Figure 10-3) require site investigation with dedicated monitoring and risk assessment to determine the nature, extent and trend of pollution, and thereby decide whether this requires remediation.

- GW35140501, PD-8, a dumpsite at Fushe-Kruje
- GW35140505, PH\_6, Auto & Tractor Factory (with a dump site 250m to SSW)

The measurable outputs of these actions will be quantification of the available resource and water balance, and determination of the quantitative and chemical status and trends with at least a moderate degree of confidence. (Refer to Table 13 19 – Single Measure for Groundwater Waterbody Group B (Kruje) at Annex VII)

#### **13.16.5 Groundwater Waterbody Group C (GW35140507 and GW35140509)**

The required general measures are the same as in Group B, including:

- Basic information on aquifer properties, the number and depths of well, abstraction and monitoring of groundwater levels and quality.
- A programme to register private abstractions.
- Municipal and urban planning authorities to introduce Sustainable Urban Drainage Systems and/or Managed Aquifer Recharge.

The measurable outputs of these actions will be quantification of the available resource and water balance, and determination of the quantitative and chemical status and trends with at least a moderate degree of confidence.

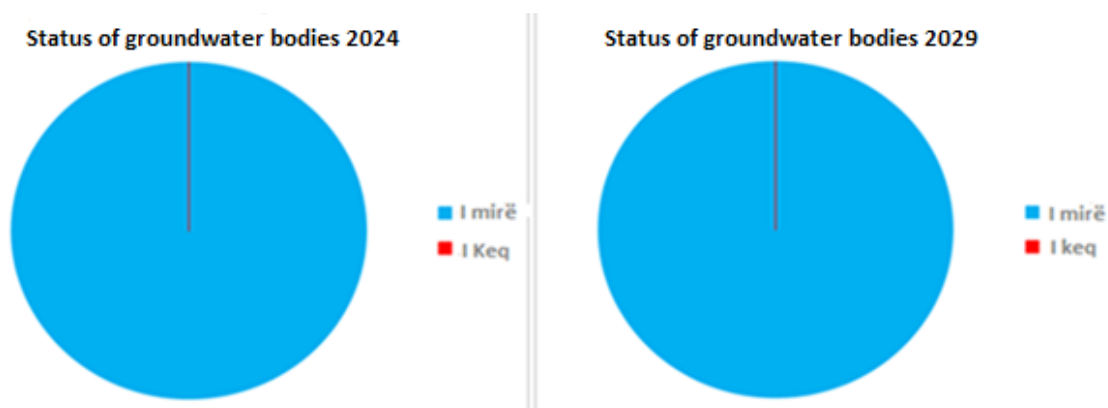
### 13.17 Summary Costings for Groundwater Measures

The summarised anticipated costs for all measures directed at groundwater waterbodies at risk and the sum total of all costs of all measures in the Plan period 2024-2029 is shown in Technical Annex VII.

### 13.18 Final Summary of Current and Projected Groundwater Body Status

Figure 13-4 summarises the expected outcomes of the 2024-2029 RBMP for the status of groundwater bodies in the Ishem basin.

Figure 13-4 – Current and Projected Proportions of Groundwater Body Status



**Table 13-8 – Summary of Programme of Measures by Groundwater Body**

No.	Measure Code	Waterbody Code or RB Code	Significant Pressure	KTM	Measure Type	Measure Name	Implementing Authority	KTM Indicator	Indicator value 2024	Indicator value 2029
1	BMRB35 14	GW35140101	1.1 – Point pollution of urban wastewater	1	Basic	Improvement and Construction of septic tanks and sewers.	AKUM AMBU	The number of septic tanks built according to the standard		
		GW35140103								
		GW35140501								
		GW35140503								
		GW35140505								
		GW35140507								
GW35140509										
2	BMRB35 14	GW35140101	1.1 – Point pollution urban pollution	1	Basic	Construction of urban wastewater treatment plants 1. Construction of WWTP Kashar 2. Construction of WWTP Kamez	AKUM AMBU	WWTP number that requires to be built or improved	4	2
		GW35140103								
		GW35140501								
		GW35140503								
		GW35140505								
		GW35140507								
GW35140509										

No.	Measure Code	Waterbody Code or RB Code	Significant Pressure	KTM	Measure Type	Measure Name	Implementing Authority	KTM Indicator	Indicator value 2024	Indicator value 2029
3	BMRB3514	GW35140101 GW35140103 GW35140401 GW35140403 GW35140405 GW35140411 GW35140407 GW35140409 GW35140501 GW35140503 GW35140507 GW35140509	1.9 – Other points	13	Supplementary	Designation of protection zones (in boreholes and UN sites) related to the control of urban development	AGS AMBU Municipalities	The number of revised permits needed to achieve the objectives		

No.	Measure Code	Waterbody Code or RB Code	Significant Pressure	KTM	Measure Type	Measure Name	Implementing Authority	KTM Indicator	Indicator value 2024	Indicator value 2029
4	BMRB35 14	GW35140101	2-2 Agriculture (distributed)	2,3,1 2	Supplementary	Reduction and improvement of agricultural practices in the use of fertilizers and pesticides	MARD AMBU			
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								
		GW35140411								
		GW35140407								
		GW35140409								
		GW35140501								
		GW35140503								
4	BMRB35 14	GW35140507	2-2 Agriculture (distributed)	2,3,1 2	Supplementary	Reduction and improvement of agricultural practices in the use of fertilizers and pesticides	MARD AMBU			
		GW35140509								
		GW35140103								
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								
		GW35140411								
		GW35140407								
		GW35140409								
4	BMRB35 14	GW35140501	2-2 Agriculture (distributed)	2,3,1 2	Supplementary	Reduction and improvement of agricultural practices in the use of fertilizers and pesticides	MARD AMBU			
		GW35140503								
		GW35140507								
		GW35140509								
		GW35140103								
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								
		GW35140411								
4	BMRB35 14	GW35140407	2-2 Agriculture (distributed)	2,3,1 2	Supplementary	Reduction and improvement of agricultural practices in the use of fertilizers and pesticides	MARD AMBU			
		GW35140409								
		GW35140501								
		GW35140503								
		GW35140507								
		GW35140509								
		GW35140103								
		GW35140103								
		GW35140401								
		GW35140403								
4	BMRB35 14	GW35140405	2-2 Agriculture (distributed)	2,3,1 2	Supplementary	Reduction and improvement of agricultural practices in the use of fertilizers and pesticides	MARD AMBU			
		GW35140411								
		GW35140407								
		GW35140409								
		GW35140501								
		GW35140503								
		GW35140507								
		GW35140509								
		GW35140103								
		GW35140103								
4	BMRB35 14	GW35140401	2-2 Agriculture (distributed)	2,3,1 2	Supplementary	Reduction and improvement of agricultural practices in the use of fertilizers and pesticides	MARD AMBU			
		GW35140403								
		GW35140405								
		GW35140411								
		GW35140407								
		GW35140409								
		GW35140501								
		GW35140503								
		GW35140507								
		GW35140509								
4	BMRB35 14	GW35140103	1.5- Polluted points or abandoned industrial areas	4	Supplementary	Investigation / closure of contaminated sites	MTE MIE AMBU	Number of contaminated sites remediated		
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								
		GW35140103								
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								
4	BMRB35 14	GW35140407	1.5- Polluted points or abandoned industrial areas	4	Supplementary	Investigation / closure of contaminated sites	MTE MIE AMBU	Number of contaminated sites remediated		
		GW35140409								
		GW35140501								
		GW35140503								
		GW35140507								
		GW35140509								
		GW35140103								
		GW35140103								
		GW35140401								
		GW35140403								
4	BMRB35 14	GW35140405	1.5- Polluted points or abandoned industrial areas	4	Supplementary	Investigation / closure of contaminated sites	MTE MIE AMBU	Number of contaminated sites remediated		
		GW35140411								
		GW35140407								
		GW35140409								
		GW35140501								
		GW35140503								
		GW35140507								
		GW35140509								
		GW35140103								
		GW35140103								
4	BMRB35 14	GW35140401	1.5- Polluted points or abandoned industrial areas	4	Supplementary	Investigation / closure of contaminated sites	MTE MIE AMBU	Number of contaminated sites remediated		
		GW35140403								
		GW35140405								
		GW35140411								
		GW35140407								
		GW35140409								
		GW35140501								
		GW35140503								
		GW35140507								
		GW35140509								
4	BMRB35 14	GW35140103	3.2 – Extraction or diversion of flow - Public water supply	7	Supplementary	Control over the permits granted and the identification of each location	AMBU AGS	The number of issuance permits with and without conditions		
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								
		GW35140103								
		GW35140103								
		GW35140401								
		GW35140403								
		GW35140405								

No.	Measure Code	Waterbody Code or RB Code	Significant Pressure	KTM	Measure Type	Measure Name	Implementing Authority	KTM Indicator	Indicator value 2024	Indicator value 2029
		GW35140411								
		GW35140407								
		GW35140409								
		GW35140501								
		GW35140503								

**Table 13-9 Summary of the costs and funds for groundwater measures.**

A - Measure BMRV3514-01 Relevant Ministry, Implementing Authority or Operator	Directive or relevant Instrument	Capital or installation costs	Operation and maintenan ce costs	Administratio n Expenses	Resource Costs	Other costs	Σ of Costs€M	Sources of Funds	External grant or loan	Central or agency budget	The budget of the Municipa lity	Funded by the Operator	State Water Fees or Taxes	Other funds	Σ of funds €M	
Improvement and construction of septic tanks and sewers.		1,493,369,000.00 ALL														
Construction of urban wastewater treatment plants  1.Construction of WWTP Kashar  2.Construction of WWTP Kamez		16,703,000,000.00 ALL														
Designation of protection zones (in boreholes and GW sites) related to the control of urban development		242,000,000.00 ALL														
Reduction and improvement of agricultural practices in the use		242,000,000.00 ALL														

of fertilizers and pesticides															
Investigation and closure of contaminated sites		242,000,000.00 ALL													
Control over the permits granted and the identification of each location		24,200,000.00 ALL													
Total costs and funds		<b>18,946,569,000.00</b> ALL													